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ARTÍCULO DE INVESTIGACIÓN

Evaluación de la calidad de vida urbana: estudio exhaustivo del distrito 12 de la Ciudad de Ho Chi Minh, Vietnam

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Resumen. Este estudio investiga los determinantes de la calidad de vida de los habitantes del distrito 12 de Ciudad Ho Chi Minh. Empleando el análisis factorial exploratorio (AFE) y el análisis de regresión, la investigación desarrolla un modelo para evaluar el impacto de diversos factores en el nivel de vida de los habitantes. El análisis identificó cinco factores principales, clasificados según su influencia: condiciones de vida, educación y formación, salud y servicios sanitarios, estabilidad vital, empleo e ingresos, relaciones familiares y sociales, e infraestructuras. A partir de estos resultados, el estudio sugiere estrategias prioritarias destinadas a mejorar la calidad de vida en el Distrito 12. Estas recomendaciones se adaptan para abordar las necesidades y retos específicos identificados a través de la investigación. El estudio aporta valiosas ideas a la planificación urbana y la formulación de políticas, sobre todo en zonas urbanas en rápido desarrollo.

Palabras clave: calidad de vida, urbano, análisis de regresión, análisis factorial exploratorio (AFE), Ciudad Ho Chi Minh.

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Evaluating urban quality of life: a comprehensive study of District 12, Ho Chi Minh City, Vietnam

Abstract. This study investigates the determinants of quality of life among residents of District 12 in Ho Chi Minh City. Employing exploratory factor analysis (EFA) and regression analysis, the research develops a model to evaluate the impact of various factors on the inhabitants' living standards. The analysis identified five primary factors, ranked according to their influence: living conditions, education and training, health and healthcare services, life stability, employment and income, family and social relationships, and infrastructure. Based on these findings, the study suggests prioritized strategies aimed at enhancing the quality of life in District 12. These recommendations are tailored to address the specific needs and challenges identified through the research. The study contributes valuable insights into urban planning and policy-making, particularly in rapidly developing urban areas.

Keywords: quality of life, urban, regression analysis, exploratory factor analysis (EFA), Ho Chi Minh City.

INTRODUCTION

Quality of life encompasses feelings of happiness and satisfaction with life's essential elements, varying per individual. According to P. Beohnke, quality of life relates to individual happiness encompassing a broad, multidimensional spectrum of emotions. In Europe, it is often associated with societal goals such as equal life opportunities, a guaranteed minimum living standard, employment opportunities, and social assistance. Thus, quality of life extends beyond income, education, and material possessions to encompass health care, family issues, and social relations (P. Boehnke, 2005). The World Health Organization defines quality of life as an individual's perception of their position in life within their cultural context, influenced by goals, expectations, values, and concerns. It is a multifaceted concept affected by physical health, psychological state, independence, social relationships, personal beliefs, and the surrounding environment (WHO, 2000).

Currently, Vietnam is undergoing an economic transition, where quality of life is influenced by various factors, including politics, economy, society, environment, transportation, health care, and education. Although material living standards have improved, issues like environmental pollution and urbanization challenges, such as slums, flooding, healthcare, and traffic safety, are affecting life quality. District 12, originally part of Hoc Mon district and primarily agricultural land, faces challenges like unclear development planning, infrastructure inadequacies, and a lack of green spaces, all of which pressure the residents' quality of life.

LITERATURE REVIEW

The concept of quality of life has garnered significant attention in urban studies, particularly in understanding how various factors contribute to residents' overall well-being. Previous studies have identified key elements impacting urban quality of life, including economic conditions, social relationships, health and well-being, education, and the environment (Sirgy, M. J., Rahtz, D. R., Cicic, M., & Underwood, R, 2000); (Marans, R. W, 2012). Focusing on Vietnam, several researchers have

emphasized the importance of infrastructure development, economic growth, and social policies in enhancing the quality of life in urban settings (World Bank, 2011); (Nguyen, T.C., Nguyen, H.D., Le, H.T. and Kaneko, S, 2022). Notably, the transformation of urban areas in Vietnam, characterized by rapid development and modernization, presents unique challenges and opportunities in this context.

The quality of life in urban areas is intrinsically linked to the urban development process (Marans, R. W, 2012). Marans and Stimson (2011) highlight that urban development influences residents' quality of life through changes in economic opportunities, social dynamics, environmental conditions, and infrastructure. These aspects collectively shape residents' perceptions of their living conditions and overall satisfaction with urban life.

In the context of District 12, Ho Chi Minh City, the rapid urbanization and subsequent socioeconomic transformations have brought a significant shift in the quality of life of its residents. This study aims to delve deeper into these changes, exploring how different factors contribute to the residents' perceptions of their quality of life and identifying areas for improvement.

METHODOLOGY AND DATA COLLECTION

Methodology

The research paper employs the sociological survey approach; data is gathered using 5-point Likert scale questionnaires. The analysis of the information gathered after the survey will be done in five steps. First, broad descriptive statistics will be run in order to generalize the characteristics of the sample that is being studied. Second, Cronbach's alpha will be used to assess the scale's dependability. Research can retain meaningful observable variables and eliminate irrelevant ones in this way. Third, an exploratory factor analysis (EFA) will be used to reduce the observed variables to a subset of more important components. To determine whether the actual number of components combined together agrees with theory, EFA analysis will be performed. Fourth, a Pearson correlation coefficient test was performed to determine whether there was a linear link between the independent and dependent variables before beginning the regression. Finally, the influence of independent factors on the dependent variable is determined using multiple linear regression analysis, which aids in testing the study hypothesis.

Research Data

Hair et al. (2010) suggest that for effective EFA, a sample size should be at least five times the number of observed variables. In this study, the survey sample comprised 34 observations, with 30 observations for each of the 6 independent variables and 4 observations for each dependent variable. The observed factors were ranked on a 5-level scale, ranging from "not at all important" to "very important." Consequently, a minimum sample size of 170 (34 x 5) was required. A total of 250 questionnaires were distributed to residents of select wards in District 12, Ho Chi Minh City. Out of these, 46 responses were deemed invalid and excluded from analysis, leading to a final sample size of 204. The survey was conducted from mid-January to mid-March 2023, a period marking the beginning of a new year and the Lunar New Year holiday. The respondents primarily consisted of long-term residents of District 12, Ho Chi Minh City, Vietnam.

Theoretical Framework

Christopher et al. (2010) observed that individuals with higher incomes, who can afford more life-related goods, tend to report higher standards of living and satisfaction. The Treasury Board of the Secretariat of Canada also noted that financial factors significantly influence quality of life (Treasury Board of Canada Secretariat, 2000).

Infrastructure, as asserted by Jonathan Brooks (2021), plays a pivotal role in socio-economic development. A modern infrastructure system enhances production efficiency, supports economic growth, and aids in resolving social issues. Quality of life, according to this research, is influenced by factors like quality roads, traffic flow, and safety.

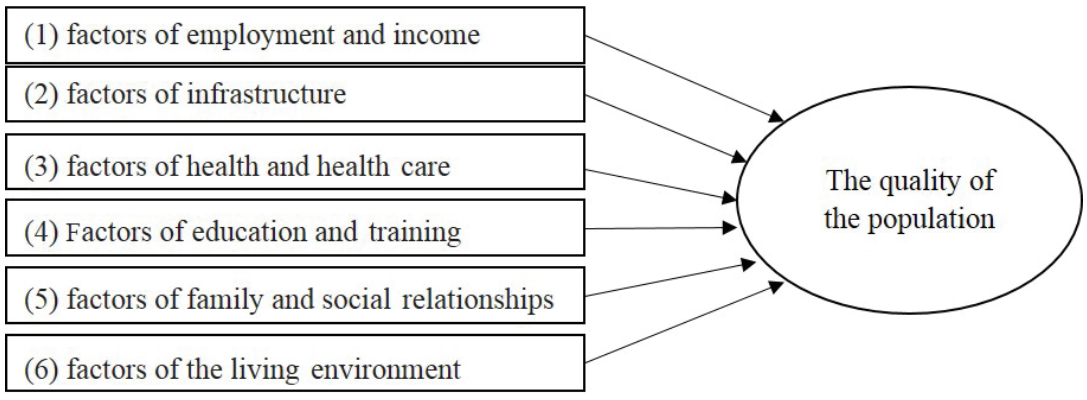
Health services and healthcare directly impact individuals' well-being. The World Health Organization defines it as the prevention, treatment, and control of disease, as well as the promotion of health through services offered by healthcare organizations and professionals (WHO, 2000).

Education's impact on quality of life is highlighted by Boehnke (2005). In addition, research by Made Nyandra et al. (2018) found that university professors nearing retirement are more susceptible to depression. Their study suggests that education and training, particularly for older adults, can enhance quality of life and reduce depression. Family and social interactions are crucial in coping with adverse situations, as indicated by Boeknke (2005). Zhao (2004) emphasizes the significant impact of having friendly neighbors on one's quality of life. Furthermore, housing is identified as a critical factor, reflecting societal progress and living standars.

Katherine Ka Pik Chang et al. (2020) found that living conditions and health behaviors significantly affect overall well-being. Environmental factors, particularly when interacting with personal factors like stress and sleep, play a crucial role in determining quality of life.

Drawing from the works of Pastha Eva et al. (2011), Michael Douglass, the Treasury Board of the Canadian Secretariat, Jonathan Brooks et al. (2021), Boeknke (2003), and Katherine Ka Pik Chang (2020), and observations of residential life in District 12, the author proposes a research model to analyze factors affecting the quality of life in District 12. These include: (1) employment and income factors; (2) infrastructure factors; (3) health and healthcare factors; (4) education and training factors; (5) family and social relationship factors; and (6) environmental factors. The theoretical framework is depicted in Figure 1 below.

Figure 1. Theoretical framework of a research proposal



RESULTS AND DISCUSSION

Utilizing Cronbach's Alpha to evaluate the scale's reliability

The reliability of the scale, a crucial step in ensuring the accuracy of the Exploratory Factor Analysis (EFA), was assessed using Cronbach's Alpha reliability coefficient analysis. (Hoang. T, Chu. M,N, 2017) suggested that for a scale to be considered reliable, the correlation coefficient of the entire variable must be less than 0.3 and the Cronbach's Alpha coefficient must exceed 0.6. In this study, six independent variables with 30 observations and one dependent variable with 4 observations were formulated. Adequate observations per variable allowed for a reliable analysis of Cronbach's Alpha. The reliability coefficient for each variable was calculated, and any observation or variable not meeting the criteria was reassessed. Table 1 presents the analysis results of the scales' Cronbach's Alpha coefficients. Both Cronbach's Alpha and the total variable's correlation coefficient met the theoretical requirements, indicating overall reliability.

TABLE 1. Evaluation of Cronbach's Alpha Coefficient.

Factors	Number of observed variables	Corrected Item-Total Correlation	Cronbach's Alpha
Employment and income	5	.445	.756
Infrastructure	5	.597	.849
Health and health care	5	.770	.925
Education and training	5	.627	.874
Family and social relationships	4	.634	.732
The living environment	4	.740	.906
The quality of the population	4	.627	.797

The motivation scale's Cronbach's Alpha coefficient was the lowest among the evaluated scales, at 0.906, with the smallest total correlation coefficient at 0.345. All observed variables' total correlation coefficients exceeded 0.3. Consequently, 32 observed variables met the reliability criteria and were utilized for further analysis.

Results from Exploratory Factor Analysis (EFA)

Subsequent to the Cronbach's Alpha analysis, 28 observations across 6 independent variables and 4 observations of 1 dependent variable were deemed reliable. These observations were structured using a theoretical framework of variables influencing urban residents' quality of life, focusing on District 12 in Ho Chi Minh City, Vietnam.

TABLE 2. KMO and Bartlett's Testa

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.796
Bartlett's Test of Sphericity	Approx. Chi-Square	4867.215
	df	378
	Sig.	.000

a. Based on correlations.

For effective EFA, the Kaiser-Meyer-Olkin (KMO) coefficient should range between 0.5 and 1, with higher KMO values indicating stronger correlations with survey data. The results of the Barlett test shown in Table 2 show that the variables in the population are correlated with each other with Sig. = 0.00 < 0.05. At the same time, the KMO coefficient = 0.796 > 0.05, proving that factor analysis to group variables together is appropriate and the data is suitable for factor analysis.

TABLE 3. Total Variance Explained.

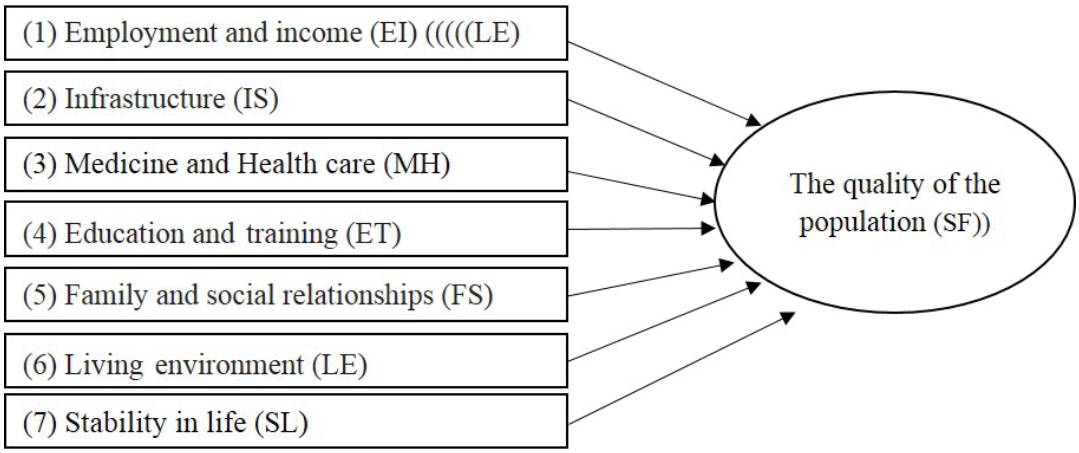
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10.954	39.122	39.122	10.954	39.122	39.122	4.076	14.558	14.558
2	2.429	8.676	47.798	2.429	8.676	47.798	3.996	14.270	28.828
3	2.081	7.434	55.232	2.081	7.434	55.232	3.636	12.984	41.813
4	1.956	6.987	62.218	1.956	6.987	62.218	3.164	11.302	53.114
5	1.778	6.349	68.567	1.778	6.349	68.567	2.446	8.735	61.849
6	1.226	4.378	72.945	1.226	4.378	72.945	2.204	7.873	69.722
7	1.175	4.196	77.141	1.175	4.196	77.141	2.077	7.420	77.141
8	.922	3.294	80.435						
9	.755	2.697	83.132						
10	.637	2.276	85.408						
11	.574	2.051	87.459						
12	.515	1.838	89.297						
13	.407	1.455	90.752						
14	.381	1.359	92.111						
15	.327	1.167	93.278						

Extraction Method: Principal Component Analysis.

Table 3 shows that all 5 factors have Eigenvalues > 1. The extracted variance is 77.141% > 50%, which is satisfactory. With the Principal Components Analysis extraction method and Varimax rotation, there are 5 factors extracted from the observed variables. This shows, solvability explains 77.141% of the change in the dependent variable in the population.

Rotated matrix demonstrates that all variables have factor loadings greater than 0.5, the scale is acceptable, and there are seven groups of factors influencing the standard of living of District 12 residents in Ho Chi Minh City. The following will be the names of the newly adjusted factor groups: (1) Employment and income; (2) Infrastructure; (3) Medicine and Health care; (4) Education and training; (5) Family and social relationships; (6) Living environment; and (7) Stability in life. Consequently, the new model will be reorganized as shown in Figure 2.

Figure 2. Proposed model to analyze factors affecting the quality of life in District 12, Ho Chi Minh City



Results of Pearson correlation analysis

Before progressing to regression analysis, Pearson correlation was used to assess the linear correlation between the dependent and independent variables.

TABLE 4. Correlation between independent and dependent variables

		F_SF	F_EI	F_IS	F_MH	F_ET	F_FS	F_LE	F_SL
Satisfied (SF)	Pearson Correlation	1	.704**	.811**	.809**	.779**	.549**	.656**	.689**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000
	N	204	204	204	204	204	204	204	204

The analysis of Pearson correlation coefficients revealed that all factors in the model had Sig values less than 0.05, indicating significant statistical correlations. Consequently, the regression model incorporated these statistically significant variables.

Linear regression analysis

The regression model's test value F = 933.931 and Sig significance level of 0.000 demonstrated a strong fit with the collected data. The independent variables in the regression analysis accounted for 87% of the variation in the dependent variable, as indicated by an adjusted R^2 value of 0.87. The remaining 13% was attributed to errors and variables outside the model. Durbin-Watson values, assessing first-order series autocorrelation, showed Durbin-Watson = 1.849, within the acceptable range of 1.5 to 2.5.

TABLE 5. Regression Coefficients

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearily Statistics	
		B	Std. Error				Tolerance	VIF
1	(Constant)	.060	.053		1.149	.252		
	EI	.097	.008	.163	12.436	.000	.865	1.156
	SL	.137	.013	.172	10.355	.000	.537	1.862
	LE	.227	.011	.348	21.086	.000	.544	1.838
	MH	.173	.013	.243	13.212	.000	.439	1.280
	ET	.207	.014	.258	15.337	.000	.527	1.898
	FS	.108	.012	.128	9.119	.000	.752	1.330
	IS	.024	.010	.037	2.277	.004	.550	1.818

a. Dependent variable: Y_SF

The analysis of the variance inflation factor (VIF) for independent variables revealed no multicollinearity, with all VIF values below 2. The regression model identified the variables influencing the quality of life in District 12 of Ho Chi Minh City After normalization, the regression equation is expressed as follows:

$$Y=\beta 0 + \beta 1 \cdot X1+\beta 2 \cdot X2+\beta 3 \cdot X3+\beta 4 \cdot X4+\beta 5 \cdot X5+\beta 6 \cdot X6+\beta 7 \cdot X6+\varepsilon$$

Here, the standardized beta coefficients of the seven independent variables (X1, X2, X3, X4, X5, X6, X7) all have positive values; as a result, the magnitude of beta indicates a positive relationship with the standard of living in District 12. Coefficients of beta in factors The living environment (LE) is the largest standardized factor; education and training (ET) is the second; medicine and health care (MH) is the third; stability in life (SL) is the fourth; employment and income (EI) is the fifth; family and social relationships (FS) is the sixth; and infrastructure (IS) is the last. From there, the specific formulation of the regression equation used in this investigation is as follows:

$$Y = 0.060 + 0.348*LE + 0.258*ET + 0.243*MH + 0.172*SL + 0.163*EI + 0.128*FS + 0.037*IS + \varepsilon$$

The above analysis and testing results show seven factors, including: living environment; education and training; health and health care; life stability; employment, and income; family and social relationships; and infrastructure. All have a certain impact on the quality of life of District 12 residents. These factors have a descending order based on the relative importance of each element, in addition to being influenced by particular observed variables. For the purpose of suggesting ideas to raise the standard of living for those living in the research area, this will be a crucial starting point. Furthermore, the research methodology can be extended to other regions that bear resemblances to Ho Chi Minh City's District 12.

CONCLUSION

The survey findings indicate that the living environment is the most significant factor affecting an individual's quality of life, followed closely by education and training. Other factors such as health and medical care, stability in life, employment and income, family and social ties, and infrastructure also impact quality of life, albeit to a lesser extent.

Despite the rapid survey execution and small sample size, the results hold statistical and practical significance, validating the research. However, this limitation suggests that the study might not comprehensively cover all factors influencing quality of life. Future research should aim to expand the study area, extend the survey period, increase the sample size, and refine the sampling technique to address these constraints.

RECOMMENDATIONS

Environmental quality directly affects every individual, particularly in urban areas where pollution levels have recently escalated alarmingly. The survey indicates that the environmental factor, with the highest Beta coefficient, significantly impacts the standard of living in District 12, which suffers from environmental degradation and flooding issues. The following are pragmatic suggestions to address these challenges:

Addressing natural landfills: Prioritize the removal of natural landfills in District 12 to mitigate their negative impact on the environment and public health.

Promoting eco-friendly interior decor: Encourage the use of sustainable materials like wood and bamboo for interior decoration. Avoid the trap of fleeting design trends by opting for antique wooden furniture.

Reducing insecticide use: Gradually phase out the use of insecticides linked to diseases like Parkinson's and cancer. Alternatives should be explored to minimize health risks.

Encouraging reusable bags in stores: Implement policies in convenience stores to promote the use of reusable bags. The environmental cost of plastic bags is significant; alternatives like cloth bags, paper, or leaves are preferable.

Government and local authority actions: The government should focus on analyzing and addressing the root causes of flooding issues. Local authorities need to implement supportive policies for infrastructure improvement, such as enhancing internal roadways and renovating buildings to prevent flood damage. Job settlement should be part of these redevelopment efforts.

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