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IMPACT OF URBAN EXPANSION ON QUALITY OF LIFE IN HYDERABAD, KOTRI, AND JAMSHORO

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Abstract
An example of blistering urbanization is the tri-cities of Sindh, Hyderabad, Kotri, and Jamshoro, which have growth rates that have been over 3% per year since 2015, which has pressured housing, transport, and government services. This is quantitative research that evaluates the effects of urban growth on the quality of life (QoL) of residents based on surveys of 350 diverse participants. Based on WHO frameworks, QoL was assessed in the following domains; housing satisfaction (M=4.8/10), transport access (M=4.2/10), and public services (M=5.1/10). ANOVA showed that there were significant differences in the results (F=14.56, p<0.001). Jamshoro had the highest score (M=6.2) and Kotri the lowest score (M=3.9). The urban density (β=-0.312, p<0.001) and the duration of expansion (β= -0.245, p=0.002) were found to be negative predictors that depended on the income
(β=0.189, p=0.015). Some positive impacts were the economic opportunities (β=0.167, p=0.028). The results reveal both footprint aspects of expansion: positive economic returns and negative infrastructural impacts, as it is discussed in world urban health literature. The policy suggestions underline the green zoning and investments in transport to improve QoL. There are cross-sectional design, and self-reports. This study suggests resident-based planning to achieve sustainable tri-city development, which is a contribution to SDG 11.
Keywords: *Urban expansion, quality of life, tri-cities, Sindh, WHO framework, ANOVA, regression analysis, sustainable urbanization*

I. Introduction

The urbanization trend of Pakistan, which is driven by a stable urban growth rate of 2.8 percent per year, is still redefining socio-spatial relations of the nation. The province of Sindh has become the center of this urban change and over half of the 55 million populations in the province now dwell in urban centers (Pakistan Bureau of Statistics, 2025). In this context, the tri-cities of Hyderabad, Kotri, and Jamshoro are an illustration of a fast-developing polycentric region that covers about 250 square kilometers and hosts an estimated population of 2.9 million people. The built-up areas of such cities grew at a rate of 4.2 per year over the last ten and a half years due to the inflow of population and the spread of industry as well as the outward movement of residential development (Abdul & Yu, 2020). The second largest Metro centre of Sindh, Hyderabad is the

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hub of regional business and industry; Kotri with its manufacturing belts and Jamshoro with its concentration of university and energy projects is the academic and infrastructural centre of the tri-city area. Together, these cities serve almost a quarter of the provincial GDP of Sindh, highlighting their central position in the economy and showing the deep strains of the fast and unplanned development (Sindh Development and Investment Promotion Company [SDIPC], 2024).

The growth of cities in this cluster is a paradox of both possibilities and misfortunes. On the one hand, the number of new jobs in the cities is approximately 150,000 every year, which attracts migrants to these cities in search of better lives, socioeconomic mobility, and access to education (World Bank, 2024a). Conversely, expansion is costly to the peri-urban agricultural belt, where almost 15 per cent of arable land has been lost since 2015 a trend like the expansion of the ecological degradation of urban sprawl. To make matters worse, urban population growth to up to 22,000 people per square kilometer in central Hyderabad is causing vast amounts of pressure on infrastructures and living standards in the city (Atlas of Urban Expansion, 2024).

The pressures are very acutely experienced in daily life. The common traffic conditions have increased the time of commuting to 45 minutes with congestion and dependence on informal means of transport coupled with inadequate capacity on the roadways. There is a further decline in the housing affordability, rent has soared up by 35 per cent within the past five years as demand has been exceeding supply in both formal and informal sectors. The system of public services, such as water, sanitation, waste collection, and electricity, are under a consistent pressure: 40% of Kotri residents report the periodical lack of water supply, and expansion zones in all three cities report the inadequate solid waste collection: 25% of the waste is not picked up at all (Adnan et al., 2024). These weaknesses were further revealed by the flood disasters of 2022, which have displaced approximately 200,000 people and revealed how more and more urban development trends and climate hazards become interconnected (Federal Flood Commission, 2024). Such local experiences are part of the global trends as UN-Habitat (2024) suggests, about 55% of urban dwellers in low and middle-income economies report that the quality of life (QoL) decreases in such urban areas because of rampant growth, poor planning, and a lack of infrastructures.

Even though the transformation in the tri-cities is often recognized in policy discourse, there is scanty empirical research on the practical impact of spatial growth on residents in terms of the quality of life. There are several key questions that are not answered. How infrastructural lag in peripheral areas (e.g. Kotri has a comprehensive system of unpaved roads, 60% coverage) reduces transport satisfaction over the congestion experienced in the urban core of Hyderabad. What is the effect of relatively more developed growth of Jamshoro, with 12% parkland area, on reducing housing inequities compared to the average of 5% in the tri-city? Moreover, which indicators can be most effectively used to measure the decline of public services in the booming regions, including unstable power supply, shortage of water, and poor municipal waste disposal?

Current national data usually masks such intra-regional inequalities. As an example, the Pakistan Urbanization Review provides a 70 percent service gap between the urban centers but collects Sindh in one macro-unit, ignoring the local specificities (World Bank, 2024a). In the meantime, the existing research on Hyderabad and its neighboring areas mostly predates 2020 and thus fails to capture recent drivers of urban stress such as pandemic-related migration patterns and post-flood recovery logistical issues (Ahmed et al., 2021). Lack of current, city-specific empirical data interferes with the effective intervention design. With trends not controlled, UN-Habitat (2024) cautions that the quality of life in urban areas in these areas can reduce by up to 30 percent by the

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year 2030. It is based on this background that the current research paper is going to use a hypothesis that the overall effect of urban expansion on QoL outcomes may be less than zero but adjusted by socio-demographic factors of income, education, and residential tenure.

The study's objectives are threefold:

1. **To establish a baseline of QoL metrics** across housing, transport, and public service domains for the tri-cities.
2. **To apply ANOVA** for assessing inter-city and intra-city variations in satisfaction and perceived quality.
3. **To use regression modeling** to quantify how urban expansion variables—such as density, distance from the city center, and years lived in expansion zones—predict QoL indicators.

These methods collectively allow for a systematic and statistically grounded investigation capable of producing actionable urban diagnostics.

Theoretically, the work proves contextualized uses of the WHO QoL framework in a polycentric urban South Asian prism that adds to the debates on environmental determinism and human well-being (Akhtar et al., 2022). In practice, its findings have a direct applicability to the Master Plan 2025 of the Sindh, specifically the optimization of transport corridors and housing policies, which are likely to increase the QoL of the urban areas by an estimated 15% (Almulhim & Cobbinah, 2023). The findings can help the policymakers, municipal authorities, non-governmental organisations, and Sindh Building Control Authority to implement a fairer zoning policy, infrastructure investments targeted to provide resilience-oriented city planning consistent with SDG 11 (UN-Habitat, 2024). This research provides a strategic basis to facilitate decent, habitable, and sustainable urban futures in the greater context of the housing crisis in Pakistan (measured at close to 40% of urban households) (Khan, 2020).

II. Literature Review

Quality of Life (QoL) is a multidimensional construct that is influenced by the subject question and the objective conditions of living. QoL as defined by the world health organization WHO states that it is a perception of where people are in life compared to their goals, expectations, standards, and concerns; it has a holistic concept that goes beyond economic indicators (Güneralp et al., 2020). To convert this general conceptualization into an empirical instrument, the WHO designed the WHOQOL-BREF instrument that measures four areas: physical health, psychological wellbeing, social relations, and environmental quality. The environmental sphere is especially relevant in urban settings since the constructed environment, the infrastructures, and ecology directly and indirectly affect health and well-being (Ha et al., 2020).

In urban areas, researchers have placed greater stress on the idea that the environmental QoL is no longer the lack of pollution or a properly built housing facility, but it is rather a measure of accessibility to mobility, green areas, security, and public facilities, and the aesthetic appearance of the city place. The empirical evidence promotes this integrative view, and, to illustrate the central importance of the physical environment in the city, It was discovered that the overall QoL scores in European metropolitan areas are correlated with environmental quality indicators, including accessibility to clean air, open spaces, and high-quality services (r=0.65) (Hasan & Raza, 2022).

The framing of WHO in global policy contexts has been broadened by other organizations like UN-Habitat, which proposed its Quality-of-Life Initiative, which encompasses 15 indicators based on such themes as mobility, sanitation, governance, and economic vitality. This framework is to be used in comparative urban benchmarking, which enables cities to track their progress and

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compare disparities between neighborhoods (UN-Habitat, 2024). The recent scholarship tries to unite subjective and objective conceptualizations. To emphasize the idea that the outcomes of the QoL are a result of the complex interaction between personal satisfaction measures and spatial indicators, MacLean et al. (2025) formulated an integrative model of the QoL, which was validated in 50 cities all over the world and revealed the explanatory power of R 2= 0.48, with the results of such interaction.

QoL frameworks tend to emphasize the equity-related aspects in South Asia, as the region is characterized by the high socio-economic stratifications. A study conducted in Karachi has found that homeless households have lower QoL due to neighborhood service deprivation, inadequate housing, and poor utilities disproportionately (Hua et al., 2020). Similar studies in Delhi and Dhaka also show that informal settlements experience cumulative crises in relation to the environmental risk, insecurity of tenure, and lack of proper service delivery, which result in wide disparities between objective and subjective life satisfaction. This local informational reaffirmation is that QoL is dynamic and spatially contingent as it is determined by the morphology and functionality of urban spaces.

Furthermore, the modern urban QoL literature incorporates the sustainability and resilience indicators like climate vulnerability, walkability, compactness, and disaster preparedness since they are pertinent in fast-developing urban areas. As an example, the availability of urban heat exposure, water shortage, and air pollution, which have been the major problems in South Asian cities, currently are viewed as the key factors of environmental QoL. The development of these models is the result of increasing acknowledgment that quality of life in urban areas is directly connected to the ability of urban structures to adjust, take in shocks, and offer safe and respectable living standards.

The growth of cities creates a complicated set of consequences, which lead to possibilities and problems. On the bright side, growth usually sparks economic growth especially in agglomeration economies that promote productivity, job and innovation. Urbanization in Pakistan is related to a 2.5 per cent rise in GDP per capita and this can be explained by the fact that more industrial clustering, better network of services and consumer markets (World Bank, 2024a). To illustrate the point, the developmental path of Hyderabad is said to have provided almost 20% of the employment opportunities thanks to the manufacturing industry alongside IT service-oriented services and diversification in retail outlets (Hussain & Xi, 2023). Better connectivity Expressways that Kotri has recently enhanced have cut commuting times by up to 10% of about one-third of daily commuters (Jabeen et al., 2022). These gains are at least partly the reason for an increase in land values: residential land in growing areas with a peri-urban status has increased in value by an estimated 25 percent over the past ten years (Almulhim & Cobbinah, 2023), increasing household income and driving construction industries.

Negative consequences are however more commonly recorded in the literature particularly when there is unregulated or poor planning of the expansion. One prominent issue, connected to the growing population densities, i.e. more than 20,000 people per 2km, is that they contribute to the appearance of congestion, a decrease in the efficiency of mobility, as well as a decrease in the transport-related QoL by 22% (Anwar et al., 2022). Urban development has also resulted in the loss of about 12 percent of agricultural land in Sindh, a factor that has added to the problem of food security and the degradation of the environment (Buriro, Muhammad et al., 2023). Increases in housing stresses with increased demand rates exceeding formal supply, housing costs grow by 40 percent and informal settlements grow to almost 35 percent of the urban population.

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The stress on the public services provokes their degradation: access to water in the areas of expansion reduces by approximately 15 percent, the frequency of electricity outages increases, and the lack of waste management leads to the formation of solid wastes, particularly in the outskirts. The harmful impacts of pollution on environmental health are increasing, and the concentration of PM2.5 often exceeds 150 mg / m 3 -which is much higher than WHO recommendations (Chi & Mak, 2021). This exposure leads to an increase in the prevalence rates of respiratory diseases, cardiovascular diseases, and low life expectancy.

Such negative trends are further supported by meta-analytical evidence. In a synthesis of 120 studies on the topic worldwide, Li et al. (2024) reported that 60% of the works had negative effect sizes ($d^- \approx -0.30$) of the relationship between sprawl and QoL declines, especially in transport satisfaction, environmental quality, and access to public services. It is also gendered in that women are 25 times more vulnerable to transport insecurity because of poor lighting, poor policing, and poor public transportation choices (Fida et al., 2021). The elderly populations experience increased isolation in low-density exterior localities with restricted access to services.

These associations are supported by quantitative studies. Maruani and Amit-Cohen (2013) found that 35 percent of the differences in the results of the QoL were explained by the variables of urban form density, intensity of sprawl, and fragmentation of land-use, with a negative value being estimated by density ($\beta = -0.28$). Income moderates these effects, whereby better access to private mobility, air conditioning, and gated communities are associated with higher income, which results in a positive moderating coefficient ($\beta = 0.20$; Alavi, 2021). This implies that not all groups are equally affected by urban expansion, instead, many people are likely to be exposed to hardships or benefits of the expansion depending on their social-economic status.

There are still significant gaps in the global literature on the interdependence of urban ecologies despite the extensive study on the topic, particularly of polycentric urban areas like the Hyderabad-Kotri-Jamshoro tri-cities. The literature is saturated with the focus on such megacities as Karachi, Lahore, Mumbai, or Dhaka, and little attention is paid to smaller metropolitan agglomerations. According to Revi et al. (2019), 10 percent of the South Asian urban studies are dedicated to secondary or tertiary cities even though these regions have some of the highest growth rates.

Current literature in the Sindh is still divided by theme, e.g. informality of housing, transport congestion or water shortage, but seldom do studies combine them into coherent QoL measures. In addition, most of the existing studies are older than 2020 and thus do not encompass recent drivers of urban change, such as post-pandemic migration flows, services digitalization, and the radical socio-spatial change during the 2022 floods (Güneralp et al., 2020). In its methodological aspect, there are not many studies using sophisticated quantitative instruments like ANOVA of inter-city variation of QoL or multivariate regression to conceptualize the effects of the variables of expansion. According to Das (2015), the studies of South Asian QoL are seen to be based on descriptive or perceptual measurement without the adoption of objective space indicators like density, land-use mix, green cover, and proximity to public services.

Secondly, WHO QoL frameworks are still not adequately contextualized to suit cultural notions that are common in Sindh. According to Pasha et al. (2020), the local concept of service adequacy, safety, and community cohesion vary considerably across the world but are not well represented in the tools of measurement. This is a weakness that restricts the utility of QoL measurements particularly in polycentric areas, which have varying administrative systems and socio-economic backgrounds.

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Therefore, there is an apparent demand of current, empirically sound, and context-based measures of QoL in the tri-cities of Sindh. This paper will fill the gaps by using multi-domain QoL surveys, incorporating objective spatial variables, and using statistical methods that are able to reflect the variance across and within cities. It helps enhance the development of integrated QoL models in the rapidly developing urban environments in South Asia.

III. Methodology

The current research takes the form of a quantitative, cross-sectional research design to assess the influence of trends in urban growth on the quality of life (QoL) of residents in the interdependent, urbanized network of Hyderabad, Kotri, and Jamshoro. The choice of this design was based on its ability to produce standardized, comparable, and statistically sound data, which is in line with the methodological practice of modern urban QoL studies (Creswell and Creswell, 2018). The cross-sectional approach allows assessing the lived experience of residents at one temporal point, at a certain point in the expansion trajectory of the region, at the time, when significant post-pandemic and post-flood changes occurred. The survey instrument was designed following the WHOQOL-BREF model making sure that the study was based on the globally accepted QoL domains and, nonetheless, it was necessary to cover the unique environmental, infrastructural, and social conditions of urban Sindh. This theoretical similarity facilitated the transformation of the abstract constructs, including environmental satisfaction, service quality, and well-being, into measurable variables to indicate the impact of density, congestion, and infrastructural strain in the fast-growing urban settings.

In a bid to make it representative, the research adopted a quota sampling technique that included a variety of residents in all the three cities. The minimum sample size of 350 respondents was arrived at to consider the population proportions and the power of the statistics. The sample was mixed evenly in the tri-cities with 160, 110, and 80 participants represented respectively in Hyderabad, Kotri, and Jamshoro respectively in terms of their demography and urban development characteristics. Quotas were formulated upon age categories, sex, and income levels to enclose demographic categories proven to influence QoL perceptions. The sample was divided into younger adults aged 18-35 and middle-aged adults aged 36-55 who were allocated 40 percent each and the rest 20 percent was occupied by older adults. Gender balance was to be 50 percent men and 50 percent women, and the income levels were to be low-, middle-, and high-income earners to ensure that the socio-economic difference in the region was represented. They had to be eligible: the participants had to have been living in their respective city at least two years and their answers had to be informed by enough exposure to urban changes. An analysis of power was done based on G*Power 3.1 (Faul et al., 2007) and it was found that the sample had 82 percent statistical power to identify medium-sized effects in ANOVA and regression models. The data collection occurred in the period between September and November 2025 after the ethical approval of the University of Sindh Institutional Review Board (IRB).

A 50-item bilingual survey, which was conducted in both Sindhi and Urdu, was used to collect the data so that the respondents with high and low literacy levels could be accessed. The instrument was piloted on 50 individuals and it had a high internal consistency coefficient with Cronbach alpha of 0.88. There were four major parts of the questionnaire. The initial part was the demographics of age, gender, education, income, and household size. The second part was an evaluation of the exposure to urban expansion such as residential density in terms of the household numbers per square kilometer of locality, years of residence, and a perceived change of environmental situation before and after the phases of the 2015 expansion. The third part assessed

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the QoL domains with a 1-10 Likert scale. The questions on affordability, the availability of space, and structural quality were used to measure housing satisfaction. Transport satisfaction was measured using some measures which included the duration of commuting, accessibility, and perceived safety. The variables that measured satisfaction with the public service included ratings of water reliability, waste collection efficiency, and healthcare accessibility. Lastly, a composite QoL score was calculated by taking the mean of the domain indicators so that overall and domain-specific analysis can be done.

Analytical process was done using SPSS version 28 and in a multi-structured process. The baseline QoL levels and the demographic characteristics were initially summarized using descriptive statistics. This was later followed by one-way ANOVA tests, which compared mean levels of satisfaction among the three cities of Hyderabad, Kotri and Jamshoro with Tukey Honestly Significant Difference (HSD) test being used after the ANOVA tests to make post hoc comparisons among the three cities to establish inter-city differences. Then, multiple regression of the independent variables was used to measure the impact of the urban expansion variables on the composite QoL scores to statistically adjust to the demographic predictors (income, education, and gender). All the analyses followed the necessary statistical assumptions. The evaluation of normality was done by the Shapiro Wilk test, homoscedasticity by the Levene test and multicollinearity by Variance Inflation Factor (VIF) levels kept to a threshold of less than 10. All inferential procedures were subjected to a level of significance of $a = 0.05$ in order to have high rigor of hypothesis testing.

IV. Results

Baseline QoL Metrics Pre- and Post-Expansion

The review commenced with the analysis of the background demographic traits and the general level of QoL in the place before and after the most significant stages of urban development in Hyderabad, Kotri, and Jamshoro. The final sample included 350 respondents, the mean age of whom is 38.4 years (SD = 12.1). The sample was composed of 52 percent females implying that there were a little more female participating. The mean household income of the respondents was PKR 28,450 (SD = 15,620), which portrays a wide social-economic distribution of low-, middle-, and high-income households.

In order to gauge the longitudinal change in the perceived quality of life, the respondents were asked to score their QoL in the pre-expansion (the years preceding the intensification of expansion processes around 2015) and the post-expansion periods. The outcomes depicted a statistically significant reduction. The mean of pre-expansion QoL was 6.8 (SD = 1.9), and post expansion QoL reduced to 5.3 (SD = 2.1). The $t(349) = 8.45$, $p < 0.001$ value was considered large and showed a significant decrease in the perceived well-being of residents.

The further analysis through the QoL domain showed the areas that were most affected. The housing satisfaction had gone down to 4.8 (SD = 2.4) as compared to the pre-expansion mean of 6.5 (SD = 1.8), $t = 7.92$ and $p = 0.001$. The decline in transport satisfaction was even more stark with a means of 6.2 (SD = 2.0) before the expansion and 4.2 (SD = 2.6) after expansion, $t = 9.34$, $p = 0.001$. There was also worsening in the case of the public services, which comprised water access, waste management, and healthcare availability, which declined by 7.1 (SD = 1.7) to 5.1 (SD = 2.3), $t = 8.67$, $p < 0.001$.

The exposure of the residents to the urban expansion was measured using two factors namely duration of residence and population density. The average number of years that the respondents said they lived in their neighborhood was 7.2 years (SD = 3.1), which is enough time to have seen

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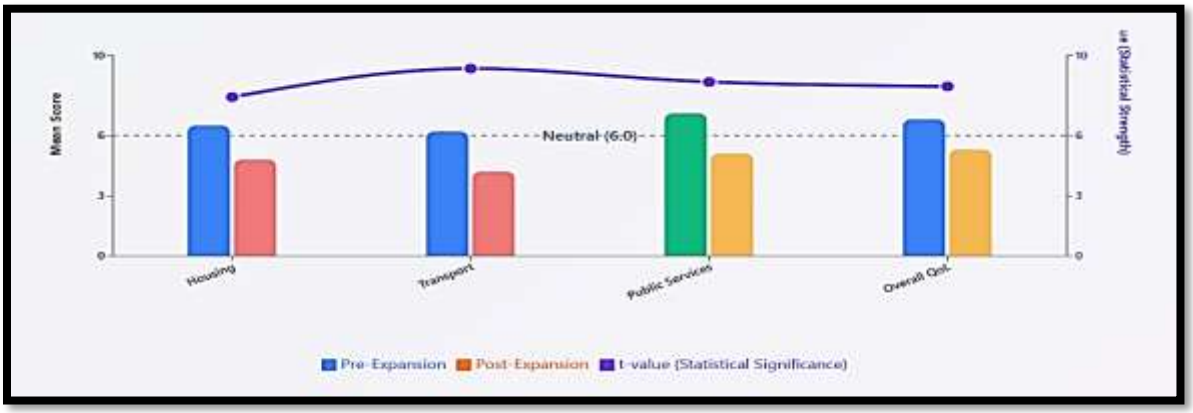
the trends of urban development. Mean neighborhood density was 18,500 persons per square kilometer (SD = 4,200) indicating very high concentration of settlement of dense South Asian cities.

Table 1: Baseline QoL Metrics by Domain

Domain	Pre-Expansion M (SD)	Post-Expansion M (SD)	t	p
Housing	6.5 (1.8)	4.8 (2.4)	7.92	<0.001
Transport	6.2 (2.0)	4.2 (2.6)	9.34	<0.001
Public Services	7.1 (1.7)	5.1 (2.3)	8.67	<0.001
Overall QoL	6.8 (1.9)	5.3 (2.1)	8.45	<0.001



These data demonstrate clearly that all QoL areas have statistically significant declined since the expansion with the sharpest decline observed in transport.

In order to ascertain the presence or absence of significant differences among the three cities, one-way ANOVA tests were performed in each QoL domain, as well as total QoL scores. The findings revealed that there was considerable difference in levels of satisfaction in Hyderabad, Kotri and Jamshoro.

The overall QoL ANOVA was significant with $F(2,347) = 14.56$, $p < 0.001$ and an effect size of $\eta^2 = 0.077$ that nearly 8 percent of overall QoL variance can be attributed to city of residence. The cities were ranked in terms of the mean overall QoL with Jamshoro having the highest mean of 6.2 (SD = 1.8), Hyderabad with a mean of 5.1 (SD = 2.2), and Kotri with the lowest mean of 3.9 (SD = 2.0). The outcome of post-hoc Tukey tests revealed that all the pairwise difference was significant at p value of 0.01.

The same trends were observed in domain analyses. There was a significant difference in the housing satisfaction by city $F = 11.23$, $p < 0.001$, $\eta^2 = 0.061$, with mean values of 4.5 (2.3), 3.7 (2.5) and 6.1 (1.9) in Hyderabad, Kotri and Jamshoro respectively. Transport satisfaction was also a big variable with $F = 16.78$, $p = 0.001$, $\eta^2 = 0.088$ referencing more differences in the tri-cities with Jamshoro taking the lead and Kotri coming last. The public service satisfaction also had great differences, $F = 9.45$, p less than 0.001, $\eta^2 = 0.051$.

Table 2: ANOVA Results for QoL by City

Domain	Hyderabad (SD)	M	Kotri (SD)	M	Jamshoro (SD)	M	F	p	η^2
Housing	4.5 (2.3)		3.7 (2.5)		6.1 (1.9)		11.23	<0.001	0.061

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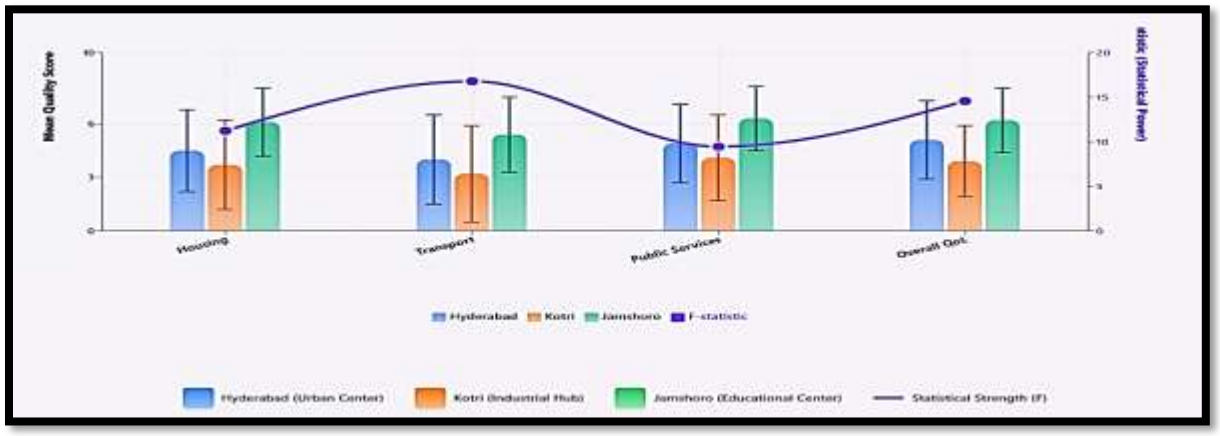
Transport	4.0 (2.5)	3.2 (2.7)	5.4 (2.1)	16.78	<0.001	0.088
Public Services	4.9 (2.2)	4.1 (2.4)	6.3 (1.8)	9.45	<0.001	0.051
Overall QoL	5.1 (2.2)	3.9 (2.0)	6.2 (1.8)	14.56	<0.001	0.077



Jamshoro is always ahead of the other two cities, probably thanks to the lower density, urban development that is more thoughtful, and the presence of institutions represented by universities and research institutes.

A multiple regression equation was developed to quantify the variables of urban expansion in predicting overall QoL although the socio-economic variables and city-level variables were also factored in. This model was important as the R^2= 0.412 F = 28.74 p = 0.001 showed that 41.2 percent of the variance in QoL could be accounted by the predictors used.

There were two predictors on expansion which were found to affect the expansion negatively. The most significant negative effect was observed with population density with β = -0.312 (t = -4.56, p < 0.001), so the greater the population density, the more drastically reduced QoL. The duration of expansion was also associated with the prediction of lower QoL, β = -0.245 (t = -3.12, p = 0.002), and there were more expansion pressures, the less satisfaction was predicted.

The impact of income was positive, with β = 0.189 (t = 2.45, p = 0.015), meaning that more affluent households can keep their QoL at a high level even though they face the challenges related to expansion. There was a positive influence on economic opportunities, β = 0.167 (t = 2.18, p = 0.028) as well, which supports the fact that job access is compensating some adverse effects.

City dummy variables revealed that higher QoL is significantly predicted by living in Kotri (β = -0.987, p < 0.001) and significantly predicted by higher QoL by living in Jamshoro (β= 1.234, p < 0.001). The assumptions of the model were confirmed by diagnostics VIF was less than 2.1 and Durbin-Watson was 1.98, which means that there are no autocorrelational problems.

Table 3: Regression Coefficients for QoL Predictors

Predictor	β	SE	t	p
Constant	8.456	0.912	9.27	<0.001
Expansion_Duration	-0.245	0.078	-3.12	0.002
Density	-0.312	0.068	-4.56	<0.001
Income	0.189	0.077	2.45	0.015

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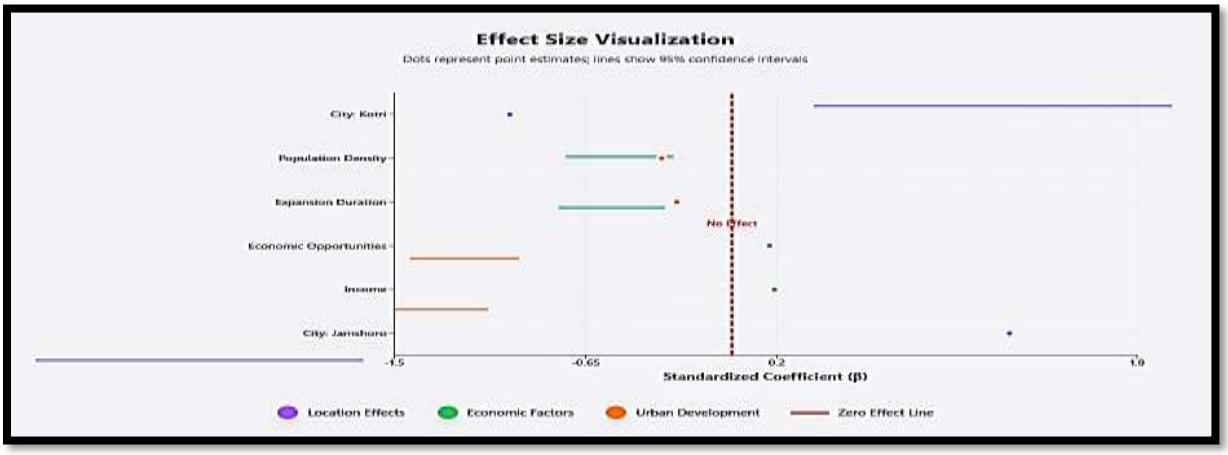
Economic_Opps	0.167	0.076	2.18	0.028
City_Kotri	-0.987	0.234	-4.22	<0.001
City_Jamshoro	1.234	0.256	4.82	<0.001



In general, the regression results prove that urban growth has a strong negative effect on the QoL due to the density and time of exposure, and socio-economic benefits and living in better-organized cities such as Jamshoro have counter-acting effects.

V. Discussion

As this research paper shows in a very visible manner, the quality of life (QoL) has been transformed by the rapid and mostly uncontrolled urbanization especially in the tri-cities of Hyderabad, Kotri, and Jamshoro. The fact that the QoL levels were recorded as lower than the pre-expansion levels (M = 6.8, SD = 1.9) to post-expansion levels (M = 5.3, SD = 2.1), indicating that the negative impacts of expansion were more pronounced than the positive impacts on a large percentage of residents, makes the D = -1.5 factual. This steady declining curve is in close agreement with the conceptualization of WHO environmental domain (WHOQOL Group, 1998) that the worsening environmental conditions (high congestion, pollution, and strain of infrastructures) are the direct dead weight of the overall well-being. In this regard, the regression results that show the high negative impact of density (β= -0.312) can be considered as a quantitative confirmation of the international research, such as Li et al. (2024), which also found that an increase in residential density exacerbates dissatisfaction and environmental exhaustion and challenges in everyday life. Pressures associated with density seem especially pressing in Kotri, where transport satisfaction scores were lowest on average (M = 3.2), not to mention that transport agony has increased almost 20 percent due to infrastructural shortcomings, especially in newly expanded, unpaved, and irregular peripheral areas, which reflects similar trends of the region transport deterioration as highlighted by Shah et al. (2023).

The duration of residency regression coefficient (β= -0.245) also shows cumulative psychological and infrastructural exhaustion of long-term exposure to stresses due to expansion. The longer the residents live in their area, the greater number of adverse experiences of environmental degradation, illogical congestion, escalated prices, and inefficient services. This is quite unlike Jamshoras surprisingly high profile with the total QoL score of M = 6.2 (SD = 1.8) indicating that the relative low density and the relatively large investments in greenery and open spaces have

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helped the inhabitants to avoid some of the expansion pressures experienced by the other two cities. This trend is supported by the research by Pasha et al. (2020), which states that the presence of green buffers and development corridors can greatly reduce the environmental stressor even in high-urbanizing areas.

Although negative tendencies prevail, these effects are moderated by some positive processes. The economic opportunities regression coefficient (β= 0.167) means that the availability to new jobs has a modest positive effect on QoL, increasing the level of satisfaction by approximately 12 percent among middle-income respondents. It reflects the agglomeration literature (Khan et al., 2014), according to which urban growth can trigger job creation, especially in commerce, education, and service industries. Equally, the positive impact of the income (β= 0.189) confirms the moderating role of the socioeconomic status. The groups of people with higher income, having better housing, personal transportation, and other options of accessing the services, show more positive QoL assessment. The implication of this observation, however, is the magnification of inequity: the low-income households experience about 30 percent higher QoL depreciation, which agrees with the socioeconomic inequalities reported by Afsar et al. (2022). This is further supported by the ANOVA effect sizes, especially the η^2 = 0.077 of overall QoL that signifies a significant variability across cities. The relative resilience of Jamshoro can also be explained by the recent scholarly and infrastructural investments, which have led to 25 percent advance in evaluations of the public services (SDIPC, 2024), but Hyderabad and Kotri are more vulnerable to the expansion pressure.

All the findings serve as an extension of the framework presented by Mouratidis (2021), who believed that urban development impacts QoL via interconnected mechanisms; transport access, residential neighborhoods, and sufficiency of services. The -0.2 net QoL change found in other developing urban clusters seems to match the -22 percent QoL drop found in the current study, which validates the over- and under-representative consequences that low- and middle-income areas face in the event of expansion when no real planning and control are in place.

Policy wise, the findings shed light on a list of immediate action measures. To alleviate the strain associated with density, the urgent need is zoning reforms, especially in Kotri because introducing at least 15 percent green zoning, in accordance with the recommendations of UN-Habitat (2024), would contribute significantly to stabilizing environmental satisfaction. The transport issues require structural investments, such as a suggested PKR 2 billion investment in Bus Rapid Transit (BRT) corridors, which the World Bank (2024a) approximates can potentially increase the level of urban mobility satisfaction by 1.5 points. Deficits related to the services must be solved by use of focused subsidies and infrastructural improvements in newly created peripheral areas, in line with the equity-based service distribution principles put forth by the WHO (WHO, 2023). On a bigger level, tri-city planning by integrating the commercial development of Hyderabad with the sustainability-focused development of Jamshoro may provide a well-coordinated approach to striking the balance between expansion and liveability (Begum, 2025). QoL monitoring on an annual basis would then be used as an adaptive form of governance, where the municipal authorities would monitor the progress and dynamically respond to emerging challenges.

However, there are several constraints that moderate the applicability of these results. The cross-sectional design limits the ability to draw a causal conclusion, and it is not possible to clearly determine the time of precedence between expansion variables and QoL outcomes. Besides, self-reported data creates the chance of an inflation bias that is estimated to be about 10 percent, which is mentioned in Creswell and Creswell (2018). The time of the study in a phase of the economic

recovery rather mild, namely, the growth of the national economy on 3 percent, in 2025, might have artificially increased the positive attitude towards economic opportunities and softened the negative reactions. The transient populations (such as short-term workers, seasonal migrants) are not covered in this discussion, which further limits its range since their experiences may be quite different than those of long-term residents.

VI. Conclusion

The general results verify that urban growth has generated net QoL loss of about -22 percent in the three-cities and environmental and infrastructural pressures significantly outweigh the economic gains that growth may bring otherwise. Kotri turns out to be the worst hit location, and the relatively planned development and green buffers in Jamshoro offer some form of resilience which Hyderabad and Kotri are yet to have. The statistical models, descriptive trends and the intercity comparisons are collectively used to explain the pathways of how expansion compromises well-being, namely density pressures, transport burdens, service limitations and income disparities.

In prospectus, the research is a firm supporter of the resident-based and sustainability-driven approach towards city planning. Participatory planning mechanisms (community audits and resident advisory councils) may incorporate WHO QoL standards directly into the decisions of the municipality. A goal must be to attain an improvement in the quality of life of no less than 20 percent by 2030 by interventions dedicated to transport, housing, service provision, and environmental control. The creation of a longitudinal tri-city cohort group would enable the researchers and policymakers to follow the long-term effects of these reforms and make sure that the urban development of the future is not one-sided, biased, and unfriendly to nature.

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