



## The Effect of Service Quality on Commuters' Satisfaction towards the Adoption of Metro Services: A Case Study of Delhi Metro Rail Corporation

Yogendra Pal Bharadwaj<sup>1</sup> and Mukesh Singh<sup>2</sup>

<sup>1</sup>Assistant Professor, IBM, GLA University, Mathura and  
PDF Fellow, ICSSR, Ministry of HRD, New Delhi & Department of Commerce, AMU, Aligarh (Uttar Pradesh), India.

<sup>2</sup>Assistant Professor, IBM, GLA University, Mathura and  
Research Scholar, Department of Management, BIT-Mesra, Ranchi, India.

(Corresponding author: Yogendra Pal Bharadwaj)

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**ABSTRACT:** The motivation behind this investigation is to explore the key effect of service quality attributes and their effect on commuters' satisfaction which improves the organizational image towards the adoption of metro services in Delhi Metro Rail Corporation. On the behalf of convenience sampling approach, data was collected from 850 commuters' commuting through DMRC using self administered questionnaire based on five point Likert scale and exposed to basic condition displaying through structural equation modelling examination to probe the significance of proposed model. The results demonstrated that commuters' friendliness is the most first determinant for commuters' satisfaction, trailed by reliability, assurance, safety & security factor. They almost share comparative associations undoubtedly to build positive attitude towards adoption of metro services. Further, attributes of service quality set out the best impact on the adoption behaviour of commuters' that directly improve the organizational image of DMRC. While, safety and security factor underscored enormous impact on organizational image and the least on commuters' fulfillment among all the four determinants of service quality for the acceptance of metro services. It will colossally help both DMRC specialists and restorative authorities in making appropriate frameworks to construct the tendency of commuters' satisfaction for a credible organizational image through prevalent course of action and espousal of efficient metro services. This study is emphasizing as in the contemporary time, commuters' fulfillment had respectably been less researched in the Indian setting of DMRC through adoption of metro services and it is acting like a source that gives standard stuff to expand organizational image so that both commuters' and association can develop a positive proximity themselves.

**Keywords:** Service Quality, Commuters' Satisfaction, Organizational Image and DMRC.

### I. INTRODUCTION

Delhi Metro assumes a significant role as transportation sector is much dynamic in present day time [62]. It is utilized as a substitute for private vehicle and furthermore to fill the elective means of open transportation such as private vehicles, buses and trains [9]. Modern information age has made an incredible need base for service quality so that administrators identified the extensive need of commuters and in this regard, Delhi Metro industry has developed extensively in recent years and the extension of metro industry has brought forth huge challenge [31, 8, 5]. To turn into the service market leader, the metro industry provide their services requiring much efforts in different exclusive territories, put resources into customer care, and tailor-make their administration operations according to the necessities of the commuters' [45, 17]. This challenge has incited an improvement in the nature of administrations with the goal that commuter satisfaction can be accomplished effectively [15]. Services offered to the metro suburbanites' in India from Delhi Metro specialist co-op has in fact expanded in specific quality [61, 27]. For the specialist co-ops the commuter loyalty is a need for metro suppliers so as to endure [28]. Further, if commuters' are fulfilled, they will get faithful to the specialist co-ops [40]. Be that as it may, customer is interested for progressively techniques so that their

operations may expand to innovative advances and retention of commuter [70, 25]. To satisfy the expanding commutation needs of metro customers' and to limit potential client misfortune, it isn't astonishing that metro organization has to made significant interest in upgrading the comfort part of their services offering through new worldview of service quality [69, 56]. In this light, service quality adoption in the metro industry is of significant enthusiasm to the industry specialists and researchers [62].

Keeping up commuters' ideal expectations, for example, repurchase goal, positive suggestion and ability to pay additionally acquire benefits in terms of productivity and manageability of an organization which can be maintained through building of credible organizational image and commuter satisfaction [46]. Despite the fact that commuter satisfaction has quite some time been viewed as the key determinant of metro reception expectations, this ordinary conviction has been tested by different observational examinations that indicated satisfaction doesn't generally convert into positive conduct aims until and unless they build organizational image [79]. In this regard, commuter expectation with respective to service quality, commuters' choice to remain or leave a service organization relationship depends on his/her judgment of the general worth of a specific attributes [31, 41]. Notwithstanding the significance of the theme, survey of the current research

found that reviews on the impacts of adoption attributes of service quality on commuters' satisfaction are rare with regards to Delhi metro industry [86, 41, 53]. In this way, a progressively exhaustive arrangement of elements of service quality adoption has brought together from servqual model as a perspective on commuter satisfaction [84, 87]. By joining six contending variables, a conceptual cum hypothetical model has inferred through an all encompassing arrangement to identify the prompt effect on utilization conduct of commuters' adoption towards Delhi metro services [16, 64, 2].

## II. THEORETICAL BACKGROUND

Organizational image assumes a significant importance in recognizing brands or brand classes in principal form of services attributes [38]. In this way, it not just concentrates on service quality and cost, yet in addition centers around economic wellbeing and separation of commuter discernment towards the brand [44]. Maintaining of organizational image is a significant issue for service firms as it is an incredible determinant for services showcasing [74]. It is additionally characterized as a lot of mental relationship in customers' observations which increase the estimation of services [48]. In this way, Delhi metro has always at the core point when brand faces forceful challenge on commercial center and brand character, so notoriety of the brand assist it with recognizing from contending contributions [23, 9]. It can bring about picking up customer steadfastness and accomplish development through improvement of hierarchical picture and commuters' satisfaction [79, 8].

However, the elements of adoption of service quality are identified as the significant characteristic in surveying the nature of a services domain and analysts have discovered that there is a positive impact of these attributes on commuter satisfaction that bring positive change in their acknowledgement [33, 1, 51]. Similarly, reliability is recognised as one of the solid indicators of ceaseless use and along these lines impacting commuter satisfaction and image in the metro setting [31, 14]. In the interim, safe and secure services rendered by the metro has been appeared to have a positive association with commuter satisfaction [45]. It is the result that customer get those services which they aspire for and it makes them contended when the administration they encountered surpass their desire [10]. Commuter satisfaction is commonly known as a result of adoption of effective service quality [16, 4]. By the by, the significance, inquire about in metro industry on this relationship is sparse and the subject merits further examination [61, 13]. Commuter satisfaction depicts the nature of services provided to the commuter in a positive way, whereby the degree of satisfaction improved alongside an expanded degree of adoption of service quality [83, 17]. At the end of the day, the more positive clients' apparent assistance quality, the better their fulfillment level with the specialist co-op is probably going to be much fruitful [69, 7]. Further, protection and security of the metro condition prompts consumer loyalty with respect to substitution need among Delhi metro suburbanites' [71, 6]. It is being revealed in

various investigations that the general commuter satisfaction with explicit assistance decides commuter retention [80, 15]. In this way, the more fulfilled a client with specialist co-op, the higher repurchase goal would be [20]. In any case, a disappointed client will probably gripe, participate in negative informal exchange and change to a contender [27]. Then again, a fulfilled client will prone to spread positive words and suggest the adoption of services to other people [28]. There are unambiguous experimental backings for the impact of commuter satisfaction on positive and assured acknowledgements [31, 11]. It is also accepted that the normal advantages of changing to another provider ought to be diminished when a commuter finds a more significant level of fulfillment and therefore, it will improve the probability of giving a positive suggestion [83, 40, 3].

Additionally, it is also stated that the more fulfilled a commuter is the more commuters' ability to pay more for metro services [25]. In that capacity, results of commuters' friendliness experience may conceptualize this relationship with the adoption of service quality into two general classes viz, specific fulfillment and total fulfillment [46]. A specific conceptualization endeavors to comprehend a service provider's assessment of a service experience whereas; an aggregate conceptualization is increasing through consolidated assessments of an adoption of services that is commuters' kind of disposition [49]. Moreover, it has been discovered that commuters' feel happy with traits of service quality in the event that it gives the services when and where they need it [56]. In like manner, it has discovered that there is a positive connection between the commuters' friendliness approach of metro service experiences and commuter satisfaction [33, 62]. Further, there is proof that characteristic of amicable service quality coming from the metro service provider works as a driver of commuters' satisfaction [69, 64].

Commuter observation is broadly shifted with adoption of service quality, fulfillment and hierarchical image [76, 63]. There are barely any observational written works examining on different factors of service quality like reliability, safety & security, assurance and commuters' friendliness with respective to organizational image of Delhi metro industry so that commuter much feel satisfied however not many investigations focused upon commuters' friendliness variable [85, 2].

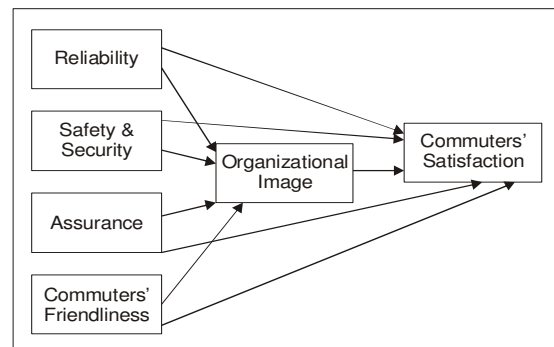


Fig. 1. Proposed research model.

This research study has discovered that the commuters' are always attentive in terms of adoption of service quality offered by Delhi Metro [19]. It also explores the impact of the attributes of service quality on commuters' satisfaction with respect to organizational image in the context of Delhi Metro Rail Corporation [52, 21, 18]. After a brief plotting of elements of adoption of service quality dimensions, organizational image and commuters' satisfaction in DMRC, the exploration theory is proposed with a conceptual model of the assessment and exhibited with certain inferential research and a path diagram [62, 49, 12].

**On the basis of above conceptual framework and different research investigation, following hypotheses have been proposed:**

**H1:** Reliability has positively influenced commuters' intention to adopt metro services in the light of organizational image in DMRC.

**H2:** Safety and Security have positively influenced commuters' intention to adopt metro services in the light of organizational image in DMRC.

**H3:** Assurance has positively influenced commuters' intention to adopt metro services in the light of organizational image in DMRC.

**H4:** Commuters' Friendliness has positively influenced commuters' intention to adopt metro services in the light of organizational image in DMRC.

**H5:** Organizational Image has significant influence on commuters' satisfaction and usage adoption in DMRC.

**H6:** Reliability has significant influence on commuters' satisfaction and usage adoption in DMRC.

**H7:** Safety and Security have significant influence on commuters' satisfaction and usage adoption in DMRC.

**H8:** Assurance has significant influence on commuters' satisfaction and usage adoption in DMRC.

**H9:** Commuters' Friendliness has significant influence on commuters' satisfaction and usage adoption in DMRC.

**III. METHODS**

*A. Research Design*

It is a conclusive research, where, the dependent variable is Commuters' Satisfaction (CS) and independent variables are attributes of service quality. Organizational Image (OI) plays a mediating role between commuters' satisfaction and determinants of service quality. The items of 'reliability' were derived from the studies, whereas, 'safety & security' were derived from the studies [1, 8, 23, 5, 9, 45]. The studies exercised by Alghamdi, (2014); Babakus, and Mangold, (1991) have identified in terms of 'assurance' and for the evaluative purpose of 'commuters' friendliness', studies of Brown, (1990) and Chou, (2002) were acknowledged in the factors of service quality [4, 10, 20, 27]. Moreover, the studies of Dutton & Dukerich (1991); Fariaa & Mendes, (2013) and Gioia, & Thomas (1996) have identified for 'organizational image' [38, 43, 47]. Moreover, for the purpose of 'commuters' satisfaction', few studies conducted by Asubonteng, *et al.*, (1996);

Churchill, Gilbert and Surprenant, (1982) and Edvardsson, (1998) have adopted to select the relative items for the stated study [7, 28, 40].

*B. Sample Design and Procedure*

Convenience sampling approach was utilized through adapted questionnaire and it was relied upon a five-point Likert scale [39, 50, 73, 66]. The underlying section included segment profiles (gender, professional diversification, metro engagement duration, age and education level) of the commuters', while, the consequent fragment dealt with the independent elements, intercede variable and the dependent variable. The data was accumulated in two stages during June 2019 to December 2019. In the fundamental stage, data was created from 250 respondents with the ultimate objective of pilot study [79, 72].

In the resulting stage, data was made from large fraction of 850 respondents. The commuters' who commute frequently from DMRC is the part of population segment. As indicated by the DMRC yearly and daily ridership reports, the various divisions have adequate on an average 4.7 million commuters' commuting through different routes [26, 31, 36, 37, 34, 35, 58].

In this regard, we had dispersed 1000 questionnaire as past assessments have watched a degree of comparable reaction [29, 82]. Out of this, only 850 commuters' returned the questionnaires and as mentioned by rule of thumb method, the sample size of 850 questionnaires is much aggregate in its nature [71, 29, 82, 67]. This shows 85 percent of reactions rate which is higher than the typical of response rates uncovered in such sort of studies [42, 68, 75]. The general reliability of the scale was .876 which is seen as satisfactory [32, 84, 73].

**Table 1: Reliability Value of the Scale.**

Variables	No. of Items	Cronbach's Alpha ( $\alpha$ )
Reliability	6	0.781
Safety & Security	5	0.873
Assurance	4	0.722
Commuters' Friendliness	5	0.871
Organizational Image	6	0.762
Commuters' Satisfaction	7	0.782

The proximity of the stated model is tested on the basis of descriptive statistics, factor analysis, regression analysis, and ultimately structural path also highlighted the closeness with the help of SPSS 20.0 and AMOS 20.0 [22, 57, 59, 74]. The ensuing table explains the estimates of the variable and its criticalness for the structural path analysis through confirmatory factor analysis and basic elements of 33 items [12, 81, 24, 30, 54].

**Table 2: Estimates of constructs of study.**

Constructs	Items	Estimates
Reliability	REL1	0.753
	REL2	0.774
	REL3	0.752
	REL4	0.620
	REL5	0.658
	REL6	0.682
Safety & Security	SFST1	0.765
	SFST2	0.752
	SFST3	0.780
	SFST4	0.759
	SFST5	0.754
Assurance	ASS1	0.648
	ASS2	0.594
	ASS3	0.652
	ASS4	0.781
Commuters' Friendliness	CFL1	0.543
	CFL2	0.860
	CFL3	0.890
	CFL4	0.543
	CFL5	0.768
Organizational Image	OI1	0.723
	OI2	0.735
	OI3	0.697
	OI4	0.720
	OI5	0.778
	OI6	0.732
Commuters' Satisfaction	CS1	0.841
	CS2	0.762
	CS3	0.749
	CS4	0.801
	CS5	0.767
	CS6	0.752
	CS7	0.742

**IV. DATA ANALYSIS AND RESULTS**

*A. Descriptive Analysis of Demographic Factors*

As per the commuters' abridgement based on gender, 650 were males and 200 were females. While, 41.18 per cent were aged 19 to 34 years, 21.18 per cent were aged 45 years and above, and 37.64 per cent were aged 35 to 44 years that means most of the commuters' are experienced enough to comprehend the closeness of metro service satisfaction with respective to the adoption towards attributes of service quality [46, 56]. In terms of professional diversification of commuters', majority of the commuters' belonged to service class category (52.94 per cent), whereas, business class of commuters' were 32.94 per cent, and other class had 14.12 per cent commuters', as far as education profile,

72.94 per cent were graduate and remaining 27.06 percent were post graduate. It means majority of commuters' are acquainted with the standard approach to choose their metro services cautiously [84]. As far as metro service engagement duration is concerned, 27.06 per cent commuters' were of more than ten years, 14.12 per cent were of 5 to 10 years duration, 30.58 per cent were of 2 to 5 years, and 28.24 per cent were of less than 2 years duration which means still commuters' are full-blown enough to recognize the exemplar approach of their metro service adoption criteria of DMRC on a comprehensive base [62, 53].

*B. Analysis of Model and Findings*

To the extent of hypotheses testing, the results exhibited strongly enormous effect of adoption towards determinants of service quality, for instance, safety & security factor on organizational image ( $p=0.048$ ), however, it ( $\beta=0.71$ ) shows 71 percent estimated impact on commuters' towards adoption of service quality attributes, while the critical ratio ( $CR=6.796$ ) raises it as a huge determinant of credibility for organizational image, so this hypothesis got accepted [21, 63]. Various estimations like reliability ( $p=0.151$ ;  $\beta=0.61$ ), assurance ( $p=0.172$ ;  $\beta=0.62$ ), and commuters' friendliness ( $p=0.473$ ;  $\beta=0.64$ ) determinedly not affected adoptive practices of commuters' towards dimensions of service quality implemented in DMRC, so these hypotheses got rejected [18].

While, in case of organizational image ( $p=0.025$ ;  $\beta=0.76$ ) is determinedly affected towards their credibility to prospect and satisfy the needs of commuters' satisfaction in DMRC constantly, so this hypothesis is accepted [78, 80]. Moreover, it is also communicated that the commutation practices are progressively stressed over commuters' issues to create and hold proclivity with them [64].

In order to test the association between adoption of service quality determinants and satisfaction of commuters', all determinants were found having superfluously impact on commuters' satisfaction with the exception of commuters' friendliness ( $p=0.023$ ;  $\beta=0.78$ ) which had immense impact on commutation aspects delivered by DMRC to the commuters', so this hypothesis got accepted [55]. Consequently, the examination further communicated that reliability ( $p=0.628$ ;  $\beta=0.58$ ), safety & security ( $p=0.183$ ;  $\beta=0.56$ ), assurance ( $p=0.0423$ ;  $\beta=0.59$ ), were influencing hardly, so these hypotheses got rejected [62, 77, 46, 3].

**Table 3: Regression paths of research model, estimates, critical ratio and P-value.**

Hypotheses	Effects	Estimate	S.E.	C.R.	P	Inference
H1	OI ← REL	0.624	0.071	6.623	0.151	Not Supported
H2	OI ← SFS	0.642	0.068	6.796	0.048	Supported
H3	OI ← ASS	0.542	0.079	5.827	0.172	Not Supported
H4	OI ← CF	0.531	0.073	13.242	0.473	Not Supported
H5	CS ← OI	0.685	0.051	14.554	0.025	Supported
H6	CS ← REL	0.696	0.053	6.796	0.628	Not Supported
H7	CS ← SFS	0.459	0.062	6.532	0.183	Not Supported
H8	CS ← ASS	0.623	0.061	5.342	0.0423	Not Supported
H9	CS ← CF	0.585	0.072	6.782	0.023	Supported

Along these lines in the wake of extricating the whole model, commuters' friendliness ( $\beta= 0.64$ ) is one of the most focal determinant of organizational image, while assurance ( $\beta= 0.62$ ), reliability ( $\beta= 0.61$ ) and safety & security ( $\beta= 0.56$ ) making a conventional endeavor to have a comparative association between commuters' fulfillment and determinants of service quality [28]. In other case, commuters' satisfaction recognized the best effect on organizational image variable ( $\beta= 0.76$ ) to make positive closeness of association between these two components [7]. The resulting parts of commuters' satisfaction are moreover affected by these determinants viz., commuters' friendliness ( $\beta= 0.78$ ), safety & security ( $\beta= 0.71$ ), assurance ( $\beta= 0.59$ ) and reliability ( $\beta= 0.58$ ). It shows commuters' friendliness has been the most adopting variable for organizational image and commuters' satisfaction towards determinants of service quality in DMRC [40, 15, 27].

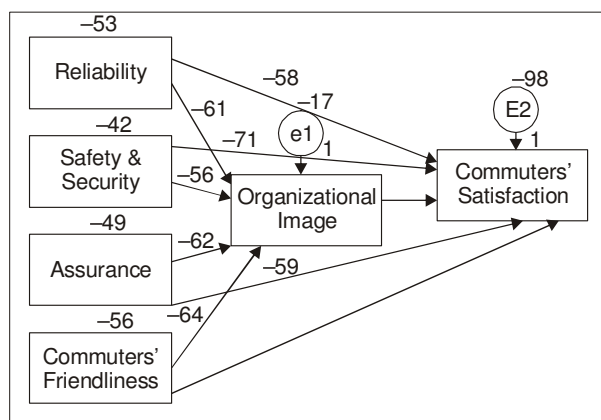
**Table 4: Estimated Model's Test Statistics.**

Fit Index	Recommended Values *	Observed Values
CMIN/DX	<0.30	2.182
GFI	0.90	0.951
AGFI	0.80	0.892
NFI	0.90	0.952
CFI	0.90	0.982
RMSEA	<0.70	0.054

**Notes:** CMIN/D.F – Chi-square value/degrees of freedom, GFI – Goodness of Fit Index, CFI – Comparative Fit Index, NFI - Normated Fit Index, AGFI – Adjusted Goodness of Fit Index, RMSEA – Root Mean Square Error of Approximation.

**Sourced from** [54, 57, 59, 65, 60].

RMSEA scores underneath 0.10 are normally viewed as of good sign fit, and our value is 0.08, which is a strong counterpart for the model [12, 22, 24]. Mulling over this, it is exhibited that all hypotheses are basically affecting the association between adoptive dimensions of service quality and commuters' satisfaction that improve the progressive image of DMRC through their commuters' friendliness intuition in the metro services for better and effective administrations [65, 67, 23]. However, this has been validated too in the below mentioned empirical model for adoption of service quality traits on organizational image and commuters' satisfaction in Delhi Metro Rail Corporation [5, 9, 45].



**Fig. 2.** Empirically Validated Model for the effect of Service Quality on Commuters' Satisfaction towards adoption of Metro Services in DMRC.

## V. DISCUSSION AND CONCLUSIVE REMARK

In light of the discussion made in the previous segments, this research investigation recognized the adoptive association between the determinants of service quality and commuters' satisfaction, and reviewed the impact of these estimations on organizational image in DMRC including a sample of 850 commuters' to whom structured questionnaire were submitted. The results highlighted that the commuters' friendliness is seen as the most chief factor among all the adoptive estimations for commuters' satisfaction [17, 6]. In addition, commuters' fulfillment applies the best impact on organizational image with due comprehension of conduct of commuters' so that the metro related service attributes segment may not hamper their fulfillment and credibility towards DMRC [10]. To the extent of organizational image, commuters' friendliness again categorise the most raised applying variable among all the measurements made a distinguished and fruitful understanding in the brains of centered commuters' so they may not misconstrue with their metro service adoption culture, whereas, commuters' satisfaction is concerned, reliability factor is apparently the least adoption factor among the entirety of the measurements in the service quality of DMRC [4, 20]. These revelations could fill in as proposals for DMRC specialists to survey their relationship and its outcomes for commuters' so it can give productive result to the growth and development of adoptive metro services with respective to Delhi Metro Rail Corporation.

The economic impact of these mentioned variables likewise decidedly contributed essentially towards clarifying the adoption of metro services on a global basis [11]. Thus, the noteworthy impact of the metro service effect on commuters' goal is a reasonable sign that the respondents utilized for the investigation were highly worried about natural factor, for example, the commuters' friendliness [28]. This examination is along these lines on the side of different investigations in the adoption of service quality attributes in service industry with special reference to Delhi Metro Rail Corporation. Steady with different investigations, the connection between commuters' friendliness and satisfaction is likewise seen as much productive and imperative [25]. Consequently, the issue of reliability, assurance and safety & security impact commuters' expectation to embrace the determinants of service quality [49]. Besides, it impacted commuters' goal to adopt metro service quality through apparent believability [56]. Notwithstanding this, it does not record the most elevated commitment of unfriendliness approach in clarifying the fluctuation in commuters' aim as uncovered by past investigations [62, 41]. The outcome likewise demonstrated that, in spite of commuter desires, the impact of the adopting conditions have been developing conduct of metro service operations effectively. Considering this, the outcome of this study proposes that the general condition of respondents' impact their adoption of service quality attributes in metro industry.

## VI. FUTURE SCOPE

Considering the investigation framework used for the assessment, the present research perceived different

components of adoption of metro service quality attributes that sway the image and commuters' satisfaction. In this context, the present examination respectively shows the implications of these parts on the Delhi Metro Rail Corporation commuting industry. The disclosures recommended that commuters' direct desire to adopt metro service quality dimensions is commonly depicted by commuters' friendliness approach followed in DMRC [53]. Thus, the assessment reprimands DMRC to place more emphasis on orchestrating friendliness dimension for its commuters, since customers' perspective alternative easily mould the structure to get the metro system into effective mode. Subsequently, there is the prerequisite for metro industry to make known to potential adopters on the different focal points that goes with the gathering of the metro service qualitative factors. In addition, another variable that affected lead point is the safety and security variable. In this regard, this investigation reproaches metro industry to heighten the need and scope of the modern advanced commuters' through metro effect on people [64, 18]. This is in light of the fact that as an especially metro society, the step by step lives of commuters' are ordinarily affected by others, and moreover it improves the execution of the metro operation development on a rapid scale. Thinking in terms of advanced progressions, commuters' referrals can be a sure technique for affecting adoptive use of the metro service enlargement. Furthermore, the finding of this research study has demonstrated that friendliness acceptability is a huge factor affecting commuters' expectation to adopt for metro services. Therefore, administrative bodies must ensure that commuters' security and friendliness concerns are especially significant practices to help the issue of credible image in the association and the development as well [63, 51]. All in all, the assessment revealed that commuters' with higher metro desire will undoubtedly grasp metro services [31]. In this context, metros are urged to execute systems and techniques that affect the commuters' lead desire in order to help and recognize their metro need as a choice to the service sort of commutation.

## VII. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

This research was limited to investigate the relationship of adoption of service quality attributes with respective to organizational image on commuters' satisfaction in DMRC. Further assessment in various sorts of associations may give assorted information into the disclosures of this examination. As demonstrated by the essential of the different business, these estimations could be added or changed to fit the affiliation unequivocal characteristics and extra assessment is proposed to be done longitudinally in order to assess the relationship with regard to time, nature and region insightful. The sample contained commuters' commuting through Delhi Metro and it may be also coordinated among straight out of various sort of customers as well.

**Conflict of Interest.** Nil

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