

Study on Mega Infrastructure Projects in Lahore and its Impact on Traffic System in Lahore & Commute time

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Abstract- A budget of \$ 1.65 billion has been allocated to the Orange Line Metro, Rs 2 billion has been allocated for the signal free jail roads, and overall trillions of Pakistani rupees are being spent on the construction projects and infrastructural development in Lahore. New roads, metro trains, new routes, and new bridges being made at such a high cost have prompted the question of necessity and usefulness of these projects. This study aims to carry out a cost and benefit analysis of these projects by carrying out a survey with the younger generation of Lahore regarding their daily commute on these routes.

Index Terms- Metro, Orange Line, LDA, Punjab, Pakistan

I. INTRODUCTION

Lahore, the capital city of Punjab, has a historic and national significance as it is one of the most prominent cities in the country. Popular for its rich and colorful culture, delicious food, and stunning architecture, this city attracts new projects related to face-lifting of historical areas e.g. the preservation of the Mall Road and the newly introduced double Decker bus for sightseeing. Other beautification projects have been done by the Parks & Horticulture Department in areas of horticulture, and the Punjab Food Authority is also playing a great role in keeping the food quality up to par. The government of Punjab, under supervision of the Chief Minister, has recently overtaken multiple developmental projects that have outshined all the aforementioned ones. One of the initial and prominent projects was the Metro Bus, which was followed by multiple projects of the same type, including the Signal-Free Jail Road route, construction of several underpasses, and the newly introduced Orange Line train. Not every citizen of Lahore considers these efforts of the government as highly applaudable – many consider some of these efforts as over-consumption of the state's money and rather unnecessary. The amount of money spent by the government on these infrastructural projects alone has surmounted 1.194 trillion [1] in the year 2015-16; the Orange Line Metro train project alone will cost \$ 1.65 billion [2]. The huge budget also promises great comfort and solution of daily commute problems for the citizens of Lahore. With major national concerns like healthcare and education taking the backseat, it is important to weigh the advantage gained by these projects, and whether they were a necessity for the common Lahore citizens. With our study we aim to find out whether the budget spent on these projects has been worth it for the majority living in Lahore. We attempted to calculate the attitude of the common citizens towards these projects and whether they provided sufficient benefit in terms of commute time, mental and

physical relaxation while traveling, and cost of commute. The quality of the route of everyday commute for students or employees is of major importance because it determines the freshness of the mind of the student or employee, and his/her performance at school or work. If these projects by the Government of Punjab prove to be successful in easing the strain of everyday commute, it can be concluded that the government has achieved a great deal by making citizens of Lahore more productive at work. This study also attempts to find out whether the citizens of Lahore (especially the younger generation) think that these projects were necessary or not. After the protest of Pakistanis over the demolishing of Kalma Chowk, the ongoing debate regarding demolishing Chowburji Chowk is also a part of this study as we aim to gather the common people's opinion in this matter.

II. METHODOLOGY

A total of 202 responses were collected via online surveys and manually filled surveys; Google Docs was used to carry out the online survey, and the questionnaire was distributed through social media, email, university portals (mostly Kinnaird College for Women, FAST, and PU) and other online forums. Our target was to collect authentic information about travelling issues around Lahore, so we opted to get the questionnaire filled by individuals above 15 years of age, mostly students or employed individuals, so we could get a clear picture of their everyday commute problems. The questionnaire comprises of 25 questions and the questions asked the individuals about facts like their commute time, distance travelled, travel frequency per week, and access to private transport. Personal opinion of the individuals regarding whether they appreciate the recent infrastructural development and whether it has given the citizens any benefit was also taken into account. We assured for authenticity of the research that each individual gave only one response, and that the responses collected reflected the true feelings of the individuals regarding the effort of the Government of Punjab.

III. HYPOTHESIS DEVELOPMENT

- H0A: Majority of respondents own and avail private transportation
- H1A: Yes, majority of respondents own and avail private transport in their daily commute.
- H0B: The main route of the majority of respondents comprises of main roads
- H1B: No, the majority of respondents do not travel via main roads.

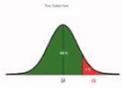
H0C: Distance traveled by respondents is roughly 25 km
 H1C: Distance traveled by respondents is roughly less than 25 km
 H0D: New bridges and signal free routes reduced overall commute time for citizens of Lahore
 H1D: Yes, New bridges and routes reduced overall commute time for citizens of Lahore.
 H0C: Some of the routes were better before the construction of flyovers/underpasses
 H1C: Yes, Some of the routes were better before the construction of flyovers/underpasses
 H0D: The new infrastructural projects have reduced the congestion and blockage on city roads.
 H1D: Yes, the new projects have reduced the congestion and blockage on city roads.
 H0E: These projects are good for the growth of the city
 H1E: No, These projects do not play a role in the growth of the city
 H0F: The historical heritage of Lahore is at stake with the increasing construction work
 H1F: Yes the historical heritage of Lahore is at stake with the increasing construction work

IV. TESTING AND ANALYSIS OF HYPOTHESIS

Hypothesis	Surveyed Value	Z- Value
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H _{0A} :	mode of the travelling is car	
.52		.556 – 1.64
H _{1A} :	yes, mode of the travelling of the majority is car	

H _{0B} :	The main route of the majority travels frequently is main roads	
.69		5.76 – 1.67
H _{1B} :	The main route of the majority travels frequently is main roads	
H _{0C} :	Distance traveled by you daily is 25 km	
.64		1.30 -1.64
H _{1C} :	Distance traveled by you daily is < 25 km	
H _{0D} :	New bridges reduced overall commute time for citizens of Lahore	
.60		2.835 -1.64
H _{1D} :	yes, Majority is agreed that new bridges reduced overall commute time for citizens of Lahore	
H _{0E} :	Some of the routes were better before the construction of flyovers/underpasses	
0.48		3.07 – 1.64
H _{1E} :	No, Some of the routes were better before the construction of flyovers/underpasses	
H _{0F} :	The historical heritage of Lahore is at stake with the increasing construction work	
0.48		1.10-1.64
H _{1F} :	Yes, The historical heritage of Lahore is at stake with the increasing construction work	

	H0	H1	P0/ μ	α	Z cal	Z tab	Acceptance/Rejection	Critical region $Z_{cal} = \frac{\hat{p} - p_0}{\sqrt{p_0 q_0 / n}}$
Mode of the travelling of the majority is car (majority = 50% or above)	$\mu = .50$	$\mu \neq .50$	.50	90	.556	1.64	Accepted	
The main route of the majority comprises of main roads	$\mu = .50$	$\mu \leq .50$	.50	95	5.76	1.645	Rejected	
Distance traveled by you daily is 25 km	$\mu = 25$	$\mu \leq 25$	25	95	1.30	1.96	Accepted	
New bridges reduced overall commute time for citizens of Lahore (less than 50 % people think so)	$\mu = .50$	$\mu \leq .50$	.50	95	2.835	1.64	Rejected	
Some of the routes were better before the construction of flyovers/underpasses (less than 49% disagreed)	$\mu = .50$	$\mu \leq .50$	.60	95	3.07	1.64	Rejected	
The new projects have reduced the congestion and blockage on city roads. (less than 50 % agreed)	$\mu = .50$	$\mu \leq .50$	.50	95	2.54	1.64	Rejected	
These projects are good for the growth of the city (less than 20% disagree)	$\mu = .50$	$\mu \leq .50$	.50	95	3.90	1.64	Rejected	
The historical heritage of Lahore is at stake with the increasing construction work (more than 40% agreed)	$\mu = .40$	$\mu \leq .40$	.40	95	1.10	1.64	Accepted	

V. ANALYSIS OF HYPOTHESIS

Hypothesis	Support	Results
H _A : Accepted	Majority owns private transport	
H _B : Rejected	The main route of the majority consists of main roads	
H _C : Accepted	Distance traveled on a daily basis is roughly 25 km	
H _D : Rejected	The new bridges and roads have reduced overall commute time for citizens of Lahore	
H _E : Rejected	Some of the routes were better before the construction of flyovers/underpasses	
H _F : Accepted	The historical heritage of Lahore is at stake with the Increasing construction work	

If we analyze our proposed hypotheses and their resulting outcomes, we find out that the majority of our respondents have

access to private transportation, mainly a car or a bike. The distance traveled by our respondents daily also does not exceed 25 km, which means that the majority does not have to go across the city for their university or work. The majority also does not follow only main roads, and a large proportion of the route comprises of secondary roads. Given these facts, we see that our respondents were still not satisfied that the new developments have reduced their overall commute time; H_D is rejected because the majority disagrees that they have experienced any increase in comfort whilst travelling after the Government of Punjab has spent trillions on the construction of new roads and bridges. It must be mentioned here that the responses of individuals who did not own a private vehicle and traveled via public transport were also recorded and they claimed to experience discomfort and inconvenience. The majority of respondents have also claimed that the increasing construction projects are a threat to the historical heritage of the city of Lahore.

VI. RESULTS AND DISCUSSIONS

17. Travelling is more comfortable with these new routes and bridges (190 responses)

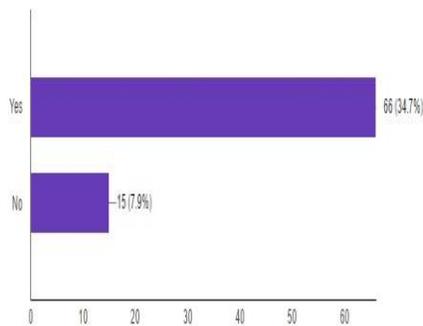


Figure 1: impact of new bridges

18. Were some of the routes better off before construction of flyovers/bridges (191 responses)

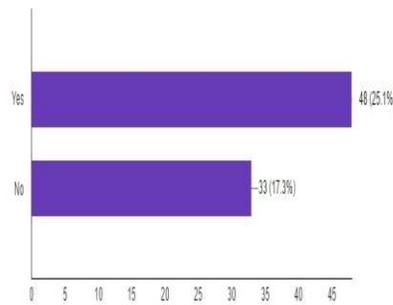


Figure 2: comparison of routes

19. Have the new projects helped in reducing congestion on roads
 (190 responses)

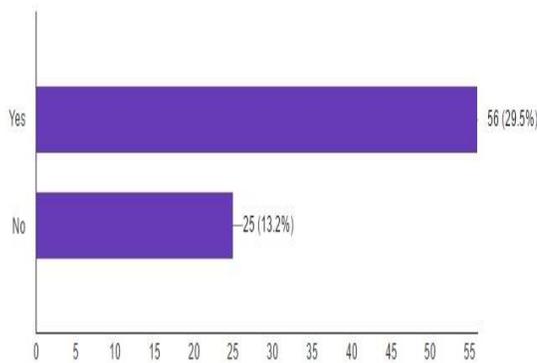


Figure 3: Roads congestion

24. Do you consider these projects good for the growth of the city (191 responses)

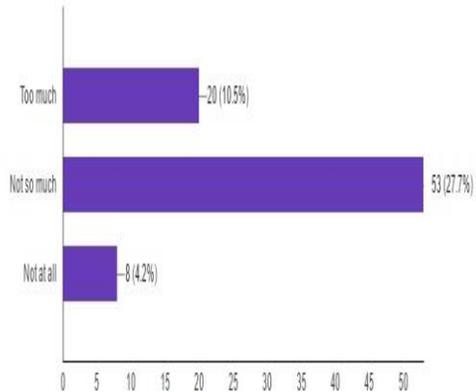
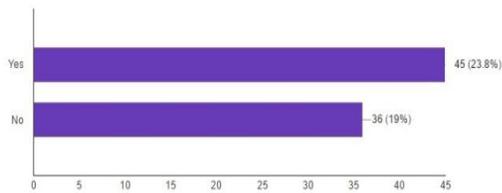


Figure 4: Usefulness

22. Do you agree that these are only useful for bigger cities (189 responses)



23. These transportation projects should be extended to remote Cities (191 responses)

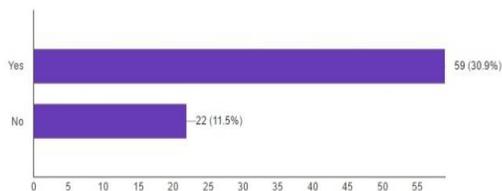


Figure 5: impact on city growth rate

25. What effect these projects are having on historical heritage of Lhr? (192 responses)

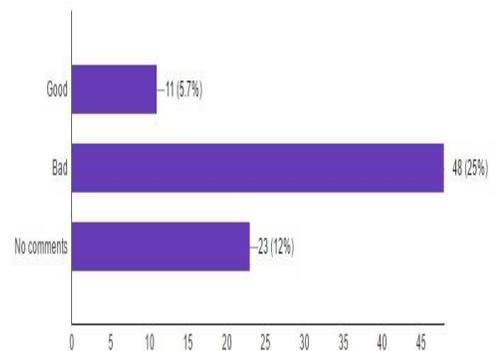


Figure 6: impact on heritage

VII. RESULTS AND DISCUSSIONS

17. This question aims to find out whether the new routes and bridges have become a source of comfort for the citizens. The majority agrees and states that travelling has become more comfortable due to the new routes. We can assume that a more systematically distributed traffic is the reason behind this change.

18. We perceived that some of the routes were actually not in such a dire need Of destruction and reconstruction that cost the government in trillions. A large fraction of our respondents agreed with us in this regard.

19. Road congestion is a major concern of all big cities in Pakistan. A poor infrastructure, poorly implemented traffic rules, large number of public and private vehicles, and poorly implemented routes contribute to the problem of road congestion. Waiting for long periods in traffic jams is tiresome for the citizens of Lahore, and we supposed that the Government of Punjab had taken this initiative to cure the menace of road

congestion. However, not all respondents agree but the majority agrees that road congestion is not a problem for them anymore. This means that the new routes have been systematically designed and are of benefit to the citizens. 22/23. We targeted our respondents to find out whether they question the absence of infrastructural development in remote cities. Lately, only the roads and bridges of Lahore are flourishing and being accessorized with fancy public transport like the Orange Line train. The majority of our respondents believe that such developmental tasks are only useful in bigger cities. However, our respondents also believe that remote cities should not be altogether deprived of transportation projects.

24. The growth of a city refers to its popularity, overall outlook, and successfulness in providing a good lifestyle to its citizens. According to our respondents, construction of roads, bridges, and transportation projects are not as instrumental in the growth of Lahore as a city.

25. Lahore is a city rich in cultural heritage. Our motive behind this question was to find out whether the recently burning debate regarding the destruction of Chowburjichowk holds any importance for our responding individuals. Previously, the popular and historical KalmaChowk was also destructed for a construction project in the city. The majority answered in affirmation of the opinion that these projects are having a bad effect on the heritage and historical significance of Lahore.

VIII. CONCLUSION

This study aimed to provide a cost and benefit analysis of the latest infrastructural development undertaken by the Government of Punjab. The construction of new routes, new roads, the signal free Jail Road project, the Metro Bus project, and the Orange Line Metro project were the main subject of this study. According to the survey conducted and the hypothesis testing carried out, it can be concluded that majority of the citizens of Lahore still feel slightly stressed while travelling to their respective schools, universities, or workplaces. This can be a result of the interruptions caused by ongoing construction projects, the harsh weather, or the mismanagement of traffic flow. A vast majority of our respondents also agreed that some of the routes were better off before the construction of new roads, bridges, and transportation projects. A major worry outlined by the study was that the historical heritage of Lahore is under threat due to these construction projects. On the brighter side, this study concludes that the new routes developed by the government have reduced the commute time for most respondents, and the new development has increased the overall quality of the travel experience despite not eliminating all negative factors. It was also found that the majority claims that new projects have reduced congestion and blockage on roads.

IX. RECOMMENDATIONS

This research paper aims to carry out a cost and benefit analysis of the recent infrastructural development done by the Government of the Punjab. The main projects highlighted in this study were the Metro bus, the Orange Line train, and the signal free Jail Road route. The fact that a budget of billions of dollars is allocated to a single project prompts the question that whether the citizens of Lahore deem these projects necessary and useful. This study can be used for long term planning of infrastructure and development using the feedback of the common people residing in the city. Feedback is taken in the form of level of respondents' satisfaction and whether their time and quality of commute has improved. This study also adds light to the debate regarding impact on Lahore's historical heritage.

Suggestions:

1. The high budget used by the Government in Punjab must be justified by either systematic control of traffic with these new project designs or by taking transport initiatives where it is severely required.
2. The historical heritage of Lahore is depicted by the buildings, roads, and gardens, and it must be protected because they are assets of our nation. The recent project of Orange Line train has been rumored to require tearing down of the ChowburjiChowk, and not so long ago the KalmaChowk was also torn down.
3. The ongoing construction projects have given rise to many physical and psychological problems for those travelling on the affected routes daily. Stress, physical strain, heat strokes, depression, and inability to perform at work are some troubles faced by the affected citizens. Cure and precaution for these troubles must be provided by the government and interactive sessions and workshops should be arranged in order to educate and facilitate the citizens.

REFERENCES

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