Integration of service quality, benchmarking and Ishikawa diagram in service operations

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Abstract
This paper aims to explore the integration of Service Quality (SERVQUAL) and two specific Total Quality Management (TQM) techniques - benchmarking and Ishikawa diagram - to improve quality in the service industry, particularly in the hospitality industry. The survey was administered to respondents at one five-star hotel in Bandung City, Indonesia. Benchmarking was conducted to compare this hotel to two other hotels at similar levels and within geographical proximity. Ishikawa analysis was then performed to analyze potential causes. The results of the study identified eleven negative score attributes (out of twenty-one) from SERVQUAL, which was in line with the benchmarking results. The Ishikawa diagram showed the root causes of these attributes and helped with developing ideas for practical quality improvements in the future. Most studies in the hospitality industry have examined SERVQUAL and TQM separately. Our study contributes uniquely to the existing literature by providing insight into the combination of SERVQUAL and two TQM specific tools to improve quality operations in a hospitality setting.

Keywords: Service quality; benchmarking; Ishikawa diagram; hospitality; operations management.

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INTRODUCTION

The importance of the service industry to the global economy is widely acknowledged. In some economies, the service industry contributes to more than 70 percent of GDP with highly innovative and intense competition characteristics (OECD, 2012). The service industry which featured by the high level of interactions, now substantially changed primarily because of advancements in information technology (Ostrom et al., 2015). This development growingly increasing competition intensity...
including in the hospitality industry. The hospitality industry is business provides accommodation, meals, and drinks outside of the home (Oxford Economics, 2015). The hospitality industry is currently highly challenging with intense competition and greater demands from the customer (Llach et al., 2016; Zaibaf et al., 2013). These circumstances suggesting high-quality service as a necessity and adoption of quality management practices become commonplace in the industry.

Service quality is the central means to provide high-quality service for long-term success in the hospitality industry (Testa & Sipe, 2012). To provide high-quality service, among many approaches available, SERVQUAL and total quality management (TQM) has received great attention from both practitioners and academics. SERVQUAL, as attribute-based methods measure the perceived service quality. TQM which received increased awareness especially in the last two decades has achieved notable success in manufacturing, and applicable in the service industry, in particular in hospitality (Talib et al., 2011). Most studies in the hospitality industry have examined these two approaches separately (Dedeoğlu & Demirer, 2015; Markovic & Raspor, 2010; Wang et al., 2012).

We are interested in combining SERVQUAL and TQM tools in the hospitality industry, particularly in a hotel setting. Past researchers have integrated SERVQUAL and TQM tools such as benchmarking, for example as Min & Min (2015) when analyzing the aviation industry in the US. This study seeks to implement SERVQUAL and two specific tools of TQM - benchmarking and Ishikawa diagram- in a large 5-star hotel in Bandung city, Indonesia (Hotel H). Bandung is the third-largest city in Indonesia and known as Paris van Java for its fashion and culinary attractiveness. Specifically, the research questions proposed are: a) How do customer satisfaction at hotel H? b) How do Hotel H performance compare with competitors? and c) How to improve Hotel H’s performance? We use SERVQUAL to address the first research question. Then we use benchmarking with two other 5-star hotels in the same geographical location to address the second research question. Finally, we use the Ishikawa diagram to address the third research question. A contribution of our study to the existing literature provides insight into the form of combination SERVQUAL and two TQM specific tools to improve operations in a hospitality setting.

Service, typically have unique characteristics in which high involvement of customer required in the process of simultaneous production and consumption (Harsanto, 2013; Prasetyo & Harsanto, 2019). In service, quality is a necessary condition for survival and growth in the competitive environment remembering its nature of the high level of interaction (Ostrom et al., 2015). Likewise in the hospitality industry as part of the service industry, service quality is increasingly crucial and is a key for customer retention as a well competitive advantage (Yang et al., 2011). Hospitality industry based on Standard Industrial Classification (SIC) including sub-sector of the hotel (code 5510 to 5590), restaurant (code 56101 to 56302), catering (5621 and 5629), event management (8230), and all (7810 and 7820) (Oxford Economics, 2015).

Prior research indicated that discussions about service quality in the hospitality industry mainly focused on the relationship between quality management practices and its impact on performance (Alonso-Almeida et al., 2012; Llach et al., 2016). Operations performance is achieved through cost optimization such as better preventive and coercive maintenance, reduce the cost of energy (electricity, water, fuel), optimize inventory cost
which these things at the same time are also increasing revenue (Pereira-Moliner & Tari, 2015). Employee performance including improvement in the team working and internal processes learning in general (Rubio-Andrada et al., 2011). Customer satisfaction impacted due to improvement in the product or service quality (Testa & Sipe, 2012), and service quality is the antecedent of customer satisfaction. Llach et al. (2016) reported findings that service quality has a strong positive relationship with customer satisfaction. It is also related to the repurchase intention of the customers (Sari et al., 2020). In the hospitality industry, it is highly important to increase revisiting intention (Ayunisa, 2018). Many determinants lead to the successful implementation of quality management practices, among the most important are top management's commitment and significant investment in the form of organizational resources (Ilyasa et al., 2016; Ostrov et al., 2015; Talib et al., 2011).

Three critical factors mainly encouraging the commitment of management encompass consumer-focused behavior, stakeholder relationships, and service quality measurement (Llach et al., 2016). Service quality is not easy to measure because its nature is relatively abstract (Zeithaml et al., 1990). There are many debates on the concept of service quality with many authors emphasizes how service quality perceived by customers dan how it can be measured (Stauss & Weinlich, 1997). There are many measurements of service quality that can categorize into incident-based or attribute-based (Stauss & Weinlich, 1997). The incident-based focused on the incidents experienced by consumers and attribute-based methods exist in wider variants (Akbaba, 2006). Service quality discussion deals with the perceived service quality since the concept mostly constructed in marketing literature. Perceived service quality is a comparison between customer expectation and their perception of service received from the firms (Zeithaml et al., 1990). From the time perspective, service quality has a role not only on pre and during service, but also post-service (Bakar et al., 2020).

Among the most popular measurement is SERVQUAL, which measuring perception of the consumer using a multiple-item scale which divided into five service quality dimensions of tangibles, reliability, responsiveness, assurance, and empathy (Parasuraman et al., 1985). Despite any criticisms, the use of this measurement continues to attract both academics and practitioners. This measurement has applied in various service industries such as restaurants or hotels. In this study, Markovic and Raspor's (2010) instrument is used since it based on original SERVQUAL and modified to suit hospitality and hotel settings.

Total Quality Management (TQM) importance continues to increase over the years both academically or practically (Tarí & Sabater, 2004). TQM can categorize into two namely management system (such as leadership) and technical system (tools and technique). As service quality, TQM is antecedents elements for firm performance. Tarí & Sabater (2004) identified the twelve most popular TQM’s tool and technique, where two of them are benchmarking, and Ishikawa diagram (or cause and effect diagram). Benchmarking is the search for best practices in the industry for continuous improvement to reach superior performance.

A recent review on benchmarking from Castro and Frazzon (2017) revealed that benchmarking related with the concept of total quality management (TQM) and major areas in this research field divided into two perspectives first is from the managerial
perspectives, and second from mathematical modeling in relation with data envelopment analysis technique. Benchmarking, both internal within firms and external to other firms, often provide firms with a great idea to improve their processes to pinpoint critical factors for success in the market. From the managerial perspectives, Castro and Frazzon (2017) suggest that main approach to perform benchmarking is comparing unit or organization with best practices (competitor or not) and then implement the critical success factor within the organization to support continuous improvement (Azis & Harsanto, 2012; Castro & Frazzon, 2017).

Ishikawa diagram is also known as the cause and effect diagram or fishbone diagram (Ishikawa, 1985). It developed by Kaoru Ishikawa who became one of the main contributors to quality management theory (Tarí & Sabater, 2004). It is popular as a fishbone diagram because of the shape. The main problem represented by ‘fish head’, and the potential causes which usually obtained from brainstorming or research represented by the ‘fish bones’ (Wong, 2011). Figure 1 shows the conceptual framework.

![Conceptual Framework](image_url)

**METHOD**

This study consists of three steps. The first step is a survey using a questionnaire. The measurement is using instruments adapted from Markovic & Raspor (2010) since it reflects SERVQUAL original dimensions (Parasuraman, Zeithaml, & Berry, 1985) with an alteration to the specific hospitality and hotel settings. In this study, the item to a small degree modified to suit Indonesia setting (Prayudha & Harsanto, 2014).

The survey was administered to a sample of 100 respondents at one 5-star hotel (hotel H) in Bandung City, Indonesia. We use convenience sampling. Respondents are selected based on their availability and willingness to respond. Questionnaires filled by guests who have stayed at the hotel H. Respondents were asked to answer the questionnaire using a Likert scale with 5 indicating very high and 1 indicating very low.

Table 1 shows the dimensions and attributes used in the survey.

The second and third step is using two specific tools of TQM namely benchmarking and Ishikawa diagram. For benchmarking, we use managerial perspective
approach (Castro & Frazzon, 2017) which compare organization with other organizations to support better performance. Benchmarking also conducted to confirm the result of the first step. We select two other 5-stars hotels in Bandung based on their similar star-level and geographical proximity. Sources of data obtained from review results at online hotel reservation site Agoda with review using 1-10 scale (worst to best). When we collect data from the Agoda website (early 2014), the number of reviewers who gave a rating for Hotel H is 2123 reviews, and two other hotels are 989, 748 reviews respectively. So, there are a large number of reviews. Agoda is an online platform company that provides reservation service hotel or resort property online that is focused primarily on the Asia Pacific region, with operational bases located in Thailand, Singapore, Philippines, and Indonesia. The company established in 1998. The data from the site is relevant enough to be used as a data source. From many different types of benchmarking, benchmarking used in this study is performance benchmarking, which is a performance comparison in different operations.

| Dimensions | Indicators |
|------------|------------|
| **Tangible** | The physical facilities at the hotel are visually appealing (T1)  
The hotel has modern-looking equipment  
Materials associated with the service (forms, bills, seating arrangement) are visually appealing at this hotel (T3)  
The hotel building is well maintained, neat and clean (T4)  
The hotel decor has elements of Indonesia (T5)  
Room signage is clear and relatively easy to find a room (T6) |
| **Reliability** | When the hotel promises to do something by a certain time, it does so (R1)  
The hotel performs the service right the first time (R2)  
The hotel provides the service at the time it promises to do so (R3)  
The hotel insists on error-free records (R4)  
Free Pollution (R5) |
| **Responsiveness** | Employees of the hotel tell the customers exactly when services will be performed (Rs1)  
Employees of the hotel give prompt service to the customers (Rs2)  
Employees of the hotel are never too busy to respond to customers’ requests (Rs3) |
| **Assurance** | Customers of the hotel feel safe in transactions (A1)  
Employees of the hotel have the knowledge to answer the customers’ questions (A2) |
| **Empathy** | Employees of the hotel are consistently courteous with the customers (A3)  
The hotel gives the customers individual attention (E1)  
Employees of the hotel understand the specific needs of their customers (E2)  
The hotel has its customers’ best interest at heart (E3) |
The hotel has operating hours convenient to all its customers (E4).

Note: P = Performance; E = Expectation
Source: Parasuraman, Zeithaml, & Berry (1985); Markovic and Raspor (2010)

The Ishikawa diagram then developed through a semi-structured interview with the hotel H senior manager as well as direct observation of the site. Interview conducted to elaborate survey results and identifying key causes of the negative gaps. The interview also conducted in early 2014. In the Ishikawa diagram, the ‘fish head’ as the main problem based on the negative gaps between the prior steps and the ‘fish bones’ as potential causes (Wong, 2011).

RESULTS AND DISCUSSION

Results

Out of 100 respondents, most respondents aged 41 to 50 (43%), followed by age 31 to 40 (42%). Respondents are dominantly male (88%). Most of the respondents are an employee in private enterprises (37%) followed by the civil servant (33%). The majority of respondents stay for work or business (53%), followed by leisure (39%). Respondents’ monthly income is in the range IDR 6 million to 8 million (47%) and IDR 3 million to 6 million (44%). It is categorized as middle income in Indonesia. The respondents know the hotel mostly from friends and family (59%), followed by internet (31%).

The first step of a study conducted using the SERVQUAL model involving five dimensions of service quality: tangible, reliability, responsiveness, assurance, and empathy. Validity test using Spearman rank resulting in all items confirmed valid ($\geq 0.300$), and reliability test using Cronbach Alpha gives a high result of 0.795 for expectation and 0.934 for performance which means it meets reliability test. Recapitulation of gaps between performance and expectation in all dimensions appeared in Table 2.

Recapitulation of gaps score.

| Dimensions      | Attributes with Positive score | Attributes with Negative score |
|-----------------|-------------------------------|-------------------------------|
| Tangible (T)    | T2=0.50, T3=0.06, T5=0.16    | T1=-0.04, T4=-0.23, TT6=-0.30|
| Reliability (R) | R1=0.24, R4=0.11             | R2=0.01, R3=-0.55, R5=-0.44  |
| Responsiveness (Rs) | Rs1=0.33                     | Rs2=-0.52, Rs3=-0.25         |
| Assurance (A)   | A1=0.07, A3=0.19             |                               |
| Empathy (E)     | E4=0.09                       | A2=-0.49                     |

Note: Gap score calculated using formula $(P)-(E)$. $P$=performance mean, $E$=Expecation mean; $N=100$. 

Table 2
Recapitulation of gaps score
To confirm the result of the survey, we then conduct benchmarking. We look for best practices, based on similar star level and geographical proximity. We found Hotel B1 and B2 matched these criteria. Hotel H, Hotel B1 & Hotel B2, these all three hotels are a 5-stars hotel and within walking distance each other. So, this led to intense competition between the three hotels. Also, the location of these three hotels is close to the city center. Based on the above information, a slight difference in quality could affect the choice of customers’ decisions. We group indicator with the negative score gaps into three groups as available at Agoda website: a) service level, b) condition and cleanliness, and c) room comfort (see Error! Reference source not found.). There is a large number of reviews for these three hotels as mentioned in the method section. Attributes of R3, Rs2, Rs3, A2, E1, E2, and E3 are in service level group; attributes T1, T4, and T6 are in condition and cleanliness group, and attributes of T1 and R5 are in-room comfort group.

Note: H= Hotel H, B1=Hotel Benchmark 1, B2=Hotel Benchmark 2 (scale 1-10)

Figure 2
Benchmarking

Discussion
Then we analyze potential causes that bring negative gaps from the survey results using the Ishikawa diagram, through an interview with the hotel H senior manager and direct observation. For tangible dimensions (see Figure 3

Ishikawa diagram for tangible), negative gaps are existing on physical facilities (T1), hotel building neatness and cleanliness (T4), and room signage (T6). Considering the tangible dimension represents the symbolic value of services provided by the hotel, it is indispensable for Hotel H to improve this aspect. Some of the causes of the negative sub T1 variables derived from the lack of budget management for updating older equipment. Also, the influence of the old building affects consumers’ assessment of the physical appearance of the hotel. Even though hotel H has a new building as an extension, but the old buildings are still used and become an anchor. Some corners of the room that renovated look dirty because of renovation. For indicator T4, some causes are not much different from the indicator T1. In addition to the shortage of personnel hygiene section also believed to be one cause. As for the indicator T6, some of the causes is the lack of information about the room signage. Also, the number of elevators (only available two) complained of by some customers having to wait long enough to use the lift.
On the reliability dimension (see Figure 3), the negative gaps exist on R3 (provides the service at the time it promises to do so) and R5 (free pollution). On the one hand, internal coordination perceived as slow. On the other hand, from the guests’ side, sometimes they also less clear in presenting complaints. For indicator R5, some causes are a renovation, so dust and dirt are often seen. Besides, noise pollution also generated from the location of the located next to highways and railroads that sometimes interfere with comfort. Additionally, it also because the air filter is not functioning optimally.
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Figure 4
Ishikawa diagram for reliability

On the dimension of responsiveness (see Figure 5 Ishikawa diagram for responsiveness), the negative gaps exist on Rs2 (prompt service to the customers) and Rs3 (employees are never too busy to respond to customers’ requests). That lack of discipline, and a sense of empathy from staff. SOP is also sometimes colliding inhibit the delivery of services to customers.

Figure 5
Ishikawa diagram for responsiveness

On the assurance dimension (see Error! Not a valid bookmark self-reference.), the negative gaps exist on A2 (knowledge to answer the customers’ questions). Some of the causes of this are the lack of knowledge about the hotel. Often when visitors ask about the hotel employees, but employees do not know the answer and should throw it to the other employees. Also, visitors from abroad often difficulties when asked but employees lack an understanding of what they are saying. Knowledge of the city also sometimes questioned when visitors ask about the city of Bandung where employees do not have sufficient knowledge to answer it.

Figure 6
Ishikawa diagram for assurance

On the dimension of empathy (see Error! Reference source not found.), the negative gaps exist on E1 (individual attention), E2 (understand the specific needs of their customers), and E3 (customers’ best interest at heart). That lack of empathy staff to
customers, often the language problem is also an obstacle in providing the best service because the visitors not only from within the country but also from abroad.

Figure 7
Ishikawa diagram for empathy

This subsection discusses the findings presented in the previous subsection. Each dimension in SERVQUAL and its gaps (Table 2) is discussed one by one starting from tangible, reliability, responsiveness, assurance, and empathy. After that, the results of benchmarking (Figure 2) and Ishikawa diagram results are (Figure 3 to 7) discussed.

Tangible dimension in SERVQUAL related to the physical building, facilities, equipment, employees, and other things in the hotel in the eyes of guests. Half the tangible dimension has a positive gap, and a half has negative. Respondents assessed the aspects of modern-looking equipment, service materials, and Indonesian elements had met their expectations. Three aspects that have not met respondents’ expectations. The highest negative gap is related to room signage (T6), followed by the neatness and cleanliness of the hotel building (T4), and the physical facilities in general (T1). Even though the tangible dimension itself cannot give superior service to the customer and considered less significant than other dimensions, Hotel X seems to need to pay more attention to this dimension. It is considering that half the attributes measured did not match the expectations of the respondents.
The reliability dimension describes the ability to deliver the promised services accurately and reliably. From five attributes, two are scored negative gaps by customers: the hotel provides the service at the time it promises to do so (R3) and free pollution (R5). Reliability is a crucial dimension considering some studies found reliability is the most important factor determining customer satisfaction and overall service quality of the hotel mainly derived from this dimension. The responsiveness dimension illustrates the willingness to help customers and provide services immediately. Two of the three indicators scored negative gaps by respondents. The highest negative gap is promptness (Rs2) and busyness when responding to customers’ requests (Rs3). Responsiveness is the result of highly empowerment front-line staff in the hotel so the guests can enjoy nimble and smooth services.

Assurance dimension provides an overview of the knowledge, friendliness, and the ability of employees to cause consumer confidence and trust in the company. In this study, there are three service attributes in the assurance dimension. Indicator employees of the hotel have the knowledge to answer the customers’ questions (A2) is still worth negative which means the performance is still considered less by customers. Since this dimension closely related to guests’ trust and confidence in the hotel, the aspect of employee’s ability -especially front-line staff- to answer guests’ questions requires attention from hotel management. Empathy dimension reflects a willingness to care and give personal attention to the consumer so that the consumer felt important and understood by the company. In this study, there are four service attributes in the empathy dimension. Three of the four indicators scored negative by the respondents. The highest negative gap is related to individual attention for the guests (E1), followed by specific needs understanding (E2), and best interest at heart (E3). Individual attention (E1) gap, along with the provides service at the time it promises to do so (R3) in the reliability dimension, both have the highest negative gap score compared to other negative gaps. Although in many studies, the dimension of empathy is not the most important, a previous study shows that empathy has a positive effect on brand awareness, which affects the overall customer satisfaction (O’Neill & Mattila, 2010).

Next, the benchmarking analysis performed to follow up on the SERVQUAL gap analysis. Our approach in this benchmarking analysis is using managerial perspectives, and not mathematical modeling (Castro & Frazzon, 2017). The service level of the hotel H still rated lower than the two other hotels by the reviewers. Some reviewers still complained about the slow pace of coordination between the receptionist and manager. Also, some facilities are less functioning properly. Such as air conditioner and hot water is not working. Regarding hotel condition or cleanliness, hotel H is still less than two other hotels. As a note, when this study performed, hotel H is in the renovation process, so it is understandable if it also affects the hotel cleanliness.

However, unlike one Hotel B1 which is a new building, the Hotel H and Hotel B2 are an old building. But the condition and cleanliness of Hotel B2 still considered better than hotel H. It should be noted that the condition and cleanliness of the hotel building will greatly affect the comfort of the hotel customers’ stay. Regarding room comfort, hotel H still perceived less comfort than two other hotels. Most of the reviewers say that the room in hotel H was clean and comfortable although some reviewers complained of sleeping equipment such as pillows, bolsters, and bed linen was less clean. However, the
Hotel H location is close to the railroad tracks. When the train passes, the sound from the train quite noisy and disruptive customer convenience. These benchmarking results demonstrated alignment with the survey result which all negative score gaps in SERVQUAL are evident lower when compared to the two closest competitors. These results expected to provide insight into Hotel H to identify and overcome critical success factor barriers for more success in the market.

Finally, the Ishikawa diagram conducted to identify key causes of the negative gaps in each SERVQUAL dimensions. In the tangible dimension, Hotel H must evaluate the tangible dimension carefully. The environmental factors mainly caused by the renovation project, and it should be not a problem. Hotel H is expected to complete this project on time so that guests can enjoy the comfort condition fully again. For an old building, it should be an advantage of the historical and heritage side, not a disadvantage. Hotel H’s management can consult with the architect, building expert, as well historian to turn these disadvantages to advantages.

Regarding reliability, this dimension by some researchers found as a key dimension of guests’ satisfaction. Consequently, various factors causing it to need awareness from hotel H management. Lack of training to foster a sense of discipline and empathy also affect the behavior of staff towards customers. Then related to assurance, the lack of staff training programs is also influential. Employee knowledge is one of the important factors determining to guests’ satisfaction, which contribute to the quality reputation, value for money, as well as prestige. For the empathy dimension, Akbaba’s (2006) findings indicated that understanding as well caring which part of empathy is one of the most critical dimensions along with the tangible dimension. Overall, considering the survey results, as well as benchmarking and Ishikawa which developed through interview and direct observation, there arise some improvement ideas as seen in Table 3.
The recurring idea of improvement mainly revolves around aspects of human resources and renovations that are being undertaken by Hotel H. In regards to the aspect of human resources (management and staff), in the hotel, human resources practices directly influence guest perception on service quality. Therefore, Hotel H needs to prioritize improvement in this aspect since it has a multi-dimensional impact. For the renovation process, the focus is on ensuring the project runs on time and accelerate it whenever possible.

**CONCLUSION**

Using five dimensions of SERVQUAL and modified to Indonesia setting, we identify eleven negative score gaps from the survey. Benchmarking conducted with two other competitor hotels with similar geographical locations and star levels. The benchmarking results are in line with the survey findings where the performance of Hotel H in all attributes with negative gaps in general below both competitors. The Ishikawa diagram shows the root causes of attributes with poor performance which then helps in developing ideas for practical improvement in the future. This study contributes to the
advancement of service quality in hospitality operations by combining SERVQUAL with two TQM tools -benchmarking and Ishikawa diagram- in the hospitality operations. Our research contributes by providing insight into the combination of SERVQUAL and two TQM-specific methods to enhance performance operations in a hospitality environment. Practically, this study can help practitioners in the service industry to use the combination of SERVQUAL tools and TQM to help identify priority improvements for their services.

We acknowledge some limitations and future directions. First, because it is not easy to establish contact with guests before and after visiting the hotel, we did not make before and after approaches in data collection and analysis. This is not ideal, considering that some literature argues that the perception of expectations and performance cannot be measured at the same time. Future studies can address this issue by taking a before and after approach so that the measurement of expectations and performance can be more accurate (Ali et al., 2018). Second, convenient data collection can result in a limited level of generalizability. This sampling technique, where we focused on the availability and willingness of respondents to fill out the questionnaire at the time of data collection, was taken for reasons of practicality. To increase representativeness and generalizability, future studies can use probability sampling techniques by establishing access to the hotel's list of guests while maintaining their confidentiality (Sarstedt et al., 2018). Third, data collection is one time, not longitudinal. Future research can collect data at more than a one-time point and analyze it longitudinally. Finally, this study is conducted in the Indonesian context, so its applicability is limited to that context. However, the results can be relevant as long as the characteristics are similar. Further studies can be carried out in different contexts.

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