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Determination of Risk Factors for Personal Accident Insurance in Iran

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Abstract

Risk management is principally used to support against the dangers of unforeseen incidents. According to Central Insurance of Iran (CII), in personal accident insurance, the job is the main criterion for selecting risk classification. Job is the only risk to determine the premium. Thus, misclassification of risks and the insured can lead to significant financial loss for insurance companies, as well as the assured policyholders. This research examines and identifies the factors that affect personal accident insurance in the research area. This study used primary data, which was collected through a questionnaire from the sample units of personal accident insurance managers. In addition to the questionnaire, interviews were used to collect information from 160 managers in eight insurance companies. As for the methodology, the operational definitions of the needed variables, and the exploratory factor analysis or principal components analysis (PCA) from SPSS software were used to test the hypothesis. The result shows that the level of risk according to a job is not sufficient for personal accident insurance; 8 risk factors are significant, therefore, more than 1 factor influences the level of risk in personal accident insurance.

Keywords: Personal Accident Insurance, Risk Factor, Premium, Level of Risk

Introduction

Insurance implies security from monetary misfortunes. Notwithstanding the meaning of danger, protection can counterbalance the monetary effect of the acknowledgment of the danger characterised for people in general. Furthermore, protection can give monetary security to the business. Protection is a topsy-turvy advancement with business improvement. Improving the financial circumstance builds trades and improves expectations for everyday comforts. It will likewise advance the progress of protection, and protection will advance with progress in the vocation of the individuals.

Insurance policies, a contract between the policyholder and the insurance company, are of different types, depending on the risk they mitigate. Broad categories include life, health, motor, travel, home, rural, commercial, and business insurance.

Individual accident protection or PA protection is a yearly approach that gives remuneration in case of wounds, handicap (perpetual aggregate or halfway incapacity, transitory inability), or passing, caused exclusively by vicious, incidental, external, and obvious occasions. It is unique in relation to life coverage, and clinical and health care coverage. Mishap protection covers a majority of the dangers of mishaps consistently (24 hours) and at any area, during the protection time frame (typically a year).

The individual mishap protection strategy states that, if whenever during the cash of this arrangement, the guaranteed (individual who has taken the approach) will support any real injury exclusively and straightforwardly in mishaps brought about by external, rough, and obvious methods, at that point the insurance agency will pay to the safeguarded or their lawful individual representative(s), by and large, the entirety or entireties put forward, in the

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approach, if bringing about determined possibilities, for example, demise, perpetual disablement, and so on

- *Bodily Injury:* Any infection because of mishap is known as substantial injury; however, it does exclude any sickness because of common reasons. Mental stun or sorrow does not add up to mishap, except if some actual injury is caused. In the current situation, it is seen that because of despondency some disablement, for example loss of motion, happens and the equivalent is covered under this strategy.
- *Solely and Directly:* The bodily injury shall have been caused solely and directly by an accident and the bodily injury must directly, and independent of any other cause, result in death or disablement.
  - A person is thrown from their horse while hunting and so injured that they cannot walk; they lie on the wet ground until they are picked up. They, thus, catch a chill, which turns into pneumonia, and they die. Though they die because of pneumonia, the actual cause is an accident, and it is covered under personal accident insurance policy.
  - If a person breaks a leg in an accident and is taken to the hospital where they contract an infectious disease from another patient, which results in death, the same is not covered under the personal accident insurance policy.
- *Accident:* An accident is an event which is wholly unexpected, not intended, or designed. For e.g. snake bite, drowning, suicide, and unprovoked murder are covered under this policy.
- *External, Savage, and Noticeable Methods:* The reason for mishap, like the methods, should be inside the overall definitions, yet the outcome may not be external. All in all, the methods or reason for mishap should be inside the definitions, yet the outcome or impact need not be external or noticeable, insofar as it is in essence an injury; for example, the injury might be inside the body, and the outcome should be passing away or disablement.
- *Disablement:* When a person is prevented by an accidental bodily injury from engaging in any occupation or business they are said to be disabled, and their ability to attend to any occupation or business is called disablement.

Table 1: Levels of Risk in Personal Accident Insurance in Iran

Number of Level	*Level of Risk*	*Examples*
1	Individuals confronting the least danger in the exercises of everyday life	Officers, Students
2	Individuals confronting more dangers in the exercises of day-to-day life, in contrast to the degree of relative risks (usually working with their mental intelligence and modern instruments)	Dentists, Doctors, Engineers
3	Includes persons who are specialists or semi-specialists (most of them work with cars and industrial instruments)	Drivers, Agriculturists
4	Includes people working with high-risk industrial equipment and machinery	Fire-fighters, Mast sections, Welders
5	People facing most risks in their daily tasks	Pilots, Miners

Source: Central Iran Insurance.

According to Table 1, in personal accident insurance, the job is the main criterion in selecting risk classification. Jobs are divided into five groups, from lowest to highest risk of danger, to determine the price of the insurance or premium. These categories form the basis for determining the premiums. Thus, misclassification of risks and the insured can lead to significant financial loss for insurance companies, as well as the assured policyholders. Wrong assessments lead to inappropriate, unreasonable, and unfair premium rates, and the assured policyholders' dissatisfaction, causing significant losses for insurance companies.

Background

Majid Ghias Abadi (1998) looked at the reasons for the absence of development and advancement, ideal protection mishap, and well-being in Iran. The result of this research shows that Factors such as monetary elements, factors social, exchanging specialists, factors social elements, and the executive's factors, remembering powerful factors for the absence of ideal execution in this field of insurance in Iran has been not stances as per the well-qualified assessments of specialists, and so on of logical and viable course of fix the absence of offers.

Olivieri and Pitacco (2008) chipped away at the stochastic models for handicap to approximations and applications to affliction and individual mishap protection. They indicated that, since the highlights of the multistate model consider a few incapacity degrees, a thorough displaying for individual mishap protection can be acquired; hazard factors (and thus, appraising variables) can be addressed by a proper decision of the progress powers. The multistate model gives a sound system to deciphering useful figuring techniques utilised in the health care coverage region; they overhauled some evaluating formulae for individual mishap and disorder protection utilised. This investigation recommended the kinds of information that ought to be gathered to improve evaluating and holding methodology. Exceptional accentuation ought to be dedicated to the chance of communicating a few danger factors through change forces. Finally, analysts approximated the multistate model and indicated the applications to ailment protection and individual mishap protection.

Neda Gazi Moradi (2013) thought about the assessment measures, the seriousness and recurrence of danger, utilising information mining models to evaluate the danger of existing classes in the individual mishap protection pays. It appears to erase the job classification, the risk existing classes as a none in any event in the previous quite a while for lawmakers isn't plausible. However, kept and proceed with the cycle, for example, all things considered, can't move toward the insurance agencies and the financial brokers towards the insurance field. Results introduced in this examination, there is a connection between's the two factors old, age and sexual orientation is variable remuneration; in this path, that with expanding age, the seriousness of those protection risks expanded and a backward connection between the force of being a lady and there are harms.

Martin Spindler (2015) inspected asymmetric data in (private) mishap protection. Lopsided data in protection markets has become a vital issue in observational writing in recent years. They break down the (private) mishap protection, which has not been dissected before in writing. However, it covers perhaps the main dangers faced by people in present day culture, specifically the deficiency of human resources. The background data give distinct insights which are of interest on their own and indicated that there is awry data, yet the degree relies upon the measure of inclusion.

Objective of the Study

This paper is an original research. With the end goal of gathering information, the research uses auxiliary sources. This review confronts essentially the following exploration goal:

- To identify the factors that affect personal accident insurance in select insurance companies in Iran.

Hypothesis

The affecting factors in personal accident insurance constitutes the objective of the study. According to the theory related to the affecting factors in personal accident insurance, the authors' purpose is to test the following hypothesis:

H_0 (Null Hypothesis): Job is not the only factor to be considered in measuring risk in personal accident insurance in Iran.

H_1 (Alternative Hypotheses): Job is the only factor to be considered in measuring risk in personal accident insurance in Iran.

Data

This study used primary data, which was collected through questionnaire from the sample units of personal accident insurance managers. In addition to the questionnaire, interviews were used to collect information from 160 managers in 8 insurance companies.

Result

According to the survey and interviews, the managers of the personal accident insurance companies identified 30 factors affecting personal accident insurance. The analysis is as follows:

Table 2: Descriptive Statistics

Sr. No.	*Name of Factors*	*Mean*	*Standard Deviation (SD)*
1	Gender	1.63	1.126
2	**Age**	**8.09**	1.095
3	**Level of Education**	**7.94**	1.026

Sr. No.	*Name of Factors*	*Mean*	*Standard Deviation (SD)*
4	Marital Status	1.88	1.282
5	**First Job**	**8.13**	1.431
6	**Second Job**	**7.84**	1.409
7	**Work Experience**	**8.23**	1.003
8	Levels of Income	1.71	0.987
9	Sponsorship	1.79	1.006
10	Dangerous Disease	1.70	0.983
11	Using Drugs	1.63	0.957
12	Disability	1.68	0.997
13	Safety Work	1.68	1.000
14	**Habitat**	**8.20**	1.008
15	**Distance to Work**	**8.21**	1.146
16	Military Service	1.69	1.004
17	Height	1.76	1.000
18	Weight	1.74	1.019
19	Ability of Sight	1.59	0.914
20	Vehicle Type	1.51	0.876
21	Type of Exercise	1.53	0.883
22	Type of Religion	1.43	0.821
23	Work Status	1.53	0.911
24	Alcohol Drink	1.48	0.854
25	Record Blood Pressure	1.45	0.838
26	Record of Previous Surgery	1.55	0.896
27	Work Mission	1.53	0.938
28	Smoking	1.43	0.821
29	Work Shift	1.46	0.875
30	**Record for Compensation**	**8.29**	1.012

Source: Field of Survey.

According to Table 2, 8 factors are significant, including age, level of education, first job, second job, work experience, habitat, distance to work, and record for compensation, showing that more than 1 risk factor influences personal accident insurance. The affecting factors in personal accident insurance is built out of 8 items from Table 2, which shows that the mean of these 8 risk factors is more than five and is effective on personal accident insurance.

Table 2 contains the operational definitions of the needed variables and exploratory factor analysis or principal components analysis (PCA) from SPSS software, which was used to test the hypothesis. First step in applying this 8-factor analysis is to check the existing relationship between the study variables by computing correlation coefficients. The computations made are shown in Table 3.

Table 3: Correlation Matrix[a]

	Age	*Level of Education*	*First Job*	*Second Job*	*Work Experience*	*Habitat*	*Distance to Work*	*Record for Compensation*
Correlation – Age	1.000	.094	.033	.091	.154	.018	.005	.068
Level of Education	.094	1.000	−.037	.010	−.023	.170	.076	−.007
First Job	.033	−.037	1.000	.104	.103	.087	−.070	.036
Second Job	.091	.010	.104	1.000	.088	.209	−.088	−.091
Work Experience	.154	−.023	.103	.088	1.000	.080	.188	−.027
Habitat	.018	.170	.087	.209	.080	1.000	.105	−.069
Distance to Work	.005	.076	−.070	−.088	.188	.105	1.000	−.031
Record for Compensation	.068	−.007	.036	−.091	−.027	−.069	−.031	1.000
Sig.(1-tailed) – Age		.117	.339	.127	.026	.410	.474	.197
Level of Education	.117		.319	.448	.387	.016	.171	.466
First Job	.339	.319		.096	.097	.136	.190	.326
Second Job	.127	.448	.096		.133	.004	.136	.127
Work Experience	.026	.387	.097	.133		.158	.009	.368
Habitat	.410	.016	.136	.004	.158		.094	.193
Distance to Work	.474	.171	.190	.136	.009	.094		.347
Record for Compensation	.197	.466	.326	.127	.368	.193	.347	

Determinant = .780
Source: Field of survey.

The values of the coefficient of correlation must be statistically different from 0.00 to identify a structural relationship between the variables, that is, a set of factors containing the common variance or communality of the variables. An independence of the variables (orthogonal variables) means lack of common variance, and hence the correlation matrix will be an identity matrix from which factors cannot be extracted. By analysing the above correlation matrix, a moderate correlation exists between the study variables. The matrix determinant equals 0.780, containing information regarding the multicollinearity of the study variables.

The degree to which the correlation matrix differs from the identity matrix and the measure of common variance (communality) is tested through Bartlett's sphericity test and Kaiser-Mayer-Olkin test, respectively.

Table 4: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.511
Bartlett's Test of Sphericity	Approx. Chi-Square	68.653
	df	28
	Sig.	.047

Source: Field of Survey.

The dependence of the study variables is verified using the Bartlett's sphericity test, which is based on the Chi-square distribution. The computed test value equals 68.653, indicating a minimal probability of 0.047. Kaiser-Meyer-Olkin divides the sum of squared correlation values to the sum of partial correlation values with the purpose of estimating the amount of common variance of the considered data set. Kaiser (1974) settles that a test value above 0.5 is proper for continuing the analysis. The KMO value of 0.511 seems to be sufficient to continue the analysis.

A few techniques can be utilised for disintegrating an informational index into a subset of variables. The most utilised factor extraction strategy is standard segments. This strategy points the deterioration of the underlying informational collection (relationship framework) into a bunch of components (Eigen estimates) with which the underlying factors (things) are corresponded. 8 variables have been separated and 4 held in the wake of applying the standard part investigation.

Table 5: Total Variance Explained

Component	*Extraction Sums of Squared Loadings*			*Rotation Sums of Squared Loadings*		
	Total	*% of Variance*	*Cumulative %*	*Total*	*% of Variance*	*Cumulative %*
1	1.451	18.139	18.139	1.283	16.036	16.036
2	1.191	14.891	33.030	1.229	15.368	31.404
3	1.134	14.173	47.203	1.223	15.293	46.697
4	1.067	13.341	60.544	1.108	13.846	60.544

Extraction Method: Principal Component Analysis

Source: Field of Survey.

It very well may be seen from Table 5 that the 4 segments contain 60.544% of the all-out variety of the extricated factors. The large measure of fluctuation is driving data in affirming the speculation of lessening the underlying factors to fewer variables (4) without a huge loss of information. For future investigation, hold these components with an eigenvalue higher than 1. The Scree plot demonstrated 4 segments that are having an eigenvalue higher than 1. The method is followed by holding the initial four parts.

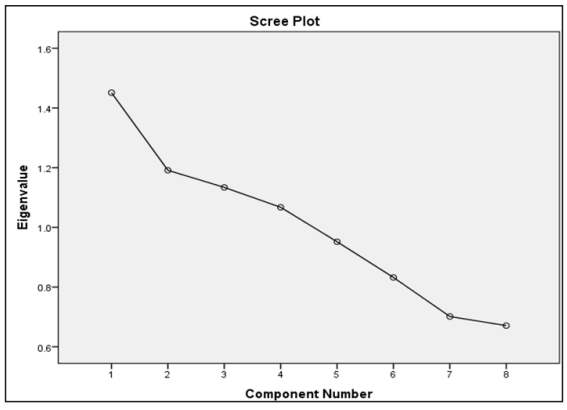

Fig. 1: Eigen Value Plot for Factor Analysis

The accompanying table rule segment grid contains the connection coefficients between the underlying factors and the held components.

Table 6: Component Matrix

Component Matrix	*Component*[a]			
	1	*2*	*3*	*4*
Age	.384	−.003	.502	.391
Level of Education	.332	.346	−.283	.643
First Job	.310	−.513	.260	−.115
Second Job	.536	−.498	−.206	−.018
Work Experience	.534	.172	.471	−.403
Habitat	.638	.007	−.384	.107
Distance to Work	.291	.728	.088	−.290
Record for Compensation	−.180	−.020	.561	.479

Extraction Method: Principal Component Analysis.
a. Four components extracted.
Source: Field of Survey

After the maintenance of the four factors, the communalities of the underlying factors with these elements have changed. On the off chance that the variety of the primary factor (first factor) might have been clarified through four unique pieces of the separated components, after the maintenance of the initial 12, the commonness of the principal factor diminishes with 1 – 0.552 = 0.448. In any case, said 44.8% of the primary factor's data is lost because of the maintenance of the 12 variables.

Table 7: Communalities

Communalities	*Extraction*
Age	.552
Level of Education	.724
First Job	.440
Second Job	.578
Work Experience	.700
Habitat	.566
Distance to Work	.707
Record for Compensation	.577

Extraction Method: Principal Component Analysis.
Source: Field of Survey

The last piece of factor investigation is to augment the coefficients' incentive for each separated and pivoted segment to facilitate the outcome understanding. This should be possible by turning the elements as indicated by a particular point. The most utilised symmetrical revolution technique is Varimax, which goes to amplify the fluctuation of the stacking of the coefficients for each factor. Factor stacking measures the relationship between the underlying and extricated and held variables.

The algebraic procedure of orthogonal factor rotation is presented below:

$B_{8\times4}\ T_{4\times4} = A_{8\times4}$

$B_{8\times4}$ = Initial factor loading matrix

$T_{4\times4}$ = Transformation matrix

$A_{8\times4}$ = Factor loading matrix after orthogonal rotation

Table 8: Component Transformation Matrix

Component	*1*	*2*	*3*	*4*
1	.603	.547	.580	.038
2	−.782	.546	.300	−.020
3	.067	.394	−.492	.774
4	−.142	−.498	.577	.632

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation.
Source: Field of Survey.

Table 9: Rotated Component Matrix[a]

Rotated Component Matrix	*Component*			
	1	*2*	*3*	*4*
Age	.212	.212	.200	.650
Level of Education	−.181	−.061	.806	.193
First Job	.622	.049	−.169	.150
Second Job	.701	−.050	.252	−.141
Work Experience	.277	.772	−.103	.126
Habitat	.338	.149	.623	−.206
Distance to Work	−.347	.736	.176	−.119
Record for Compensation	−.123	−.127	−.110	.731

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation.[a]
a. Rotation converged in nine iterations.
Source: Field of Survey.

The factor loadings after the rotation shows that a clear strong relationship exists between the said items and the four factors, which are shown in Table 10.

Table 10: Components

Component	Selected items
Component 1	First Job (0.622), Second Job (0.702)
Component 2	Work Experience (0.772), Distance to Work (0.736)
Component 3	Level of Education (0.806), Habitat (0.623)
Component 4	Age (0.650), Record for Compensation (0.731)

Source: Field of Survey.

The results of the conducted factor analysis using the principle component method confirm that the initial 8 items can be reduced to 4 components without a significant loss of information; the 8 risk factors (age, level of education, first job, second job, work experience, habitat, distance to work, and record for compensation) and the effect risk factors of personal accident insurance show that the level of risk according to a job is not sufficient for personal accident insurance. The 8 risk factors are significant, therefore, more than 1 factor influences the level of risk in personal accident insurance. Thus, the alternative hypothesis (H_1) was not significant, and the null-hypothesis (H_0) is accepted. This means that job is not the only factor to be considered in measuring risk in personal accident insurance in Iran. Age, level of education, first job, second job, work experience, habitat, and distance to work are also considered as risk factors in personal accident insurance.

Conclusion

Agreeing the 160 director's respondents and factor investigation (PCA), from 30 risk factors just 8 components acknowledged the influencing hazard factors in close to home mishap protection. at that point, the 8 elements are huge that including that (Age, Level of Education, First Job, Second Job, Work Experience, Habitat, Distance to Work and Record for Compensation), so the invalid speculations is acknowledged, and the work isn't just factor considered as a risk factor in close to home mishap protection, yet more than 1 danger figure impact individual mishap protection.

To distinguish conspicuous dangers influencing the individual mishap protection in Iran, 8 elements were considered from the incessant examination, which includes age, level of education, first job, second job, work experience, habitat, distance to work, and record for compensation.

To assess the overall significance of the correlation matrix with Bartlett's test, and the measure of sampling adequacy (MSA), all 8 factors were statistically significant (Chi-square value 68.653) and collectively met the necessary threshold of sampling adequacy with a KMO value of 0.511. All the measures indicated that the set of factors used is appropriate for analysis of risk factors. Among the 8 items taken, 4 components were extracted, which have an Eigen value higher than 1.

Principal component analysis (PCA) demonstrated that the investigation with 8 risk factors affects considering hazard factors in personal accident insurance in Iran. PCA and Varimax with standardisation strategies showed that, among the 30 elements, first job and second job had a critical effect, with 16.036% variance; work experience and distance to work were fundamentally affected at 15.368%; level of education and habitat were at 15.293%; and age and record for compensation were at 13.846%. The results show that the 8 factors were key components in bringing the beneficiary to a level of risk, to the extent of 60.544%. Job is not the only risk factor to be considered in measuring risk in personal accident insurance in Iran. More than 1 risk factor influences personal accident insurance.

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