

An Evaluation of the Indoor Environment Quality and counter Facilities of a Typical Nigerian Rail Station: A Case Study of Kano Railway Station

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Abstract- *This paper presents passengers' evaluation of the indoor environment quality (IEQ) and the Counter facilities of a typical Nigerian railway station taking the Kano Railway station as a case study. The study was pursued using a quantitative research design that adopted the use of a structured questionnaire to establish passengers' and/or staff's perceptions. A total of one hundred and fifty questionnaires were distributed with a hundred and thirty-four returned adequately filled giving a percentage response of 89.3% and the data gotten were analyzed using the SPSS version.19.0. the result reveals among others that the most common method of getting tickets in the railway station is the manual ticket counter, however, there is a pressing need for the addition of more counters due to the insufficient number of counters in the station leading to traffic and clusters at the counter. Regarding the indoor environment of the station, excellent 'Customer Information Services', 'Noise Level Control' and 'Crowd management in the boarding' were identified. However, a poor ventilation status of the station and 'Crowd management in the ticketing session' was established. Consequently, it recommended that the Ventilation of the stations be improved as well as the adoption of E-ticketing to help in managing the crowd in the station.*

Indexed Terms- *Indoor Environment Quality (IEQ), Counter Facilities, Rail Station*

I. INTRODUCTION

Several countries in the world have attributed economic growth to the role of the railway in bringing socioeconomic development through the movement of heavy goods and passengers. Rail transportation is known to be relatively better than other means of transportation in terms of affordability, cost-efficiency, environmental friendliness and energy-saving natures. There is no doubt that rail transportation is one of the critical national infrastructures that are necessary for economic and technological growth (Pius et al, 2018). The quality of service provided in any commercial service provision is a major determinant of the continuous patronage of the customers, therefore, to sustain the customers, the quality of service and facilities ought to be at its best. (Nwaogbe, Ukaegbu & Ibe, 2013). The consistent maintenance of the facilities of the railway station can only be assured with a routine evaluation of the facilities of the railway station. The inability of railway cooperation in most African countries to respond adequately to the changing nature of the economies of the country they serve as well as the lack of encouragement on the side of the governments have led to a retardation in the growth of railway transportation. this unfortunate plight of the railways' systems has led to the rapid depletion and dilapidation of the railway facilities, due to neglect of the longer-range maintenance and operating capital needs. The sum effect is that it has diminished the potential of the full contribution to the economy of the country the railway system (Amade et al, 2022).

The Nigerian railways were established or first constructed by the colonial power, Great Britain. The Nigerian Railway Corporation, own and operates the rail transportation system in Nigeria. unfortunately, according to Wison and Felix (2015), the NRC has failed in the provision of efficient and affordable transportation of goods and services, especially for long-distance journeys. The NRC has had a precipitous drop in the discharge of its responsibility in recent times duties due to poor implementation, enforcement and monitoring of the as well as the delay in the review of the 1995 Act. the decline in the discharge of responsibility lingered over decades (Manji, 2020). A railway station often referred to as a depot is the facility where the train stops to load and/orunload passengers and goods. In order words, it is the space where the passengers can alight or board (Amwe& Jonathan, 2013).

NRC train stations domiciled along the narrow-gauge line have experienced neglect in terms of FM services one can see vividly when he/she visits the facility. The station building and other facilities are not pleasing to the eye and some look obsolete due to a lack of maintenance and upgrading to match the modern requirements of an effective and functional train station. A visit to the Kano train station showed that the environment doesn't look clean and pleasant to the eye in terms of cleaning, waste collection and disposal. The environment doesn't look pleasant to the eye. Littering is all over the place, and refuse management doesn't seem to be efficient. This paper focuses on is evaluation of the provision of FM services within the train stations on the corridors of the narrow-gauge line. Therefore, services such as the provision of hygiene, health and safety, in Kano Station as a case study for a typical Nigerian train Station. Also, the appraisal is limited to the perception of passengers and NRC staff and how the services appeal to the respondents.

II. LITERATURE REVIEW

Facilities in the railway station

A railway station is engaged in passenger and cargo train operations place. It is a link between the railway with the passenger and the owner of goods. Every station has a maintenance and operation cost demand that must be met for it to remain effective. Usually,

the station portrays the image of the railway system as it gives the passengers the impression or a sense of permanence, consequently it is important that the station is well designed to meet existing and anticipated passenger and community needs that will ensure optimal performance. The following are the major part of the railway station:

A. Platforms

The section along the rail tract and pathway is referred to as the railway platform. It can either be one or more than one depending on the size of the station. It is provided in the station primarily for passengers to either board or alight. (Akwaru et al, 2014).

B. Entrances and Exits

As the name implies the Entrance and Exit allow the passenger to pass both in normal and emergency circumstances. The number of entrances and exits is largely influenced by the design of the station, the size of the station as well as the circulation design of the station. (Akwaru et al, 2014).

C. Passenger Information System

This is a digital information system that is used to transmit real-time information to passengers. Passenger Information Systems (PIDS) in recent times advanced environments are also used for advertisement, however, in the real-time situation primarily created to display passengers-oriented information like the destination and expected time of arrival of the next train, the time, the train schedules and the destinations served from this station and from which platform. are digital information systems that display real-time information for passengers. Train

D. Ticket Office

Is a room or location where tickets are sold at the station. It is often at the counter and has a ticketing machine, even though in some trains, the ticket is sold on board of the train. In the come occasion, the ticket office combines convenience stores and customer services depending on the design of the train station. (Akwaru et al, 2014).

E. River Relief Station (Restrooms)

Driver's restroom facilities shall be located in an area that is both convenient for the train operators and the

taxi operators. These facilities are not open to the general public. Building design shall follow the standard layout for restroom facilities.

F. Concessions (Refreshment)

This is the space in the station provided for shops often perceived as the refreshment centers. It is a space in the station for commercial activities and a great source of income for the railway. In some station it contains the coffee shops, small lunch rooms newspaper rooms and flower shops.

III. METHODOLOGY

The study adopted the use of a qualitative and quantitative research approach involving the use of the questionnaire, and interview. For this study, the questionnaire was distributed to users and workers within the Kano train facilities. The Kano train facility is an inter-state train station, and the respondents were drawn from both the passengers and staff of the corporation to get a generalized opinion of the rail station.

With regards to the sampling size in the distribution of the questionnaire, the sampling size will be determined based on the formula below because the targeted population is unknown (because the passenger influx is fluctuating though the number of staff is identified as forty (40). (IWSD, 2003 in Macdonald, 2006)

$$n = (z^2 pq) / d^2$$

Where;

n = the desired sample size

z = the ordinate on the Normal curve corresponding to α or the standard normal deviate, usually any of the following determined based on the ‘margin error formula’

A 95% level of confidence has $\alpha = 0.05$ and a critical value of $z_{\alpha/2} = 1.96$.

P = the proportion in the target population estimated to have a particular characteristic (normal between the range of 0.1 - 0.5)

q = 1.0-p

d = degree of accuracy corresponding to the confidence level and Z selected.

Consequently, the sample size is determined as thus, $z = 1.96, d = 0.05$ where $p = 0.1, q = 0.9$

Hence,

$$\text{Sample size } n = [(1.96)^2 \times 0.9 \times 0.1] / (0.05)^2 = 138.2$$

Thus, the study will administer 150 questionnaires.

• Data Analysis

The data collected for this study will be subjected to various statistical analyses using the computer-based software “Statistical Package of Social Sciences” (SPSS). The five-point Likert scale ranking was transformed to relative Importance Indices (RII) for each of the construction contract documents. The weighted average for each item was determined and ranks were assigned to each item, representing the perception of the respondents’. RII ranges between zeros to one.

$$\text{Relative Importance Index (RII)} = \frac{\sum fx}{\sum f} \times \frac{1}{k} \dots \dots \dots (3.1)$$

Given that

$\sum fx$ = is the total weight given to each attribute by the respondents.

$\sum f$ = is the total number of respondents in the sample.

K = is the highest weight on the Likert scale.

Results are classified into three categories as follows (Othman et al, 2005) when;

$RII < 0.60$ -it indicates low frequency in use

$0.60 \leq RII < 0.80$ -it indicates high frequency in use.

$RII \geq 0.80$ -it indicates very high frequency in use

IV. DATA PRESENTATION, ANALYSIS AND DISCUSSION

This section encompasses the presentation of the data, analysis of the data and discussion of the data gotten from the questionnaire survey.

V. QUESTIONNAIRE RESPONSE RATE AND RESPONDENT PROFILE

• Questionnaires Survey Result and Analysis

One hundred and thirty-four of the one hundred and fifty questionnaires distributed to the passenger and/or staff of the Kano railway station were returned adequately filled giving a percentage response of 89.3%. Details are presented in Table 1.

Table 1 Questionnaire administered

Questionnaires	Frequency	Percentage of (%)
Number returned	134	89.3
Numbers not returned	16	10.7
Total	150	100

Source: Field Survey, (2019)

• Respondents Profile

From the result of the analysis of the respondents' opinion conducted, the profile of the respondents is presented in Table 2. From the table, it can be deduced that a greater percentage of the respondent was male (64.2%) while only 35.8% were female. The result also revealed the age bracket of the respondents. From the result of the analysis, it can be deduced that a greater percentage of the respondents 43.3% were in the age bracket of 21-40 years. This was closely followed by those within the age bracket of 41-60, 36.6% of the respondents while only 20.1% of the respondents were above 60 years

Similarly, with regard to the duration of the respondents' experience as staff or users of the Kano Station; it can be seen that a large percentage had experience within the age bracket of 11-15years (33.6%). This was followed closely by those within the age bracket of 6-10year (26.1%); 0-5year (16.4%); 16- 220 years(14.2%) and 220 years and above (9.7%); showing that a larger percentage of the respondents have worked for a reasonable number of years in the facilities management firm

Concerning the highest academic qualification of the respondents, it can be deduced that a larger percentage of the respondents were degree holders (46.3%) with very few masters holders corresponding to just 3.0% of the respondent. Finally, with regard to the purpose of the station, it can be established a larger percentage of the respondents 66.4% opined that the station was for the transportation of goods, people and other services.

Table 2 Respondents' Profile

S/N	Variable	Option	Frequency (No)	Percentage (%)
1	Gender :	Male	86	64.2
		Female	48	35.8
		Total	134	100
2	Age bracket	Less than 20	-	-
		21-40	58	43.3
		41-60	49	36.6
		over 60 yrs	27	20.1
		Total	134	100
3	Duration of Working/using Kano Railway Station	0-5years	22	16.4
		6-10years	35	26.1
		11-15years	45	33.6
		16-20years	19	14.2
		20years and above	13	9.7
		Total	134	100
4	Highest Qualification	Ordinary National Diploma (OND)	09	6.6
		Higher National Diploma	11	8.2

		(HND)		
		Bachelor’s Degree	62	46.3
		Post-Graduate Diploma	36	26.9
		Masters	12	9.0
		Doctorate Degree	4	3.0
		Total	134	100
5	Purpose Of The Station	Transportation of goods	28	20.9
		Transportation of people	14	10.4
		Patronage of another service	3	2.3
		All of the above	89	66.4
		Total	134	100

Source: Field Survey, (2019)

• TICKETING AND COUNTER FACILITIES IN THE STATION

In the assessment of the ticket and counter facilities in the Station under study, the mode and the ease of obtaining tickets were ranked and the result is as presented in Tables .3 and 4. from Table 3, it can be

established that the most common mode of obtaining ticket in the station is the Manual ticket counter as it was ranked first (RII= 0.83). This was closely followed by E-tickets (RII= 0.80) and the Post Offices (RII= 0.77) which are ranked second and third respectively.

Table 3: Ranking Of the Mode of Obtaining Train Tickets at the Station

S/N	Common Mode Of Obtaining Train Tickets At The Station	WEIGHT/RESPONSE FREQUENCY										
		1	2	3	4	5	(Σf)	Σfx	MEAN	RII	RANK	
1	Manual Tickets Counters	-	4	19	62	49	134	558	4.16	0.83	1 st	
2	e- ticket	-	32	07	38	57	134	536	4.00	0.80	2 nd	
3	Post Offices	-	12	19	80	23	134	516	3.85	0.77	3 rd	
4	Vending Machines	-	15	32	48	39	134	513	3.83	0.76	4 th	

Source: Field Survey, (2019)

Where: 1-Never 2- Rarely 3- Sometimes 4- Often 5- Always

ticketing method is the easiest method of obtaining a ticket (RII= 0.86) as it was ranked highest. However, the manual counter ticketing was ranked second (RII= 0.82) while the Post Office ticketing method (RII= 0.77) was ranked third.

With regards to the ease of obtaining a ticket at the station, the result of the analysis revealed that the E-

Table 4: Ranking of the frequency of obtaining train tickets at the station

S/N	Ease of obtaining tickets in the various mode	WEIGHTING/RESPONSE FREQUENCY									
		1	2	3	4	5	($\sum f$)	$\sum fx$	MEAN	RII	RANK
1	Manual Tickets Counters	-	12	17	48	57	134	552	4.11	0.82	2 nd
2	e- ticket	-	4	9	62	59	134	578	4.31	0.86	1 st
3	Post Offices	-	12	19	80	23	134	516	3.85	0.77	3 rd
4	Vending Machines	28	39	32	20	15	134	357	2.66	0.53	4 th

Source: Field Survey, (2019)

Where: 1- Never 2- Rarely 3- Sometimes 4- Often 5- Always

• CLEANING AND WASTE SERVICES

The respondents ranked the cleaning services in the railway station and the result is as presented in Table.5. From the Table, Waste Disposal is ranked the highest (RII=0.80) among other services

considered very well such as: ‘General Cleaning of the platform (RII=0.76), ‘Cleaning near refreshment/canteens’ (RII=0.75) and ‘Cleaning of the surrounding’ (RII=0.74) ranked second, third and fourth respectively. However, the least-ranked cleaning service is the ‘cleaning at the waiting room’ (RII= 0.63). Details of the ranking of other cleaning services are as presented in Table 5

Table 5: Ranking of the Cleaning Services in the railway station

S/N	Cleaning Services in the railway station	WEIGHTING/RESPONSE FREQUENCY									
		1	2	3	4	5	($\sum f$)	$\sum fx$	MEAN	RII	RANK
1	General Cleaning on platforms	-	26	22	41	45	134	507	3.78	0.76	2 nd
2	Cleaning near refreshment/canteens	6	19	22	41	46	134	504	3.76	0.75	3 rd
3	Cleaning in waiting rooms	31	11	27	40	25	134	419	3.13	0.63	8 th
4	Cleaning in Toilets	24	30	14	28	38	134	428	3.19	0.64	7 th
5	Cleaning of the surrounding	6	26	20	28	54	134	500	3.73	0.74	4 th
6	Frequency of cleaning	-	43	14	32	45	134	481	3.60	0.72	5 th
7	Waste collection	22	21	13	44	34	134	449	3.35	0.67	6 th
8	Waste disposal	-	24	17	29	64	134	535	3.99	0.80	1 st

Source: Field Survey, (2019)

Where: 1- Very bad, 2-Bad, 3-Fair, 4- Good, 5- Very Good

• CANTEEN SERVICES

Table 6 present the ranking of the Canteen Services at the railway station. From the Table, ‘food served in the canteen’ (RII= 0.83) was ranked the highest among other factors considered good. Similarly,

‘Hygiene of the canteen’ (RII= 0.82), ‘Affordability of products’ (RII=0.80) and ‘Varieties of products in

the canteen’ (RII= 0.76) were ranked second, third and fourth respectively.

Table 6: Ranking Of the Canteen Services in the Railway Station

S/N	Canteen Services In The Railway Station	WEIGHTNG/RESPONSE FREQUENCY									
		1	2	3	4	5	(∑f)	∑fx	MEAN	RII	RANK
1	General look/size of the canteen	22	43	11	31	27	134	400	2.99	0.60	6 th
2	Varieties of products in the canteen	14	7	19	44	50	134	511	3.81	0.76	4 th
3	Food served in the canteen	3	10	13	46	62	134	556	4.15	0.83	1 st
4	Approach of canteen personnel	17	9	10	53	45	134	502	3.75	0.75	5 th
5	Affordability of products	7	13	13	44	57	134	533	3.98	0.80	3 rd
6	Hygiene of the canteen	5	11	9	49	60	134	550	4.10	0.82	2 nd

Source: Field Survey, (2019)

Where: 1- Very bad, 2-Bad, 3-Fair, 4- Good, 5- Very Good

• INDOOR ENVIRONMENTAL QUALITY (IEQ)

The Indoor Environment Quality of the station was also accessed and the result of the respondents’ ranking is presented in Table 7. The result revealed that ‘Customer Information Services’ (RII 0.81) was

the highest-ranked service. This was closely followed by ‘Noise Level Control (RII= 0.78); ‘Ambience; (RII=0.77) and Crowd management in the boarding’ (RII= 0.76) which were ranked second, third and fourth respectively. However, it can be deduced that the least ranked factor is ‘Ventilation’ (RII=0.69) followed closely by ‘Crowd management in the ticketing session’ (RII= 0.72). Details of the ranking of other indoor environment factors are presented in Table.

Table 7: Ranking Of the IEQ Factors in the Railway Station

S/N	IEQ Factors in the Railway Station	WEIGHTNG/RESPONSE FREQUENCY									
		1	2	3	4	5	(∑f)	∑fx	MEAN	RII	RANK
1	Ambience	13	11	12	45	53	134	516	3.85	0.77	3 rd
2	Noise	7	12	23	35	57	134	525	3.92	0.78	2 nd
3	Air conditioning	10	19	22	37	46	134	492	3.67	0.73	6 th

4	Customer Information Services (CIS)	7	14	14	31	68	134	541	4.04	0.81	1 st
5	Ventilation	20	18	14	49	33	134	459	3.43	0.69	8 th
6	Pest control	14	15	11	49	45	134	498	3.72	0.74	5 th
7	Crowd management in the ticketing session	14	11	20	53	36	134	488	3.64	0.72	7 th
8	Crowd management in the boarding	-	26	21	44	43	134	506	3.78	0.76	4 th

Source: Field Survey, (2019)

Where: 1- Very bad, 2-Bad, 3-Fair, 4- Good, 5- Very Good

• ACCESSIBILITY OF THE STATION

Table 8 presents the respondent’s ranking of their accessibility to the station. From the Table, it can be seen that “Availability of public transport to and from the station” (RII= 0.83) was ranked first as the respondents were satisfied with its ease of access to

the station. Other highly ranked accessibility concerns based on the respondents’ satisfaction are: “Inspections of baggage and vehicles are carried out in accordance with assignment instructions” (RII=0.82), “Entry validations are issued and collected in accordance with organizational procedures” (RII= 0.80) and “General accessibility to the train station” (RII=0.76) ranked second, third and fourth respectively. Details of the ranking of other facilities and services are presented in the Table.

TABLE 8: RANKING OF RESPONDENTS’ ACCESSIBILITY FACTORS OF THE RAILWAY STATION

S/N	Accessibility Factors Of The Railway Station	WEIGHTNG/RESPONSE FREQUENCY									
		1	2	3	4	5	(∑f)	∑fx	MEAN	RII	RANK
1	General accessibility to the train station	14	7	19	44	50	134	511	3.81	0.76	4 th
2	Availability of public transport to and from the station	3	10	13	46	62	134	556	4.15	0.83	1 st
3	Identification documentation of persons entering premises is	17	9	10	53	45	134	502	3.75	0.75	5 th

	verified in accordance with organizational procedures										
4	Entry validations are issued and collected in accordance with organizational procedures	7	13	13	44	57	134	533	3.98	0.80	3 rd
5	Inspections of baggage and vehicles are carried out in accordance with assignment instructions and organizational procedures	5	11	9	49	60	134	550	4.10	0.82	2 nd

Source: Field Survey, (2019)

Where: 1- Very bad, 2-Bad, 3-Fair, 4- Good, 5- Very Good

(RII=0.75) and ‘Cleaning of the surrounding’ (RII=0.74) ranked second, third and fourth respectively. However, the lease ranked cleaning services is the ‘cleaning at the waiting room’ (RII= 0.63). see Table 4.5

SUMMARY, CONCLUSION AND RECOMMENDATION

The following is the summary of the findings:

- a) The most common mode of obtaining a ticket in the station is the Manual ticket counter, which was ranked first (RII= 0.83). This was closely followed by E-ticket (RII= 0.80) and the Post Offices (RII= 0.77) which are ranked second and third respectively. However, the result of the analysis revealed that the E-ticketing method is the easiest method of obtaining ticket (RII= 0.86).
- b) With regards to the cleaning and waste services in the station, Waste Disposal is ranked the highest (RII=0.80) among other services considered by the respondents to be very good. Other cleaning services considered good ranked in their order of excellence are; ‘General Cleaning of platform (RII=0.76), ‘Cleaning near refreshment/canteens’

- c) As a major component of any station, the canteen services of the station was assessed and according to the respondents ranking, ‘food served in the canteen’ (RII= 0.83) was ranked the highest among other factors considered good. Similarly, ‘Hygiene of the canteen’ (RII= 0.82), ‘Affordability of products’ (RII=0.80) and ‘Varieties of products in the canteen’ (RII= 0.76) which were ranked second, third and fourth respectively.
- d) The result revealed that ‘Customer Information Services’ (RII 0.81) was the highest ranked indoor environment service. This was closely followed by ‘Noise Level Control (RII= 0.78); ‘Ambience; (RII=0.77) and Crowd management in the boarding’ (RII= 0.76) which were ranked second, third and fourth respectively. However, it can be deduced that the lease ranked factor is ‘Ventilation’ (RII=0.69) followed closely by

- ‘Crowd management in the ticketing session’ (RII= 0.72). Details are provided in Table 4.7
- e) Finally, “Availability of public transport to and from the station” (RII= 0.83) was ranked first as the respondents were satisfied with its ease of access to the station. Other highly ranked accessibility concerns based on the respondents’ satisfaction are: “Inspections of baggage and vehicles are carried out in accordance with assignment instructions” (RII=0.82), “Entry validations are issued and collected in accordance with organizational procedures” (RII= 0.80) and “General accessibility to the train station” (RII=0.76) ranked second, third and fourth respectively.

CONCLUSION

The following conclusions can be drawn

The most common method of getting tickets in the railway station is the manual ticket counter, however, there is a pressing need for the addition of more counters due to the insufficient number of counters in the station leading to traffic and clusters at the counter. Consequently, an insufficient number of the counter is the most pressing challenge experienced at the counter alongside other challenges like poor crowd management, and hectic methods of getting tickets. With regards to the ease of ticketing E-ticketing was identified as the easiest and as such, it should be encouraged.

Regarding the cleaning and waste services in the station, ‘Waste Disposal’ (RII=0.80) was ranked the best service. Other cleaning services ranked in the order of excellence are; General Cleaning of the platform (RII=0.76), ‘Cleaning near refreshment/canteens’ (RII=0.75) and ‘Cleaning of the surroundings’ (RII=0.74).

Similarly, with regard to the canteen services provided in the station; a good canteen with excellent food, good hygiene and the affordable product was observed.

Considering the indoor environment of the station, excellent ‘Customer Information Services’, ‘Noise Level Control’ and ‘Crowd management in the

boarding’ were identified. However, a poor ventilation status of the station and ‘Crowd management in the ticketing session’ was established. With reference to the security facilities and consequent threats in the station, Bombings/Bomb Threats’, ‘Car snatching and stealing’, ‘Employee theft’ and ‘kidnapping’ are the major security threat in their order. Consequently, improvement of the security facilities is a pressing challenge in the station.

Finally, the availability of public transport to and from the station was identified to be excellent along with other accessibility challenges like; “Inspections of baggage and vehicles are carried out in accordance with assignment instructions” and “Entry validations are issued and collected in accordance with organizational procedures” were identified.

RECOMMENDATION

The following are recommended:

- i. Introduction of additional counter centres in the station and an improvement of the ticketing process as it will help in ensuring adequate facilities management, and reduction of congestion/ clusters at the ticketing centres.
- ii. Adequate ventilation of the Station to facilitate an adequate and conducive indoor environment in the station.
- iii. Similarly E-ticketing should be encouraged with discounts as an incentive in a bid to also tackle the challenges of Crowd management in the ticketing session.
- iv. Adequate record tacking and acknowledgement of the complaints on any facilities so as they facilitate and improve the response interval for any complaints within the station

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