



APPLICATION OF GSQUAL-KANO AND QUALITY FUNCTION DEPLOYMENT (QFD) IN IMPROVING GREEN HOTEL SERVICES

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ABSTRACT

This study aims to examine the green practices that have been implemented in an eco-hotel and further design services to meet the customer expectation. The data was collected through a survey distributed via e-form to 250 hotel guests who personally experienced green services at the hotel. Through the integration of Green SERVQUAL (GSQual) and the KANO model, there are 11 attributes that need to be improved. Further, the improvement of green services is prioritized using the technical importance score from the QFD. The highest rating of technical importance is 376.62, indicating the need to install an automatic faucet sensor to reduce water consumption waste. By implementing the improvements, the hotel will be able to better manage its water consumption and thus satisfy their customers.

Keywords: Service, GSQual, KANO, QFD, Green hotel, Survey

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1. INTRODUCTION

Indonesia's tourism has been impacted by the COVID-19 outbreak, much like it has been in other nations like Malaysia (Foo et al., 2020). Green marketing methods are receiving more attention for their potential to raise competitive advantage and improve the sustainability of the hotel industry amid the COVID-19 epidemic (Tsai, B. et al., 2021). The Central Bureau of Statistics (BPS) reported 4.05 million foreign tourist arrivals in 2020, which fell to 1.5 million in 2021. Tourism is one of the key economic sectors in Indonesia after the oil, coal, and palm oil sectors. Tourism is classified as an environmentally friendly industry in comparison to other industrial sectors (Parsons et al., 2018).

The tourism industry is one of ten recognized by the United Nations as having the potential to shift society toward a green economy (UNWTO, 2012), and also one of the fastest developing business sectors (Park & Jeong, 2019). The tourist sector must quickly transition to green practices through new technology and intense employee training in order to change the public's perception of the issue of global warming. A. Gupta and A. Mishra (2018). Apart from being a form of environmental responsibility, the service and manufacturing industries are currently confronted with the fact that the majority of consumers have knowledge and awareness about environmental sustainability issues, which influences their purchasing decisions (Hartmann et al., 2012; Asshidin et al., 2016). In Indonesia, if the concept of quality and sustainable tourism is properly implemented, the number of foreign tourist arrivals is expected to increase by 1.8 million to 3.6 million people by end of 2022, according to the Ministry of Tourism and Creative Economy.

Zolfani et al. (2015) emphasizes that hotels as one of the supporters of green tourism, must be able to apply green practices in their operations and services. Green hotels are defined as those that use clean practices in their operations, such as energy efficiency, water consumption, recycling, and waste management. The hospitality sector has made the environmental effects of the world's growing tourism a key topic (Berezan et al., 2013). Many studies on green hotels have been conducted,

such as identifying factors that influence consumer decisions to choose green hotels and implementing green practices (Kang et al., 2012; Radwan et al., 2012; Prud'homme et al., 2013; Berezan et al., 2013; Alipour et al., 2019; Verma & Chandra, 2019; Abdou et al., 2020; Valdivieso et al., 2021).

Environmental problems and imbalances in natural resources change the environmental management of organizations. Companies today must pay attention to operations to include innovative and sustainable environmental management activities to create innovation and environmental performance (Ninaroon & Khammadee, 2022). Customers today are increasingly choosing to purchase green products and services from companies that practice environmental responsibility that accommodate to their green needs (Han and Kim, 2010; Amar et al., 2021). With global resource depletion and growing awareness of environmental protection and ecological conservation, many hotels' management have established a 3R (recycle, reuse, and reduce) program in their properties.

Few studies have conceptualized the precise characteristics that make up green services in a variety of contexts, including tourism and hospitality. There are many studies that discuss green services. For instance, Chan et al. (2016) propose a number of components that make up green services for product-oriented businesses, including energy-saving technology, water-saving technology, maximum efficiency, sustainable design elements, reuse, and recycling, customer awareness of the environment, motivating customers towards environmentally friendly behavior, eco-friendly packaging, employee training, and scalable performance environments.

Kang et al. (2012) tested consumers' willingness to pay more for environmentally friendly services without emphasizing any particular green features using a new ecological paradigm scale. According to Millar and Baloglu (2011), attributes of hotel services such as recycling regulations, shampooing options, dim lighting, towel and linen regulations, and green certification allow for a higher preference for

green hotels. Four criteria—green hotel equipment, energy and water use, staff behavior toward the environment, and availability of bio-food—were outlined by Bastic and Gojcic (2012).

Based on the authors' personal experiences, many of the hotels in Indonesia that claim to be "green" or "environmentally friendly" have practices that are far from green. Based on the author's personal experience, many hotels in Indonesia that claim to be "green" or "environmentally friendly" have practices that are far from green. Based on a survey of hotel guests through reviews of hotel service provider platforms such as: Tripad, Agoda, Tiket.com and Traveloka, there were several complaints experienced by previous hotel visitors. Among other things, "The condition of room & bedroom equipment is not good and not environmentally friendly, equipment in the bathroom such as water faucet sensors and automatic lights, not many variants of organic food menus, lighting in room corridors and around rooms. the hotel is not bright, the service from the staff is less than the standard of an environmentally friendly hotel".

Consequently, it is crucial to gather more information from hotel guests in order to identify the crucial elements of green services that should be improved from the customers' point of view. This paper reports on a study that used GSQual, Kano, and QFD to improve the green services provided by a hotel. Findings from this study are expected to close a market gap by improving hotel services that have failed to meet customer expectations through service design that incorporates green and quality aspects.

2. LITERATURE REVIEW

This section discusses the research on quality service which includes the design of an instrument to measure the service provided by green hotels. Following is a brief discussion of previous studies.

Gojcic and Bastic (2012) investigated the eco-tourism expectations in connection to the service quality of spa and wellness hotels in order to develop and test a novel metric for measuring the "environmental component," a

component of hotel service quality. The research reveals four aspects of environmentally friendly elements, including bio-food, healthy and environmentally friendly equipment, efficient use of energy and water, and environmentally friendly hotel staff behavior. Travelers also display a hierarchy of environmental concerns, with the eco-friendliness of hotel staff ranking highest and bio-food ranking lowest. Depending on the traveler's income, nationality, and hotel certification, the level of the eco-dimension can differ significantly. Different levels of education did not, however, result in any discernible differences being found.

Several components of green services were identified by Chan et al. (2016), including the location of the service, promotion, logistics, purchasing, product development and design, after-sales activities, information systems, human resource management, and corporate policy. Compared to other conventional hotels, these green hospitality products are widely thought to be safer for the environment (Han, 2020). Consumers' perceptions of which restaurant green features are most important and how attitudes toward various green features affect consumers' behavioral intentions were examined by Lan et al. (2016). The dimensions that are used are those that are administration-, environment-, and food-focused. Berezan et al. (2013) in their research stated that service was ranked first by consumers compared to price, food, marketing and others. Monteiro et al. (2020) in his research aimed to improve the quality in its application, by establishing a relationship between the interests valued by hotel consumers and the ecological design features in hotels that satisfy consumer desires.

Through the distribution of questionnaires throughout the Portuguese city of Porto, data were gathered. The findings show that hotel guests are more concerned with the implementation of "Good sanitation practices (such as water conservation)" than with the presence of a "Active System for Leak Detection and Repair" of water in the toilet, sink, and bathroom. On the other hand, less favourable characteristics included "Change"

bed sheets only when asked to stay a few nights and "Use of ecologically low pressure toilets and sinks. Hotels should prioritize the adoption of "Waste Management and Recycling" and "Use of Energy-Saving Techniques and Technologies," according to research conducted during the construction of the House of Quality.

The SERVQUAL scale was mentioned by Knutson et al. (1990) in their proposal for a green lodging service scale to evaluate the standard of services offered by hotels and inns. 26 things in total, divided into 5 dimensions, make up the green lodging services (tangible, reliability, responsiveness, assurance, and empathy). The primary instrument for assessing the caliber and effectiveness of hotel services is the green service scale, which has been utilized by numerous other researchers as well as hotel management. In their research, Cheng et al. (2018) developed the GLSERV scale's dimensions and items using methodical, scientific methods. Given the rise in environmental consciousness and carbon reduction initiatives, green hotels have become an important business direction for the hospitality industry. This issue leaves a significant measurement gap for the level of service provided by green hotels. The six elements of the GLSERV scale—assurance, dependability, empathy, environmental communication, green energy savings, and tangibles—each have a total of 25 items.

Khan and Su (2010) used the service quality expectation (ECOSERV) scale to look at visitors' expectations for service quality on Cheju Island in southwest Korea. The main components of Parasuraman's SERVQUAL, namely assurance, dependability, responsiveness, empathy, and an additional eco-tangibles dimension, form the basis of the instrument. Through the classification with the Two-Dimensional Quality Model, Li et al (2014) 's other study aims to determine customer emphasis on the green service quality of international tourist hotels. Twenty green service quality items are of Indifferent Quality, four are of Attractive Quality, and four are of One-Dimensional Quality, according to the research findings.

3. METODOLOGY

3.1 Data Collection and Sample

Data was collected at an eco-hotel in the Province of East Java, Indonesia and it was took place of a period of two months. A questionnaire survey is being used in this study to gather information from hotel visitors. The respondents filled out the questionnaires before making a purchase after receiving them online. 250 responses in total were received for use during the analysis phase.

3.2 Questionnaire Design

The questionnaire was written in both English and Indonesian to accomodate respondents from other countries who may only speak English. The questionnaire was divided into three parts: the respondents' details (such as age, gender, occupation, length of stay at the hotel); perception and expectation of green hotel services; service measurement based on KANO model. Details of the questionnaire can be seen in Appendix 1.

The primary components of the Green SERVQUAL (GSQual) survey were modified from earlier research by Khan (2010), Bastic and Gojcic (2012), and Li et al (2014). The following is a description of the four GSQual dimensions:

1. Ecotangibles (adapted from Khan and Su (2010) and Li et al. (2014))

In terms of the physical appearance of the hotel, representative of environmental-friendly materials are available and carefully maintained in the hotel environment.

2. Energy & water (adapted from Bastic and Gojcic (2012) and Li et al. (2014))

Enabling facilities for hotels that emphasize resource use, energy efficiency, and water efficiency as ways to reduce waste.

3. Green behavior (adapted from Bastic and Gojcic (2012))

Employee activities and abilities that apply and support environmental-friendly values in the hotel environment.

4. Food (adapted from Bastic and Gojcic (2012))

The availability of food and beverages, including organic ingredients, the menu freshness without the use of preservatives, and the conservation of agriculture and

plantations in the hotel's environment and use of these resources in their food service.

A preliminary survey was conducted, as shown in Table 1, to evaluate the reliability of the questionnaire, and all Cronbach's alpha values were higher than 0.6.

3.3 Reliability and Validity of the Questionnaire

Table 1 Reliability Test

Dimension	Cronbach's alpha for Perception	Cronbach's alpha for Expectation
Ecotangibles	0.909	0.958
Energy and Water	0.870	0.901
Green Behaviour	0.877	0.952
Food	0.925	0.965

3.4 Data Analysis

3.4.1 Analysis of customer satisfaction using gap analysis and KANO

The gap value is determined by subtracting the value of perceptions and the expectations of services (gap = perception – expectation). In KANO model, customer needs based on the six types category (i.e. One-dimension, Must-be, Attractive, Indifferent, Questionable and Reverse). As in Appendix 1, there are two types of questions in Part 3 of the questionnaire which is functional and dysfunctional questions. These two types of questions can be classified into six categories.

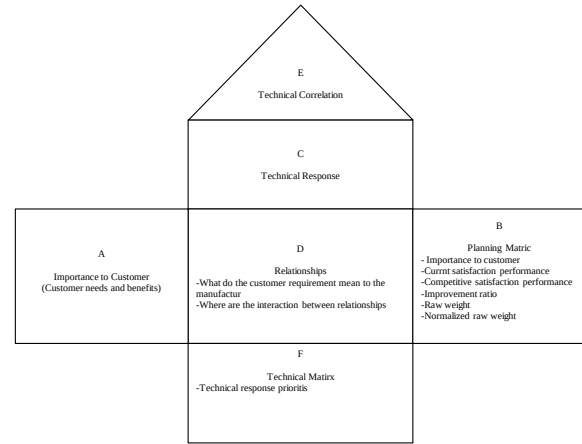


Figure 1 HOQ Diagram

3.4.2 Priority of improvements

The main stage of the QFD technique, which is utilized to prioritize improvements, is the House of Quality (HOQ) development. The matrix is prepared to obtain customer wishes, and the priority of improvement will be based on the value of the Technical Importance Rating in the form of a percentage on the HOQ.

4. RESULTS

4.1 Gap analysis of green service hotel

In Table 3, the gap value showed that service attributes number 1, 4, 7, 8, 12, 13, 14, 15, 17, 18, 19, 20, 22, 23, 24, and 25 are negative. These negative values mean that the service expectation is unfulfilled.

Table 3 Gap value between perception and expectation

No.	Service Attributes	Perception	Expectation	Gap
1	Environmental-friendly equipment	4.212	4.244	-0.03
2	Natural materials in hotel building construction	4.312	4.204	0.11
3	Natural resources were used to make the hotel ceramic tiles	4.116	3.984	0.13
4	Natural materials are used to make hotel mattresses and bedding	3.772	4.196	-0.42
5	Numerous green plants outside a hotel	4.508	4.180	0.33
6	Hotel in a tranquil setting	4.388	4.024	0.36
7	Hotel offering free wireless Internet access around-the-clock	3.892	4.176	-0.28
8	Provision of water dispenser	2.42	4.284	-1.86
9	Reusable towels	4.144	4.008	0.14
10	Reusable bedding	4.156	3.928	0.23
11	Separate trash cans between organic and non-organic are easy to find in the hotel area	4.184	4.124	0.06
12	Efficient use of energy in the hotel	3.292	4.384	-1.09

13	Efficient use of water in the hotel	2.784	4.388	-1.60
14	Automatic water saving system in the toilets	2.128	4.284	-2.16
15	Automatic lighting in hotel restrooms and hallways	2.244	4.140	-1.90
16	Eco-behavior of hotel staff	4.252	4.236	0.02
17	Information about the hotel's environmental protection efforts is provided in the room	2.848	4.488	-1.64
18	Eco-friendly cleaning product applied in a hotel	3.772	3.796	-0.02
19	Electricity which have an energy saving label	2.980	4.408	-1.43
20	Reduce the use of paper (paperless), for example online check-in and check-out	3.904	4.112	-0.21
21	Hotel wastes being recycled	3.992	3.988	0.00
22	The use of a card key (keycard door lock) in addition to ensuring the security of guest rooms, also for efficient use of electricity	2.036	4.400	-2.36
23	Meals made from organically produced components	3.772	3.816	-0.04
24	A hotel serves up fresh food	3.780	3.848	-0.07
25	Used produce, herbs, and plants are cultivated in the hotel garden	3.668	3.684	-0.02

4.2 Green service based on KANO & QFD

Next, the categorization of service based on KANO model is presented in Table 4. The attributes categorized Attractive (A) are: 4, 5, 6, 7, 8, 12, 16, 17, 19, 20, 21. Categorized as

One-dimension (O) are: 13, 14, 15, 22. Categorized Indifferent (I) are: 1, 2, 3, 9, 10, 11, 18, 23, 24, 25. Thus the attribute categorized (A) is weighted 4, then categorized (O) is weighted 2 and (I) is weighted 0 or ignored.

Table 4 Service attributes based on the KANO category

ECOTANGIBLES		Category
1	Environmental-friendly equipment	I
2	Natural materials in hotel building construction	I
3	Natural resources were used to make the hotel ceramic tiles	I
4	Natural materials are used to make hotel mattresses and bedding	A
5	Numerous green plants outside a hotel	A
6	Hotel in a tranquil setting	A
7	Hotel offering free wireless Internet access around-the-clock	A
8	Provision of water dispenser	A

9	Reusable towels	I
10	Reusable bedding	I
11	Separate trash cans between organic and non-organic are easy to find in the hotel area	I
ENERGY AND WATER		Category
12	Efficient use of energy in the hotel	A
13	Efficient use of water in the hotel	O
14	Automatic water saving system in the toilets	O
15	Automatic lighting in hotel restrooms and hallways	O
GREEN BEHAVIOR		Category
16	Eco-behavior of hotel staff	A
17	Information about the hotel's environmental protection efforts is provided in the room	A
18	Eco-friendly cleaning product applied in a hotel	I
19	Electricity which have an energy saving label	A
20	Reduce the use of paper (paperless), for example online check-in and check-out	A
21	Hotel wastes being recycled	A
22	The use of a card key (keycard door lock) in addition to ensuring the security of guest rooms, also for efficient use of electricity	O
FOOD		Category
23	Meals made from organically produced components	I
24	A hotel serves up fresh food	I
25	Used produce, herbs, and plants are cultivated in the hotel garden	I

The results of the integration of SERVQUAL and KANO are shown in Table 5. There are eleven attributes that require

improvement and are classified as A, O, or M with a negative gap. These attributes are used as customer requirements in the HOQ matrix.

Table 5 Green Servqual & Kano Integration

No.	Service Attributes	Perception	Expectation	Gap	KANO Weight	Customer Importance (Gap x KANO)	Adjusted Importance
ECOTANGIBLES							
1	Environmental-friendly equipment	4.212	4.244	-0.032	I		
2	Natural materials in hotel building construction	4.312	4.204	0.108	I		
3	Natural resources were used to make the hotel	4.116	3.984	0.132	I		

	ceramic tiles							
4	Natural materials are used to make hotel mattresses and bedding	3.772	4.196	-0.424	A	4	-1.696	1.696
5	Numerous green plants outside a hotel	4.508	4.180	0.328	A			
6	Hotel in a tranquil setting	4.388	4.024	0.364	A			
7	Hotel offering free wireless Internet access around-the-clock	3.892	4.176	-0.284	A	4	-1.136	1.136
8	Provision of water dispenser	2.420	4.284	-1.864	A	4	-7.456	7.456
9	Reusable towels	4.144	4.008	0.136	I			
10	Reusable bedding	4.156	3.928	0.228	I			
11	Separate trash cans between organic and non-organic are easy to find in the hotel area	4.184	4.124	0.060	I			
ENERGY AND WATER								
12	Efficient use of energy in the hotel	3.292	4.384	-1.092	A	4	-4.368	4.368
13	Efficient use of water in the hotel	2.784	4.388	-1.604	O	2	-3.208	3.208
14	Automatic water saving system in the toilets	2.128	4.284	-2.156	O	2	-4.312	4.312
15	Automatic lighting in hotel restrooms and hallways	2.244	4.140	-1.896	O	2	-3.792	3.792
GREEN BEHAVIOR								
16	Eco-behavior of hotel staff	4.252	4.236	0.016	A			
17	Information about the hotel's environmental protection efforts is provided in the room	2.848	4.488	-1.640	A	4	-6.560	6.560
18	Eco-friendly cleaning product applied in a hotel	3.772	3.796	-0.024	I			
19	Electricity which have an energy saving label	2.980	4.408	-1.428	A	4	-5.712	5.712
20	Reduce the use of paper (paperless), for example online check-in and check-out	3.904	4.112	-0.208	A	4	-0.832	0.832
21	Hotel wastes being	3.992	3.988	0.004	A			

	recycled							
22	The use of a card key (keycard door lock) in addition to ensuring the security of guest rooms, also for efficient use of electricity	2.036	4.400	-2.364	O	2	-4.728	4.728
FOOD								
23	Meals made from organically produced components	3.772	3.816	-0.044	I			
24	A hotel serves up fresh food	3.780	3.848	-0.068	I			
25	Used produce, herbs, and plants are cultivated in the hotel garden	3.668	3.684	-0.016	I			

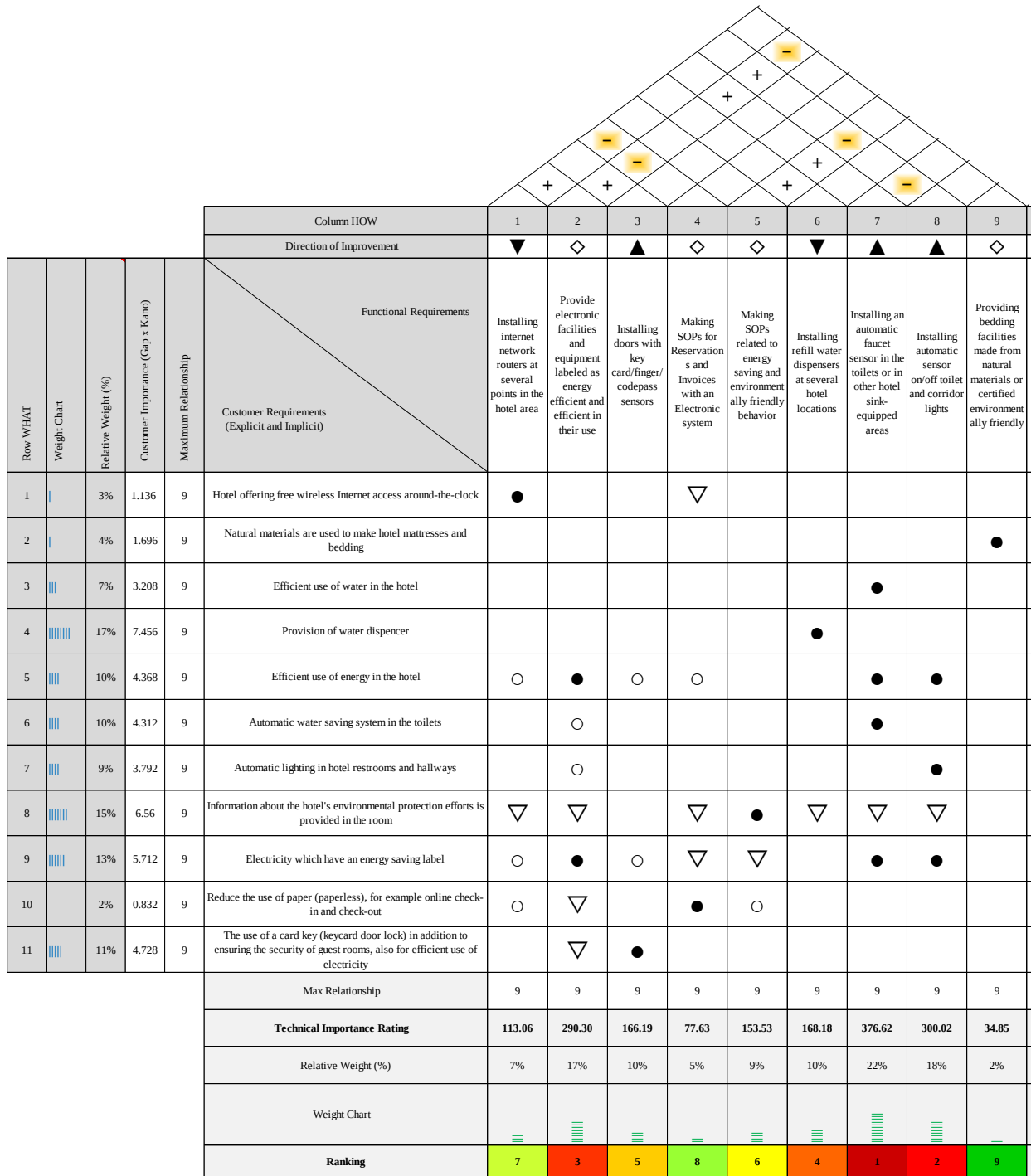


Figure 2 House of Quality (HOQ)

As shown in HOQ matrix, the highest technical importance rating is “faucet” with a Technical Importance Rating value of 376.62 and a percentage of 22% of the total How's

attribute. These attributes will be a priority in solving green service problems that affect the satisfaction and interest of hotel guests.

4.3 Automated water faucet sensor application

According to the HOQ result, the use of an automated water faucet will enhance the

hotel guests' perception of green service (see Figure 3). This application will also support the hotel efforts to regulate water consumption in the hotel area.



Figure 3 Water faucet sensors and its application in the hotel

According to tests conducted following the installation of an automated water faucet, water consumption is decreasing (see Table 6).

Table 6 Conventional vs. Automated Water Faucet Sensor

Number of Tests	Conventional (L)	Automatic Sensor (L)
1	2.3	1.7
2	2.5	1.3
3	2.8	1.5
4	2.1	1.8
5	2.5	1.6
6	2.6	1.8
7	2.9	1.7
8	2.3	1.7
9	2.1	1.5
10	2.5	1.6
Average	2.46	1.62
Efficiency	0.84 Liter	

5. CONCLUSION

According to the findings of the data analysis, it can be determined that:

1. There are 16 attributes with negative values in the gap analysis. The most negative gap between hotel guests' perceptions and

expectations is "the use of a card key in addition to ensuring the security of guest rooms, also for efficient use of electricity," with a value of -2.36.

2. Using the KANO model, eleven attributes are classified as Attractive (A) with a weight

of 4. The next four attributes are classified as One-dimensional (O) and have a weight of 2. Meanwhile, the remaining attributes are neither evaluated nor disregarded because they carry no weight.

3. The integration of GSQual and KANO revealed 11 attributes with the goal of increasing environmentally friendly services, with the criterion of having a negative gap value and a KANO weight. The attribute with the highest importance value is "provision of water dispenser," which has a value of 7.456.
4. The functional requirements can be sorted based on the calculation of the technical importance rating on the HOQ, namely: "installing an automatic faucet sensor in the toilets or other hotel sink-equipped spaces" with a value of 376.62. The lowest score is 34.85 for "providing sleeping facilities manufactured from natural materials or certified environmentally friendly".

The following suggestions are made in accordance with the research:

1. Replacement of automated water faucets might begin in locations where water is often used. For instance, public restrooms, restaurants, and some of the most expensive sorts of accommodations.
2. Hotel management must establish a target for determining improvements based on existing attribute findings and adjusted to the hotel's ability.
3. It is vital to train personnel on green hotel services, or at least do a comparative study with hotels that have implemented the green hotel concept.
4. Hotel administration must perform frequent reviews of the services supplied to hotel guests in order to implement the necessary service innovations.

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