Using factor analysis to determine the most important factors affecting the increase in social problems in Erbil Governorate

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Dedication

I dedicate the fruits of our labors:

- To our fathers and mothers...loyalty and appreciation
- And to our brothers and sisters
- And to those who taught us a letter... and planted love in us

Thanks and appreciation

Praise be to God, and prayers and peace be upon our master, our leader, and our beloved Muhammad (May God bless him and grant him peace), the teacher of humanity, and upon all his family and companions.

It is incumbent upon us to fulfill the duty to express our sincere thanks and utmost appreciation to the virtuous professor (Dr. Kamaran H. Ahmed) for accepting to supervise the research.

I record our thanks to our family for the hardships they endured with us throughout the study period. I also extend my thanks and appreciation to the professors of the Statistics Department and teaching assistants.

I place on record my thanks and appreciation to those who contributed and facilitated the task of completing this research.

Chapter One

(Introduction and The theoretical Social problems)

Chapter One

1.1 Introduction

Social problems include social conflict and social suffering. This issue also indicates that it affects a large segment of individuals within society, as the phenomenon is dangerous and poses a threat to the security, stability and development of society. On this basis, the subject of the study was chosen in order to determine the most important factors affecting the abundance of social problems in Erbil Governorate using factor analysis.

The research consists of four chapters, where the first chapter includes the theoretical aspect of social problems and the second chapter, especially the theoretical aspect of factor analysis, and the third chapter includes the practical aspect and the fourth chapter includes conclusions and recommendations.

1.2 Search objective

The research aims to identify the most important factors affecting the abundance of social problems in Erbil Governorate by using one of the most important methods of multivariate analysis, which is the factor analysis.

1.3 The theoretical side of social problems

1.3.1-The concept of the social problem:

The social problem is a situation that requires corrective treatment and results from the conditions of society and the social environment to confront and improve it. Social problems accompany industrial progress and the sense of them increases among some groups of the population when they compare the conditions in which people live, for example, with the conditions that could exist and lead to breaking the severity of these problems. Therefore, social problems are divided into two parts:

A- Social disintegration

B- Deviant behavior

The researchers believe that the social problem is those difficulties and manifestations of deviation and abnormalities in social behavior, and manifestations of proper social maladjustment that the individual is exposed to, which reduces his effectiveness and social adequacy and limits his ability to build successful social relationships with others, and to achieve the desired social acceptance. The social problem of youth is not separate from their physical, psychological, mental and intellectual problems, rather they are completely linked and often we find them intertwined with them. If a young man's health worsens or he suffers from a physical deficiency, the effect of this does not stop at reducing his physical sufficiency, but rather it reduces his psychological, mental and social sufficiency.

1.3.2 Classification of social problems:

There are several types of social problems:

1- Life problems (basic):

It is the one that greatly affects the members of society, such as problems (housing, food, education, health, social care). Educational problems are being faced; the illiteracy rate has increased, and if there is no proper health care (preventive or curative), epidemics and diseases spread.

2- Economic problems:

They include low average per capita income, low productivity among members of society, weak economic institutions in carrying out their productive functions, relying on consumption more than production, weak savings for citizens and the inclination of citizens to establish economic projects.

3- Social problems:

It means more than just the existence of unsatisfied needs for large segments of the population, but rather the members of society feel the brunt of these problems and seek to exert effort, either alone or with the help of a team to face these problems, and among these social problems is what the family suffers from the disintegration of social relations and the lack of places to occupy Emptiness, the injury of a family member with a major problem such as (drug addiction, family conflict problems, divorce).

4- Societal problems:

It is related to building society (organizations, institutions) and community policy (a set of procedures, regulations, and legislation and general policies for societies) and the components of society (individuals, groups, communities) and it is also related to the functions of society (productivity, social, and politics) which have a direct impact on security and community stability.

Societal problems also include problems of juvenile delinquency, unemployment, terrorism, and such problems have an impact on all other sectors of society, and this type of problem falls under this type of problem (economic, social, political, health, security, and educational problems).

1.3.3 Causes of social problems:

The trend in modern sociology centers around the study of social problems from one starting point, which is deviation from the rules and standards set by society for correct behavior, and the interest in studying deviant behavior is not focused on its simple or non-recurring types, or that encounter mere aversion and disgust, but rather revolve around Those types that are considered a threat to the entity of the group on the one hand, and to the rules of acceptable behavior on the other hand.

The social problem is the deviation of social behavior from the rules set by society for correct behavior, as long as these rules set certain standards, the deviation from which leads to a clear reaction from the group.

Many researchers believe that many social problems are due to the non-satisfaction of some needs among the members of society, and these needs may be social, psychological, economic, biological, health, educational or recreational.

1 - Subjective factors: due to the citizen himself.

2- Family factors: It is related to the citizen’s family.

3- Social factors: refer to the groups to which the citizen belongs.

4- Environmental factors: due to the limited neighborhood or community in which the citizen lives.

5- Societal factors: due to the conditions of the general society in which the citizen lives.

Among the causes that lead to social problems, the most important of which are the following:

1- The technological progress that is accompanied by the export of types of devices, tools and machines to some societies, which is accompanied by new cultural patterns in those societies, and some of these cultural patterns may be completely alien to the members of the society, and from here some social shocks occur that may result in some social problems.

2- Extreme openness to other societies and cultural transfer from them, as human societies deal with each other and transfer from one another in many fields, especially in technical fields, which have increased these days due to the ease of communication, and because of the validity of technical patterns for use in all societies.

3- The societies' lack of understanding of the needs of the youth, and the failure to satisfy those needs by sound and legitimate means.

4- The cultural gap between generations. It is noticeable that there is a difference between adults and children in their understanding of things

Their dealings with events, and therefore there are types of conflict that begin between the parties to the equation in the same society.

Chapter Two

Theoretical aspect of factor analysis

Chapter Two (Theoretical aspect of factor analysis)

2.1 Factor Analysis

Factor analysis is a multivariant mathematical technique and one of the oldest structural models, having been developed by Spearman in 1904. He tried to explain the relations (correlations) among a group of test scores, and suggested that these scores could be generated by a model with a single common factor, which he called 'intelligence,' plus a unique factor for each test.

Factor analysis has been used in two data analytic contexts: in a confirmatory manner designed to confirm or negate the hypothesized structure, or to try to discover a structure, in which case the analysis is called exploratory.

Factor analysis, also known as dimension reductions, a statistical method of reducing data of larger volume to a smaller data set. As the name suggests, factor analysis basically reduces the dimensions of your data and break it down into fewer variables. This small data set is now more manageable and easier to understand. Factor analysis finds a repeating pattern in a dataset and observes the common characteristics in the patterns. Hence the "factor" refers to observed variables sharing similar responsive patterns.

2.2 Objective

The main objectives of Factor Analysis include

1. Reducing the number of variables to the smallest number of common factors for modelling processes.
2. Selecting a subset of variables from a large set based on which original variable have the highest correlations with the principal component factors.
3. Creating a set of factors to be treated as uncorrelated variable as one approach to handling multicollinearity regression.

2.3 Methods

There are different methods that we can use in Factor Analysis, the most important ones are:

1.The Principal Components Method:

It is the most common method which the researchers use. Also, it extracts the maximum variance and put them into the first factor. Subsequently, it removes the variance explained by the first factor and extracts the second factor. Moreover, it goes on until the last factor.

If we have a single group of participants measured on a set of variables, then principal components partition the total variance (i.e., the sum of the variances for the original variables) by first finding the linear combination of the variables that accounts for the maximum amount of variance:

$$y_1 = a_{11}x_1 + a_{12}x_2 + ... + a_{1p}x_p$$

where y_1 is called the first principal component, and if the coefficients are scaled such that $a_1'a_1 = 1$ [where $a_1' = (a_{11}, a_{12}, ..., a_{1p})$] then the variance of y_1 is equal to the largest eigenvalue of the sample covariance matrix (Morrison, 1967, p. 224). The coefficients of the principal component are the elements of the eigenvector corresponding to the largest eigenvalue. Then the procedure finds a second linear combination, uncorrelated with the first component, such that it accounts for the next largest amount of variance (after the variance attributable to the first component has been removed) in the system. This second component y_2 is:

$$y_2 = a_{21}x_1 + a_{22}x_2 + ... + a_{2p}x_p$$

and the coefficients are scaled so that $a_2'a_2 = 1$, as for the first component. The fact that the two components are constructed to be uncorrelated means that the Pearson correlation between y_1 and y_2 is 0. The coefficients of the second component are the elements of the eigenvector associated with the second largest eigenvalue of the covariance matrix, and the sample variance of y_2 is equal to the second largest eigenvalue. The third principal component is constructed to be uncorrelated with the first two, and accounts for the third largest amount of variance in the system, and so on. The principal components method is therefore still another example of a mathematical maximization procedure, where each successive component accounts for the maximum amount of the variance in the original variables that is left. Thus, through the use of principal components, a set of correlated variables is transformed into a set of uncorrelated variables (the components). The goal of such an analysis is to obtain a relatively small number of components that account for a significant proportion of variance in the original set of variables. When this method is used to extract factors in factor analysis, you may also wish to make sense of or interpret the factors. The factors are interpreted by using coefficients that describe the association between a given factor and observed variable (called factor or component loadings) that are sufficiently large in absolute magnitude. For example, if the first factor loaded high and positive on variables 1, 3, 5, and 6, then we could interpret that factor by attempting to determine what those four variables have in common. The analysis procedure has empirically clustered the four variables, and the psychologist may then wish to give a name to the factor to make sense of the composite variable. In the preceding example we assumed that the loadings were all in the same direction (all positive for a given component). Of course, it is possible to have a mixture of high positive and negative loadings on a particular component. In this case we have what is called a bipolar component. For example, in factor analyses of IQ tests, the second factor may be bipolar contrasting verbal abilities against spatial-perceptual abilities.

2. Common Factor Analysis:

It's the second most favored technique by researchers. Also, it extracts common variance and put them into factors. Furthermore, this technique doesn't include the variance of all variables and is used in SEM.

3. Maximum likelihood Method

In finding factors that can reproduce the observed correlations or covariances between the variables as closely as possible, a maximum likelihood estimation (MLE) procedure will find factors that maximize the likelihood of producing the correlation matrix. In trying to do so, it assumes that the data are independently sampled from a multivariate normal distribution with mean vector μ, and variance-covariance matrix of the form $\Sigma = LL' + \Psi$ where L is the matrix of factor loadings and Ψ is the diagonal matrix of specific variances. The MLE procedure involves the estimation of μ, the matrix of factor loadings L, and the specific variance Ψ, from the log likelihood function which is given by the following expression:

$$l(\mu, L, \Psi) = \frac{np}{2}\log 2\pi - \frac{n}{2}\log\left|LL' + \Psi\right| - \frac{1}{2}(X_i - \mu)'(LL' + \Psi)(X_i - \mu)$$

By maximizing the above log likelihood function, the maximum likelihood estimators for μ, L and Ψ are obtained.

4. Principal Axis Method

Principal axis analysis rotates principal components to optimally detect cluster structure, rotation being based on a second spectral decomposition identifying preferred axes in the sphered data. As such, it complements principal component analysis as an extremely fast, general, projection pursuit method, particularly well-suited to detecting mixtures of elliptical distributions. Examples show that it can perform comparably to linear discriminant analysis without using group (cluster) membership information, while its sphered and unsphered forms offer complementary views. Points of contact with a range of multivariate methods are noted and further developments briefly indicated.

5. Centroid Method
The centroid method tends to maximize the sum of loadings, disregarding signs; it is the method which extracts the largest sum of absolute loadings for each factor in turn. It is defined by linear combinations in which all weights are either + 1.0 or – 1.0. The main merit of this method is that it is relatively simple, can be easily understood and involves simpler computations. If one understands this method, it becomes easy to understand the mechanics
involved in other methods of factor analysis.

2.4 Factor Model

Explains the factor model of observed variables (k) in sample size (n) by a linear function (m) of the common factors; where (m <k) and k is a unique factor for each variable namely that:

$$\underline{X}_{k\times 1} = \underline{\mu}_{k\times 1} + A_{k\times m}\,\underline{F}_{m\times 1} + \underline{U}_{k\times 1}$$

Where;
X: random vector of variables.
A: factor loadings matrix of any constant matrix.
F: random vector of common factors.
U: random vector of a unique factor.
μ: average vector

2.5 Assumptions

Basic assumption of factor analysis is the correlation between a variety of variables known as intera-correlation that affect by the existence of common factors and return to the reality of these factors, i.e., $Cov(X_i, X_j) \neq 0$, where the factor analysis explains these correlations that have minimum number of independent factors among them. These assumptions take the standard value of the variables, which are distributed normal distribution with mean (0) and variance (1), as well as to get rid of different variables and measurement units. Since the averages vector of both the common factor and unique factor are zero vectors depending on the assumption that the zero vector average variables:

$$E(X) = \mu = 0$$

So, factor model is as follows:

$$\underline{X}_{k\times 1} = A_{k\times m}\,\underline{F}_{m\times 1} + \underline{U}_{k\times 1}$$

The covariance matrix for each vector of the common factors (F) and the unique factors (U) (the assumption being independent) are as follows:

$$E\begin{pmatrix}\underline{F}\\ \underline{U}\end{pmatrix}\begin{pmatrix}\underline{F}' & \underline{U}'\end{pmatrix}=\begin{pmatrix}E(\underline{F}\,\underline{F}') & E(\underline{F}\,\underline{U}')\\ E(\underline{U}\,\underline{F}') & E(\underline{U}\,\underline{U}')\end{pmatrix}=\begin{pmatrix}\Phi_{m\times m} & 0_{m\times n}\\ 0_{n\times m} & \Psi_{m\times m}\end{pmatrix}$$

Under this assumption, we have three types of variation namely:

1. Common Variance is a part of the total variation and is correlated the rest of variables.
2. Specific Variance is a part of the total variation which in not correlated with the rest of variables but correlated with the same variable.
3. Error Variance is a part of exist variation during errors in the drawing of the sample or measured, or any other changes lead to volatility in the data.

Share all of the common's variation, specific variance, and error variance to create in the total variation which represents the equation.

$$1=a_{j1}^2+a_{j2}^2+....+a_{jm}^2+S_j^2+e_j^2$$

The square roots of common ratios of a_{j1} to a_{jm} to return loading factors and represents the amount of the correlate of variable j for each factor.

2.6 Communalities

The communalities of the variable j (standard value) is the sum square of factors loading analysis of variable and represents the variation ratio which interprets summary factors from the correlation matrix analyzed for these variables, and symbolized by the symbol h_j^2 and the following formula:

$$h_j^2=a_{j1}^2+a_{j2}^2+...+a_{jm}^2=\sum_{p=1}^{m}a_{jp}^2$$

Where; a_{jp} represents a weight of factor p for variable j which a matrix of factors known in factors loading. Therefore, the total variation of the variable j represents by equation.

$$h_j^2+s_j^2+e_j^2=1$$

One characteristic of h_j^2 is positive that is between zero and one $(h_j^2+s_j^2+e_j^2=1)$.

The extent h_j^2 of overlap between the variables and summary factors: if h_j^2 is large and close to one, this means that the variable interfere with summary factor. If h_j^2 is equal to zero, it means that the summary factor is not able to explain any part of the variation. If h_j^2 is between zero
and one that indicate the partial overlap between the variables and factors.

2.7 Rotation of Factors

Unrotated results from a factor analysis is not easy to interpret, although the plot helps. Simply put, rotation was developed not long after factor analysis to help researchers clarify and simplify the results of a factor analysis. Indeed, early methods were subjective and graphical in nature (Thurstone, 1938) because the calculations were labor intensive. Later scholars attempted to make rotation less subjective or exploratory (e.g., Horst, 1941), leading to initial algorithms such as Quartimax (Carroll, 1953) and Varimax (Kaiser, 1958).5 Quite simply, we use the term “rotation” because, historically and conceptually, the axes are being rotated so that the clusters of items fall as closely as possible to them.
After obtaining the initial factor solutions, one is interested to rotate the loadings. The goal of factor rotation is to find simpler factor structure that can use to make interpretation of the resulting factors easily and meaningfully and to determine the appropriate number of factors. It is a way of maximizing high loadings and minimizing low loadings so that the simplest possible structure is achieved. To accomplish this and for the simplicity of this study, orthogonal rotations are done using the varimax procedure. Here we only focus on the orthogonally rotated solutions as they can produce more simplified factor structures from a large amount of data.
In this research we used loading method by orthogonal method (Kaiser - Varimax) that apply the definition of the variation by factor loading (i). [(Alvin, 2002, 431-434), (Brian, 2005, 71-72), (Subhash, 1996, 119), (Amy, John, Jennifer, Schuyler, Gary, and Shelley, 2013, 9)

$$Var(F_k) = \frac{1}{p}\left[\sum_{j=1}^{p} (a_{jk}^2)^2 - \frac{1}{p}\left(\sum_{j=1}^{p} a_{jk}^2 \right)^2 \right] \qquad , \quad k = 1,\dots,m$$

Where;
Var (F_k) represents a variation factor (k).
a_{jk} represents the value of the saturation variable (j) factor (k).
p represents the number of variables

2.8 Choosing the number of Factors

Choosing of the number of common factors is very important. We draw a graphic of pairs (j, λj), the "scree plot", and we observe the position in which this graphic begin to become "flat" (Cattell, 1966). Another criterion to address the number of factor problem is the Kaiser criterion (Kaiser 1960). With this approach, a factor j is important when the eigenvalue is $\lambda>1$. If the number of factors found by Kaiser Test is equivalent with the number of factors, which have resulted even from the "scree plot", then we can continue with the other procedures, or otherwise we have to choose one of the results already obtained. If one of the obtained results from "scree plot" graphic is chosen, the aforementioned procedures and arrange the best number of factors must be repeated. The results change as the number of factors changes. Available options include Kaiser's (Kaiser 1956) "eigenvalues greater than one" rule, the scree plot, a priory theory and retaining the number of factors that gives a high proportion of variance accounted for or that gives the most interpretable solution.

2.9 Variance Extracted

Another selection method based on similar conceptual structure is to retain the number of factors that account for a certain percent of variance extracted. The literature varies on how much variance should be explained before the number of factors is sufficient. The majority suggests that 75 – 90% of the variance should be accounted for; however, some indicate as little as 50% of the variance explained is acceptable. As with any criteria method solely depending on variance, this seemingly broad standard must be viewed in relation to the foundational differences between extraction methods. The amount of variance that was included for extraction must be considered when interpreting the value of percent of variance extracted. Component analysis includes more variance to be explained, suggesting that higher percentages of explained variance are expected than would be required when only common variance is included.

2.10 Measurement Error

Suppose that the numbers we write down as our observations aren't altogether accurate that our numbers are the true variables plus some measurement noise. (Or, if we're not making the measurements ourselves but just taking numbers from some database, that whoever created the database wasn't able to measure things perfectly.) PCA doesn't care about this — it will try to reproduce true-value-plus-noise from a small number of components. But that's kind of weird — why try to reproduce the noise? Can we do something like PCA, where we reduce a large number of features to additive combinations of a smaller number of variables, but which allows for noise? The simplest model, starting from PCA, would be something like this. Each object or record has p features, so X_{ij} is the value of feature j for object i. As before, we'll center all the observations (subtract off their mean). We now postulate that there are q factor variables, and each observation is a linear combination of factor scores F_{ir} plus noise:

$$X_{ij} = \varepsilon_{ij} \sum_{r=1}^{k} F_{ir} \omega_{rj}$$

The weights ω_{rj} are called the factor loadings of the observable features; they say how much feature j changes, on average, in response to a one-unit change in factor score r. Notice that we are allowing each feature to go along with more than one factor (for a given j, ω_{rj} can be non-zero for multiple r). This would correspond to our measurements running together what are really distinct variables.

Here ε_{ij} is as usual the noise term for feature j on object i. We'll assume this has mean zero and variance ψ_j— i.e., different features has differently-sized noise terms. Then ψ_j are known as the specific variances, because they're specific to individual features. We'll further assume $E\left[\varepsilon_{ij}\varepsilon_{lm}\right] = 0$, unless i = l, j = m — that is, each object and each feature has uncorrelated noise.

Chapter Three
(Practical Part)

Chapter Three (Practical Part)

3.1 Introduction

This chapter includes an applied study on determining the most important factors affecting the abundance of social problems in Erbil Governorate, through the application of factor analysis to a set of data collected through the questionnaire. The results were extracted using the (SPSS) program.

3.2 Description of the data:

This research was conducted based on a sample size of (180), and the data includes a set of variables that were collected through the questionnaire, which consists of two axes, the first axis is related to personal information and the second axis is concerned with the studied factors to determine the most important factors affecting the abundance of social problems in Erbil Governorate (Appendix (1)), where It was encoded from (X1) to (X21) and my agencies:

Q1: Gender
Q2: Age
Q3: Educational level
X1: Unemployment.
X2: Bad economic situation.
X3: Drug use.
X4: Family problems.
X5: Low level of culture in society.
X6: The bad political situation.
X7: Bad friend.
X8: Not paying attention to citizens' demands by the government.
X9: Having a gun with a citizen.
X10: Not solving problems by law.
X11: Coming of foreign people to Kurdistan.
X12: Bad role of some media.
X13: Addicted to social networks.
X14: Misuse of technology.
X15: Imitating other society's traditions.
X16: Lack of conviction.
X17: Lack of trust among individuals in society.
X18: Early-age marriage.
X19: Not giving a healthy education by the family.
X20: Dominating old traditions.

X21: Envy among people.

3.3 Descriptive statistics results:

1- Distribution of the sample by gender:

Table (3-1): Frequency Distribution of Data by Gender

Gender	Frequency	Percent
Male	90	50 %
Female	90	50 %

This table shows that the samples taken equal the proportion of females and males, each with a rate of 50%.

2- Distribution of the sample by age:

Table (3-2): Frequency Distribution of Data by Age

Classes (Age)	Frequency	Relative Frequency
18-24	91	50.55%
24-30	46	25.55%
30-36	10	5.55%
36-42	14	7.77%
42-48	9	5%
48-54	6	3.33%
54-60	4	2.22%

This table shows that the largest percentage of the sample taken falls in the age group (18-24), where their percentage reached (50.55).

3- 3- Distribution of the sample according to the educational level:

Table (3-3): Frequency Distribution of Data by Social Status

educational level	Frequency	Percent
Primary	7	3.38%
Secondary	36	20%
Bachelor's	123	68.33%
Master and Ph.D	14	7.7%

Table (3-3) shows that most of the sample taken is from the Bachelor's category, with a percentage of (68.33 %)

3.4 Factor Analysis Results

The goal of this topic is to apply factor analysis to the data to study the identification of the most important factors affecting the abundance of social problems in Erbil Governorate and to show the most important variables:

3.4.1 KMO and Bartlett’s test

This test is used to determine the suitability of the data in factor analysis according to the following hypothesis:

H_0: The data are not suitable for the Factor Analysis
H_1: The data are suitable for the Factor Analysis

Table (3-4): KMO and Bartlett’s test

KMO and Bartlett’s test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.722
Bartlett's Test of Sphericity	Approx. Chi-Square	1162.71
	Df	110
	Sig.	0

Since the p-value of Bartlett’s test is less than (0.05), then we reject H_0 (That’s mean the data are suitable for the factor analysis). As well as according the value of KMO which is greater than (0.5).

3.4.2 Communalities

Uses commonality values to know the importance of the studied variables in factor analysis.

Table (3-5): Communalities of the variables

	Extraction
X1	0.755
X2	0.632
X3	0.831
X4	0.741
X5	0.669
X6	0.533
X7	0.546
X8	0.516
X9	0.621
X10	0.647
X11	0.572
X12	0.631
X13	0.737
X14	0.532
X15	0.587
X16	0.638
X17	0.66
X18	0.728
X19	0.679
X20	0.695
X21	0.633

This table shows that the Communities values of all variables are greater than 0.50 and this indicates the importance of all studied variables in the factor analysis

3.4.4 Total Variance Explained

Table (3-6): Total Variance Explained by Components

Component	Total	% of Variance	Cumulative %
1	6.21491	23.746	23.746
2	2.84836	10.883	34.629
3	2.11247	8.071	42.701
4	1.70728	6.523	49.224
5	1.54346	5.897	55.121
6	1.41235	5.396	60.518
7	1.27704	4.879	65.397
8	1.13491	4.336	69.733
9	1.08294	4.138	73.871
10	1.04956	4.01	77.881
11	0.900082	3.439	81.32
12	0.74707	2.854	84.175
13	0.664227	2.538	86.713
14	0.609478	2.329	89.041
15	0.525689	2.009	91.05
16	0.491219	1.877	92.927
17	0.459049	1.754	94.681
18	0.432373	1.652	96.333
19	0.378385	1.446	97.778
20	0.344209	1.315	99.094
21	0.237211	0.906	100

From the above table there are ten significant factors, which explain (77.881%) of the total variance. Although these factors explain different percentages of variance, they are important in diagnosing the most important factors affecting the abundance of social problems in Erbil Governorate, as they explain each of them, respectively (23.746%, 10.883%, 8.071%, 6.523%, 5.897% , 5.396%, 4.897% , 4.336%, 4.138%, 4.01%) of the total variance.

3.4.4 Component matrix

Table (3-7): Loading values of the eight significant factors

	Component									
	1	2	3	4	5	6	7	8	9	10
X5	0.827									
X4	0.625									
X3	0.563									
X10		0.752								
X9		0.666								
X11		0.561								
X2			0.804							
X1			0.793							
X12			0.69							
X13				0.85						
X17				0.695						
X16					0.73					
X15					0.66					
X7						0.68				
X8						0.61				
X19							0.63			
X18								0.60		
X20									0.72	
X21										-.54

The above table shows the values of the significant loadings of the ten factors of the studied variables whose value is greater than (0.5), according to the sequence. The significant factors are explained as follows:

The first Factor

This factor is of great importance and comes first in terms of importance in determining the variables affecting the abundance of social problems in Erbil Governorate, as it explains (23.746 %) of the total variance, and the significant variables within this factor are (by order):

Order	Significant variables within the factor	Loading
1	X5: Low level of culture in society	0.827
2	X4: Family problems	0.625
3	X3: Drug use	0.563

The Second Factor

This factor is of great importance and comes in second place in terms of importance as it explains (10.883 %) of the total variance and the significant variables within this factor are (by order):

Order	Significant variables within the factor	Loading
4	X10: Not solving problems by law	0.752
5	X9: Having a gun with a citizen	0.666
6	X11: Coming of foreign people to Kurdistan	0.561

The Third Factor

This factor has a great and significant importance and is in the third place and explains 8.071 % of total variance and contains three of significant variables affecting of social problems (by order):

Order	Significant variables within the factor	Loading
7	X2: Bad economic situation.	0.804
8	X1: Unemployment	0.793
9	X12: Bad role of some media	0.69

The Fourth Factor

This factor has a great and significant importance and is in the fourth place for the migration of citizens and explains 6.523 % of total variance and contains two of significant variables affecting of social problems (by order):

Order	Significant variables within the factor	Loading
10	X13: Addicted to social networks	0.85
11	X17: Lack of trust among individuals in society	0.695

The Fifth Factor

This factor has a great and significant importance and is in the fifth place for the migration of citizens and explains 5.897 % of total variance and contains two of significant variables affecting of social problems (by order):

Order	Significant variables within the factor	Loading
12	X16: Lack of conviction	0.73
13	X15: Imitating other society's traditions	0.66

The Sixth Factor

This factor has a great and significant importance and is in the sixth place and explains 5.396 % of total variance and contains two of significant variables affecting of social problems (by order):

Order	Significant variables within the factor	Loading
14	X7: Bad friend	0.68
15	X8: Not paying attention to citizens' demands by the government	0.61

The Seventh Factor

This factor has a great and significant importance and is in the seventh place and explains 4.879 % of total variance and contains two of significant variables affecting of social problems (by order):

Order	Significant variables within the factor	Loading
16	X19: Not giving a healthy education by the family	0.63

The Eighths Factors

This factor has a great and significant importance and is in the seventh place and explains 4.336 % of total variance and contains one of significant variables affecting of social problems (by order):

Order	Significant variables within the factor	Loading
17	X18: Early-age marriage.	0.60

The Ninths Factors

This factor has a great and significant importance and is in the eighths place and explains 4.138 % of total variance and contains one of significant variables affecting of social problems (by order):

Order	Significant variables within the factor	Loading
18	X20: Dominating old traditions	0.72

The Tenths Factors

This factor has a great and significant importance and is in the eighths place and explains 4.01 % of total variance and contains one of significant variables affecting of social problems (by order):

Order	Significant variables within the factor	Loading
19	X21: Envy among people	-0.54

Chapter Four

Conclusion and Recommendations

4.1 Conclusion

After reviewing the results and their interpretation, the study reached a number of conclusions based on these results. The following is a presentation of the most important conclusions:

1. The results of the factor analysis show that there are eight significant factors, during which it is possible to identify the most important factors affecting the migration of citizens, which explain (77.881 %) of the total variance.

2. The research showed that the most important variables that have significant effects through which it is possible to determine the most important factors affecting the social problems in terms of importance are:(X5) Low level of culture in society. , (X4) Family problems., (X3) Drug use., (X10) Not solving problems by law., (X9)Having a gun with a citizen., (X11) Coming of foreign people to Kurdistan., (X2) Bad economic situation. (X1) Unemployment, (X12) Bad role of some media, (X13) Addicted to social networks. (X17) Lack of trust among individuals in society., (X16) Lack of conviction.,(X15)imitating other society's traditions., (X7) Bad friend.,(X8) Not paying attention to citizens' demands by the government., (X19)not giving a healthy education by the family., (X18) Early-age marriage.,(X20) Dominating old traditions., (X21) Envy among people.

4.2 Recommendations

Based on the results and conclusions that have been reached, the study came out with a number of recommendations, the most important of which are listed below:

1. Providing job opportunities for citizens
2. Improving the economic condition of the citizens
3. Increasing the awareness of the members of society in knowing the factors influencing the many social problems.
4. All members of society must be satisfied with what they have.
5. Educating the community about the harms of drug use and avoiding it.

References

First: Foreign Sources

1. Afifi, A. and Clark, V (**1984**): "Computer Aided Multivariate Analysis". Lifetime Learning Publications, USA.
2. Anderson, T. W. (**1984**): "An Introduction to Multivariate Statistical Analysis". 2nd- Edition, John Wiley and Sons, New York-U.S.A..
3. Chatfield, C. and Collins, A. J. (**1980**): "An Introduction to Multivariate Analysis". In Association with Methuen, Chapman and Hall, London, New York-U.S.A..
4. Dillon, W. R. and Goldstein,M. (**1984**): "Multivariate Analysis Methods and Applications". John Wiley and Sons, New York-U.S.A..

Second: Arabic Sources

1. الهاشمي، ندى محمد جواد (**1999**): " استخدام التحليل العاملي لتحديد العوامل المؤثرة ذات العلاقة بظهور حالات الاصابة باورام الدماغ". رسالة ماجستير – كلية الادارة والاقتصاد – جامعة المستنصرية.
2. دبدوب، مروان عبد العزيز، والشكرجي، باسل ذنون يونس (**2007**): " الانتقال المختصر بين نتائج Q-mode و R-mode في التحليل العاملي". المجلة العراقية للعلوم الاحصائية- كلية العلوم والحاسبات والرياضيات، جامعة الموصل، العدد 11 المجلد 7.
3. كريم، زيان احسان (**1992**): " استخدام التحليل العنقودي في تقييم الاراضي لاغراض الزراعة". رسالة ماجستير – كلية الادارة والاقتصاد – جامعة صلاح الدين.
4. كيورك، لوسين عمانوئيل (**2002**): " دراسة أهم العوامل المؤثرة في امراض المرارة باستخدام التحليل المتعدد". رسالة ماجستير – كلية الادارة والاقتصاد – جامعة صلاح الدين.

Appendix (1)

زانكۆی سەڵاحەدین - كۆلێژی بەڕێوەبردن و ئابووری
بەشی - ئامار و زانیاری

فۆرمی ڕاپرسی

بەڕێزان ئەم فۆرمە بریتیە لە چەند پرسیارێك بە مەبەستی ئەنجامدانی توێژینەوەیەكی زانستی بە ناونیشانی
(دیاریکردنی گرنگترین هۆکارەکانی زیاد بوونی کێشە کۆمەلایەتیەکان لە پارێزگای هەولێر)

یەکەم: زانیاری کەسی

1- **ڕەگەز :** **نێر** ☐ **مێ** ☐

2- **تەمەن :** ☐ **ساڵ**

3- **ئاستی خوێندن :** **سەرەتایی** ☐ **ناوەندی** ☐ **ئامادەیی** ☐
بەکالۆریوس ☐ **ماستەر و دکتۆرا** ☐

دووەم: زانیاری گشتی: بە ڕای بەڕێزتان تا چەند ئەمانەی خوارەوە هۆکارن بۆ زیاد بوونی کێشە کۆمەلایەتیەکان.

ژ	هۆکارەکان	لە گەلیم بە تەواوی	لە گەلیم	بێ لایەن	لە گەڵ نیم	لە گەڵ نیم بە تەواوی
1	بێکاری					
2	خراپی باری ئابووری					
3	بەکارهێنانی مادده هۆشبەرەکان					
4	بوونی کێشەی خێزانی					
5	کەمی ئاستی رۆشنبیری تاك لە کۆمەلگا					
6	نا جێگیری بارودۆخی سیاسی هەرێم					
7	هاورێی خراپ					
8	گرنگی نەدان بە داواکاری هاولاتیان لە لایەن حکومەت					
9	بوونی چەك لەدەست هاولاتیان					
10	چارەسەر نەکردنی کێشەکان لە رێگەی یاسا					
11	هاتنی خەلکانێکی بیانی بۆ ناو هەرێم					
12	خراپی رۆلی بەشێك لە راگەیاندنەکان					
13	ئالوودەبوون بە تۆرە کۆمەلایەتیەکان وەك (مۆبایل و ئینتەرنێت.....)					
14	خراپ بەکارهێنانی تەکنەلۆژیا					
15	لاسایی کردنەوەی دابونەریتی کۆمەلگای تر					
16	نەبوونی قەناعەت					
17	نەبوونی متمانە لە نێوان تاکەکانی کۆمەلگا					
18	هاوسەرگیری لەتەمەنی زوودا					
19	پێنەدانی پەروەردەیەکی تەندروست لەلایەن خێزان					
20	زالبوونی داب و نەریتی کۆن					
21	حەسودی و ئیرەیی لەنێوان خەلکان					