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Assessing User Satisfaction in E-Haj Systems: Insights from Bangladesh

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Abstract

This study examines how e-haj management systems in Bangladesh affect user satisfaction. Therefore, the authors presented the hypothesis using webQual 4.0 Model. Data was collected using a 5-point-lickert questionnaire. 347 valid data were collected from Dhaka city. SPSS 27 displayed descriptive statistics, and Smart PLS 3.3.3 was analysed for measurement and structural model. The study found the positive impact of the usability, information quality, and service information quality of e-hajj on users' satisfaction. Thus, e-government implementers can get benefits from the findings of the paper as they come to know what factors motivates individuals to use the government's e-haj management portal. This finding also suggested that government should focus on website's easy to navigate option, updated information and 24/7 customer service. As a result, this tendency of the citizens towards e-government services will be increased day by day and motivated to accept these e-hajj system. This research will increase trust and improve the democratic process for all citizens including businesses, or different government agencies by enhancing service quality provided to them. Small sample size, data collection period, and location are the limitations of this study. Future researchers may combine more model's items and reduce these limitations to improve practical application studies.

Keywords: e-haj management systems, Usability, Service interaction quality, portal

1.INTRODUCTION

The usage of information and communication technology, also known as ICT, has brought about a dramatic shift in the technique of working formerly employed by individuals, firms, and governments. Today, governments acknowledge the value of the internet and have made major changes to supply public services online so citizens may always access them from any place and time [1]. So, the Prime Minister

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has launched a program for making Bangladesh digital and wants Bangladesh to be digital by 2021 and knowledge-based known as smart Bangladesh by 2041. [2] defined four pillars such as developing human resource, connecting citizens, making Digital Government and Promotion of ICT Industry to make digital Bangladesh. So most governmental services are provided through online. This concept is called "e-governance".

According to [3] the term "e-government" refers to an umbrella term that incorporates many different types of information and transactions that are supported by electronic means. As a result of the complex nature of its organizational makeup [4], the government offers its services at a variety of different levels, including those for other governments, for private business entrepreneurs, and for general public access [5]. Among all the types, G2C becomes the key way of building e-governance. So, Government-to-citizens service encompasses all government-to-citizen interactions at various levels. Among many G2C services, managing haj for interested citizens are more popular services from government. Because most of the people of Bangladesh are Muslim. Besides the number of hajis are increasing day by day. According to [6] approximately 60,146 (including management members) pilgrims have completed Haj in 2022. Generally speaking, the first person to perform the Haj pilgrimage was the prophet Muhammad. The messenger of Allah, who later evolved into one of Islam's five central figures and principles. Therefore, the pilgrimage known as the Haj must be performed at least once in a person's lifetime if they are of good health and have sufficient financial resources [7], [8], [9].

Haj takes place over five days (8–12) in Zul-hijja, the last month of the Islamic lunar calendar. As a consequence of this, the specific duration of the Haj Period will shift slightly from year to year according to the Gregorian calendar [10]. The ministry of religious affairs controls haji flight, housing, catering, passports and other logistics services [11]. The citizens can get these services directly or by the contacts of agents. Different countries establish different e-haj system for their haji. Through establishing e-governance, the Bangladeshi government has opened a web site namely haj management portal like others countries. By making one portal the government can monitor and manage all the activities of haj for their citizens. This haj management portal managed by government can work like another commercial website. But the proper guidelines to use of these system, lack of integration with other government services and privacy risk are the main reasons to attract pilgrim to use this system so that they feel easy to use traditional methods in this sector. These, this website quality needs to be measured like measuring other e-commerce website quality so that the government can focus.

Various scholars have argued that customer or citizen centricity is essential to the success of these services.[12], [13]. Evaluation by the citizens at large is the most

important criteria for judging any government [14], [15], [16]. However, satisfaction has not been a central concept in studies of e-government. According to research [17], customer satisfaction is one of the least utilized metrics for measuring e-government performance. Haji health concerns [18], [19], [20], [21] ; haj crowd control via technology[22]; haj pilgrims monitoring; and Improvement of an Online System to Manage Haj Pilgrims have all been the focus of prior study [23]. However, academics have paid little attention to whether or not people are happy with the e-haj system. Additionally, WebQual 4.0 model are used here to assess the user satisfaction regarding the use of the e-hajj portal. This is the model that was build from interview with web designers and users. No research directly focuses on the e-government services by using this model. Therefore, its elements are highly related to identify the user satisfaction.

So, the researcher emphasis on the user satisfaction by using haj management system introduced by bd government. The research aims to assess the user satisfaction of the e-hajj management system in developing countries like Bangladesh. The main contribution of this study is to increase trust and improve the democratic process [24] for all citizens including businesses, or different government agencies by enhancing service quality provided to them [25], [26], [27]

2.MATERIALS AND METHOD

2.1 Literature Review

In this sector, some terminology like e-hajj management system, user satisfaction and different models to assess website quality are descripted. In the next section hypotheses are formulated on the basis of the previous basis.

2.1.1 E-Haj Management System

Study by [28] stated that E-haj is a management system for the Haj that assists candidates in performing the ritual from the time they register until the time they return home. Each nation's citizens must follow a distinct set of planned procedures in order to obtain a portion number for the haj activity. The modern electronic Haj has also been adopted by a number of other nations, including Saudi Arabia, Lebanon, and Malaysia, amongst others. Saudi Arabia was an early adopter for technology for the management of haj operations [23]. Information that is important with services on Mecca, such as accommodation and transportation providers, food suppliers, and so on is provided via Saudi Arabia's e-haj applications [29]. A Haj savings account should be established in Malaysia for the purpose of assisting people with the organizational and financial challenges associated with pilgrimages. Their application provides access to a great deal of information, including details about the company itself, which may contain data

and statistics, as well as information regarding investments, deposits, and haj services. In addition to this, the application e-haj Malaysia also provides e-services haj in the form of the following: e-Haj Management System, e-Registration of Haj (For Malaysians Abroad) and e-Haj Personnel [30]. In addition, Bangladesh developed a website known as "Bangladesh Haj management Portal" for the purpose of providing information and knowledge regarding the actual implementation of the pilgrimage, such as the Haj video services, finalized statistical data, lost luggage of pilgrims, and pre-registration [6].

2.1.2 Website Quality for user Satisfaction

A company's website is the main channel of communication between it and its clients in this information era. They can draw users from all over the world to their information and get an advantage over rivals by maintaining a website other [31], [32],[33], [34] stated that it has recently been more prevalent than ever before in every field (business, government, education, entertainment, healthcare, culture, industry, finance, and many others). To make it simpler for stakeholders to obtain information fast and without having to visit the institutions, these sectors therefore invested a great deal of effort into creating a helpful website [35], [36], [37]. Quality is believed to be something that is simple to spot but difficult to pin down and assess. Website quality is distinct from the conventional notion of quality mainly because it is a multidimensional component that takes into account the users' and designers' perspectives [38], [39]. A study by [40] indicated that satisfied customers are more likely to make a purchase after being exposed to a high-quality website, and vice versa. Therefore, it is crucial to establish user-centric quality criteria. The first step in enhancing the services provided by websites is to identify the factors that influence their general level of quality.

2.1.3 Model of Web Quality

According to [41], [42] from the perspective of consumers, the level of service of a website is the most significant aspect in determining the degree of happiness they experience. So, the perceptions of users or visitors to a website are the most important factor considered when evaluating the quality of a website. After that, a particular research instrument or questionnaire is used for the measurement. These instruments or questionnaires have been referred to by a variety of names or models in some earlier studies, including the Servqual, WebQual, WebQual and IS Success Model. The following Table 1 provide the listings of models:

Table 1. Different Framework

Models	Factors	Sources
SERVQUAL	Tangibles, Reliability, Responsiveness, Assurance, and Empathy	[43]
IS Success Model	System Quality, Information Quality, Service Quality	[44]
WebQual 4.0	Usability, Information Quality, Service Interaction Quality	[45], [46]
WebQual™ Model	Usefulness, Ease of Use, Entertainment, Complementary Relationship	[47]

2.2 WebQual 4.0 Model

When it comes to managing public services, the government plays a crucial role in utilizing web-based IS. Customer satisfaction can have a major impact on the success or failure of e-Government Programs in the course of studying citizen-response. The goal of an IS evaluation is to determine whether or not the developed system satisfies the needs and expectations of the user. Consequently, feedback from actual customers can be used in the research. Here, a systematic approach to determining online quality based on end User feedback is presented in the form of the Webqual model, which borrows heavily from the quality function deployment (QFD) methodology. Webqual methodology, as defined by [48], is an evaluation method for gauging website quality using the customers' own words as a benchmark. The Webqual 4.0 methodology is also used to distinguish between users' actual opinions and their desired ones [49]. Webqual has been used in a lot of studies because it is such a reliable metric for gauging the factors that matter to users while shopping on an online store [50], [51], [52], [53], [54] . Usability, Information Quality, and Service Interaction are the three components of the Website Quality Model created by [46]. The following is a description of these three factors:

2.2.1 Usability

Study by [55] defined Usability as the aspects of a website's layout that the user experiences directly, such as its visual appeal, its intuitive operation, its ease of navigating, and its overall presentation. High-Quality Use Encompasses: Simple Instructions, Clear Explanations, a Friendly Interface, Solid Knowledge and Exciting New Experiences.

2.2.2 Information Quality

According to [46] Information quality means the standard of the site's content like correctness, organization, and connections between pieces of data. Information Quality encompasses accurate, dependable, easy-to-understand, thorough, topic-appropriate, and format-designed information.

2.2.3 Service Interaction

Service Interaction is the quality-of-service interactions customers have when they explore deeper sites, manifested with trust and empathy as examples of transaction security and information, product delivery, and site owner communications. [56] defined as the Interaction quality as the ability to provide a sense of security during the interaction, have a good reputation, enable conversation, produce more personal emotional feelings, store user data securely, establish a more specialized community, and deliver on promises.

2.2.4 User Satisfaction

It is important to keep the customer's wants and needs in mind when designing an information system, product, or service. Feedback from users is a crucial factor for management to consider when deciding what features to focus on. Therefore, customer satisfaction is a crucial yardstick for evaluating businesses' effectiveness [57]. It has also become an important part of marketing theory and practice because of the many positive effects it has on businesses and their customers, including the discovery of customer loyalty, the comprehension of company reputation, the facilitation of growth and management [58], the reduction of future transaction costs, and the improvement of employee efficiency and productivity [59]. Increasing product quality leads to happier customers, as was discovered by [60]. When a product or service falls short of expectations, it can lead to dissatisfaction [61]. [62] stated that the degree to which a product meets or falls short of a customer's expectations is directly related to how satisfied or dissatisfied they are with the product. The following hypotheses can be established from above discussion:

H1: Usability has positive impact on user satisfaction.
H2: Information quality has positive impact on user satisfaction.
H3: Service interaction quality has positive impact on user satisfaction

Thus, the model of this study is shown as below in Figure 1:

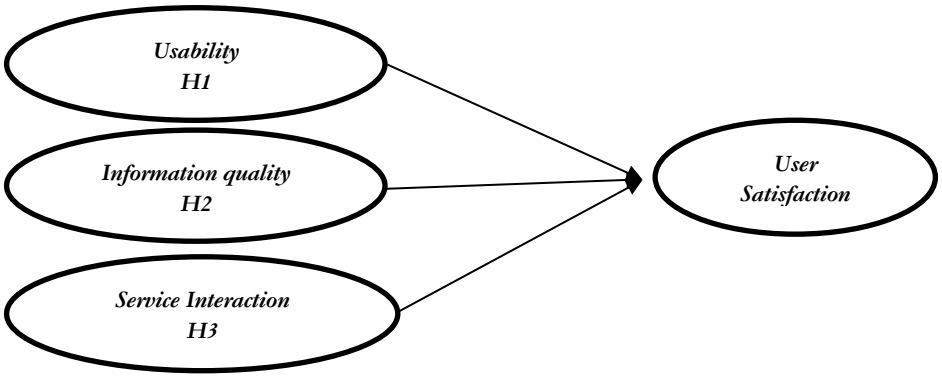

Figure 1. Conceptual Framework

2.3 Methodology

2.3.1 Sampling Method and Sample Size

As we derived some research hypothesis in literature review section in this study, we aim to justify the established hypothesis with quantitative analysis. The base of our analysis is primary data. Here, purposive sampling technique are used to complete this study. Most of the respondents are from Dhaka and Rangpur city in Bangladesh. For this purpose, the researchers collected only 25 data from the user of e-haj management systems and 10 academia in Bangladesh. We have done a pilot test with this data to identify whether the items serve our research purpose or not that helped to use appropriate questionnaire. We modified few items to indicate the purpose of this study by getting the feedback from the pilot testing. Our research questions were proved as good validity and reliability. Our further step of this study was to set the sample size of data collection. We found our satisfactory sample size [63] from the formula given below.

$$n= N * [Z2 * p * (1-p)/e2] / [N – 1 + (Z2 * p * (1-p)/e2];$$

where,
N = Population size,
Z = Critical value of the normal distribution at the required confidence level,
p = Sample proportion,
e = Margin of error

For our analysis we set a margin of error or 8% and 90% confidence level. We got the sample size that was fit for our study was 295. We distributed 400 questionnaires based on convenience sampling method [64] as we thought about 10-15% would be missing or invalid for various reasons. Before distributing questionnaires, we trained our data collectors how to conduct with the respondents. We also declared at the beginning of our questionnaires that this

survey was only for academic purpose and no identity of respondents would be disclosed.

2.3.2Collection of Data

Our survey questionnaires were divided into two parts. One of the parts is demographic information and the other part deals with direct research questions. The research questions were broadly categorized as four segments. Segment one (Usability) has six questions, segment two (Information quality) has seven questions, segment three (Service interaction quality) contains six questions and final section contains four questions. For measuring weight of the items (questions) we used five-point Likert-type scale [65] using strongly disagree (1) to strongly agree (5). The total collected respondents are 389 responses for the survey and among them 347 data were valid for analysis. Our data collection time period was January-March, 2024. All the response were collected through online or face to face interview.

2.3.3 Statistical Analysis

We conducted our analysis in two phases. First, we analysed our data by SPSS 27. for getting descriptive statistics for the questionnaires. Secondly, Structural Equation Modelling (SEM) is used to define the relationship between independent and dependent variables. Here, the researcher used Smart PLS 3.3.3 for analysis of relationships established in our theoretical model. Smart PLS 3.3.3 [66] was used to estimate the parameters along with bootstrapping of 347 sample for identifying the significance of the parameters. We verified the necessary condition of reliability, convergent validity and discriminant validity before testing the structural relationships in the theoretical model. For this purpose, Cronbach's Alpha [67] was used for checking the reliability of the latent variables and the acceptance value is equal or greater 0.7. Convergent validity is determined by using composite reliability (CR), average variance extracted (AVE), factor loading. The accepted value of composite reliability and factor loading is equal or greater 0.7 and variance extracted equal or greater than 0.5 [68]. The above three indicators satisfied the mentioned condition for analysis as all the three indicators exceeds 0.7. To demonstrate convergent validity, we employed SmartPLS. The results indicated that all item loadings were significant ($p < 0.01$), with standardized loadings exceeding 0.7 [69]. Additionally, the average loadings were above 0.7 [70].

3.RESULTS AND DISCUSSION

3.1 Descriptive Statistics

As we said earlier that we collected total 389 survey data but form their only 347 data were valid. Invalid responses were removed thus 89.20% was the valid response rate. We can see the table 2 where demographic responses were presented. Most of the respondents are from business profession and then retired persons took the second position. The lowest respondents are students and it is very predetermined as students in our country have no earning source to go for a haj. Service holders are also doing haj and they are only 15.80% from our respondents. Form the table below we see that most of the respondents are from age range between 40-49 (39.50%) and the lowest respondents belong to 20-29 age range that is 6.90%. The senior citizens responded to our survey and they occupied 27.80% that is second highest respondents of our survey. We also noticed that our data collection covers 32% female and 68% male. As we know that in our country the male goes for haj more than the female. In this survey we found that 83.50% are married respondents where only 16.50% were unmarried or single respondents.

Table 2. Demographic Information (Total N=347)

Category	variables	Frequency (N)	percentage (%)
Profession	Student	31	8.94
	Service	55	15.80
	Business	121	34.8
	Retired	103	29.60
	Others	37	10.86
Age	20-29	24	6.90
	30-39	67	19.30
	40-49	137	39.50
	50-59	119	27.80
	60 and above		
Gender	Male	201	68
	Female	146	32
Marital Status	Single	57	16.50
	Married	290	83.50

3.2 Measurement Model Testing

Composite Reliability (CR), Average Variance Extracted (AVE), and Cronbach's Alpha are employed to assess whether the items adequately represent the proposed dimensions, indicating the internal consistency of the model. As per [67], [68], Cronbach's Alpha values range from 0.819 to 0.901, while Composite Reliability (CR) values range from 0.782 to 0.900. Table 2 demonstrates that all values fall within the acceptable range. Specifically, the Average Variance Extracted (AVE) values range from 0.531 to 0.791, which are above the threshold of 0.5, indicating acceptability [68]. Cronbach's Alpha [67] was used to assess the reliability of latent variables, with an acceptance criterion of 0.7 or higher. Convergent validity was evaluated using Composite Reliability (CR), Average Variance Extracted (AVE), and factor loadings. The accepted thresholds are CR and factor loadings of 0.7 or higher and AVE of 0.5 or higher [68]. Table 3 further highlights that the factor loadings are sufficiently significant for the analysis [70].

Table 3. Values of Factor Loading, Cronbach's Alpha, Composite Reliability and Average Variance Extracted

Variables	Items	Factor Loading	Cronbach's Alpha (a)	Composite Reliability (CR)	Average Variance Extracted (AVE)
Usability	U1	0.819	0.852	0.900	0.693
	U2	0.766			
	U3	0.892			
	U4	0.835			
	U5	0.832			
	U6	0.814			
Information Quality	INF1	0.849	0.819	0.888	0.791
	INF2	0.826			
	INF3	0.873			
	INF4	0.812			
	INF5	0.887			
	INF6	0.889			
	INF7	0.823			

Variables	Items	Factor Loading	Cronbach's Alpha (a)	Composite Reliability (CR)	Average Variance Extracted (AVE)
Service Interaction Quality	SRQ1	0.734	0.901	0.922	0.630
	SRQ2	0.830			
	SRQ3	0.869			
	SRQ4	0.788			
	SRQ5	0.835			
	SRQ6	0.785			
User Satisfaction	SAT1	0.701	0.850	0.782	0.531
	SAT2	0.789			
	SAT3	0.711			
	SAT4	0.753			

For confirming the discriminant validity shown in Table 4, a correlation between construct was tested and it was justified that Average Variance Extracted (AVE) for each of the item was greater than the square of the correlation between that item and any other [68].

Table 4. Discriminant validity

Variables	Information Quality	Service Interaction Quality	Usability	User Satisfaction
Information Quality	0.796			
Service Interaction Quality	0.344	0.889		
Usability	0.274	0.237	0.915	
User Satisfaction	0.189	0.212	0.539	0.794

3.3 Structural Model

It is shown in Table 5 that all our proposed hypotheses are supported. We can see that H1 was justified with the external characteristics of user's satisfaction of e-Haj management system in bd and it has positive influence on Usability. The beta value of H1 is 0.378, T-statistics is 5.275 and P-values is 0.000 those indicate the H1 is supported as all the mentioned values are in accepted range [68]. From table 4 we see that the relationship between Usability (U) and User satisfaction (SAT) is very significant. That means the users satisfaction much more depends on website usability of e-haj management systems.

Table 5. Testing results of Hypothesis

Hypothesis	Relation	Beta	T-statistics	P-Values	Results
H1	U>SAT	0.378	5.275	0.000	Yes
H2	INF>SAT	0.573	8.340	0.000	Yes
H3	SRQ>SAT	0.450	5.244	0.011	Yes

Notes: U=Usability; INF=Information Quality; SRQ= Service Interaction Quality and SAT= User Satisfaction

According to table 4 our proposed H2 is also supported as the Beta, T-statistics and P-values are respectively 0.573, 8.340, 0.000. These values denote that all the values are in accepted range [68]. Based on the findings, it can be concluded that the relationship between Information Quality and User Satisfaction is both strong and significant. User satisfaction largely relies on the information quality provided by the e-Haj management system's website. Furthermore, Service Interaction Quality shows a positive association with user satisfaction regarding the e-Haj management system (H3) in our country. This is supported by the Beta value (0.450), T-statistic (5.244), and p-value (0.011), which collectively confirm the hypothesis.

3.4 Discussion

In our study we proposed three hypothesizes based on the previous study. Our results showed that usability (H1) has the positive relation with users' satisfaction of using any website. This result supports the study of [35], [36], [37]. Their study found that people will visit the website if they find it useful to their life and daily activity. Our results also proved that websites visitors use the website frequently if the information is usable and convenient to find and it's easy to navigate the information.

Our second hypothesis Information quality (H2) is strongly linked to user's satisfaction. It means if the information quality is up-to the mark, users become satisfied using a certain website/portal. Our results also same as the study results of [40]). His study reveals that satisfied customers are more likely to make a purchase after being exposed to a high-quality website, and vice versa. Therefore, it is crucial to establish user-centric quality criteria. In order to improve the services offered by websites, it is necessary to first isolate the aspects that contribute to their overall quality. Our result from the analysis also proved the same thing as [40]).

According to the result our third hypothesis Service interaction quality (H3) has positive impact on users' satisfaction using govt haj management portal. This result is same as [56]. Their defined as the Interaction quality as the ability to provide a sense of security during the interaction, have a good reputation, enable conversation, produce more personal emotional feelings, store user data securely, establish a more specialized community, and deliver on promises. From the above discussion it is noticed that users' satisfaction using a portal/website depends on usability, information quality and service interaction quality according to the WebQual 4 Model [46]. Our survey results showed that there is a strong connection of users' satisfaction with the three factors of this model. So, government should emphasis more on this factor to make the haj management portal more usable and secured place for the website visitors so that after using the website the users feel it is valuable and real-time information hub for them. If it fulfils these, the users become satisfied using this site. 5.

3.5 Theoretical and Practical Implication

This paper purpose was to identify the factors that affect the users' satisfaction using haj management portal in Bangladesh. For this purpose, we use the WebQual 4.0 model to justify our proposed hypothesis. For our analysis we see that all the proposed hypothesis was supported. This implies that user satisfaction is primarily influenced by the website's usability, information quality, and service interaction quality. This paper contributes in the theoretical implication by implementing webqual 4.0 model in any government services.

The key contribution of this study lies in identifying the most impactful factors affecting user satisfaction, which can help e-Government strategists, practitioners, developers, and policymakers focus on the critical drivers of satisfaction in the context of Bangladesh's Haj management system. If this website can maintain enough quality for the user, user can easily trust this website and their satisfaction will also be increasing day by day. . This finding can be implemented to other e-government services like e-passport or e-procurement etc. As a result, individuals will have a more favourable impression of and attitude toward e-Government.

Since many nations in the MENA region share commonalities in terms of ICT competence, culture, and political systems, the study's findings should prove useful to those operating in this sector.

4. CONCLUSION

This study focuses the importance of user's satisfaction as it is directly and positively connected to Bangladesh haj management portal's usability, information quality and service interaction quality.The paper has found the positive relationship between portal's usability, information quality and service interaction quality on the user satisfactions. Every year a certain number of people go for haj from our country. They prepare themselves for going to haj before one or two years. They seek various information to people and visit website for getting valid information regarding haj. So, if the website visitors get proper information and service regarding haj, they will frequently visit website and will be less dependent to others who spread false information and charge them for providing information those are furnished in govt website. From our analysis, it is clear and significant that usability, information quality and service interaction quality all have positive relation with users' satisfaction regarding using the Bangladesh haj management portal.

We collect 347 valid data for analysis and it is standard but not enough to represent all the population. Now from the above limitations we suggest the future researchers to collect more data for this type of study. We collect data during three-month time period and it is very short duration for data collection. Future researchers have the opportunity to collect data in a long time from different regions or other geographic location. We did not focus any region from where people access website information so we cannot say anything regarding which region's people visit Bangladesh haj management portal most. This result can be analzed other statistical model like regression analysis. We did not mention any literacy level of respondents so it is our limitations to say which type of people visit this portal most how they interact with this. We proposed our hypothesis based on WebQual 4.0 model only. They may include literacy level item in demographic sector. Future researchers may combine WebQual model with IS Success Model and WebQualTM Model so that they get more exciting results from analysis and can add new variable like trust or loyalty in this model.

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