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# A Risk Management Framework for Life Insurance Companies

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**ABSTRACT**

**Purpose**: After the outbreak of COVID-19, the insurance business has experienced losses in terms of decreased demand for an insurance policy, lower return on investment, and increased claim settlement. Thus, risk management plays a significant role in mitigating the risk for businesses. However, risk management is restricted as a predefined approach for managing threats of uncertainty resulting from the activity or error of humans. Furthermore, the life insurance industry faces the challenge of paying claims in case of an increased death rate after the outbreak of COVID-19. Thus, there is a need for a better risk management framework.
**Methodology**: This paper identifies the gap between the existing risk management model and the model specified by IRDA and suggests a model to mitigate the insurance risk. The study posits that whether an individual is more suitable or not for life insurance can be decided based on a simple factor. By using this tool/model of risk management, a life insurance company can reduce its risk of providing insurance to a customer exposed to high risk.
**Practical Implications**: This study will help life insurance companies to mitigate their insurance risk.

**ARTICLE INFO**

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## 1. INTRODUCTION

This study aims to develop a risk management tool adopted in the life insurance industry to mitigate insurance risk.

The organization of the current study in the paper is given in Figure 1 below.

### 1.1. Life Insurance Industry Market

According to data issued in 2020, Life Insurance companies experienced a slowdown in net premiums after the COVID-19 outbreak. On average, the difference in premiums written in the life insurance sector in the year 2020 in comparison to the year 2019 is only 2%. Before the outbreak of COVID-19, the life insurance sector was experiencing an increase in demand for life insurance policies worldwide (Abdul-Fatawu et al., 2019; Tsendsuren et al., 2018; Mitra, 2017; Ellyne and Cheng, 2014). Additionally, the number of claim settlements in the life insurance industry was also not high (Adem, Aylin and Dagdeviren, 2016). Moreover, the good performance of the stock market was also providing positive returns on investment to insurers as insurance companies invest a significant amount of money pooled

in the form of premiums into the stock market (Luciano et al., 2015). Thus, the insurance industry plays a very significant role in the economic growth of any country (Olayungbo, 2015; Anyanwu, 2014; Odhiambo, 2009; Ward and Zurbruegg, 2000; 2002; Babbel, 1981; Bodie and Merton, 1998).

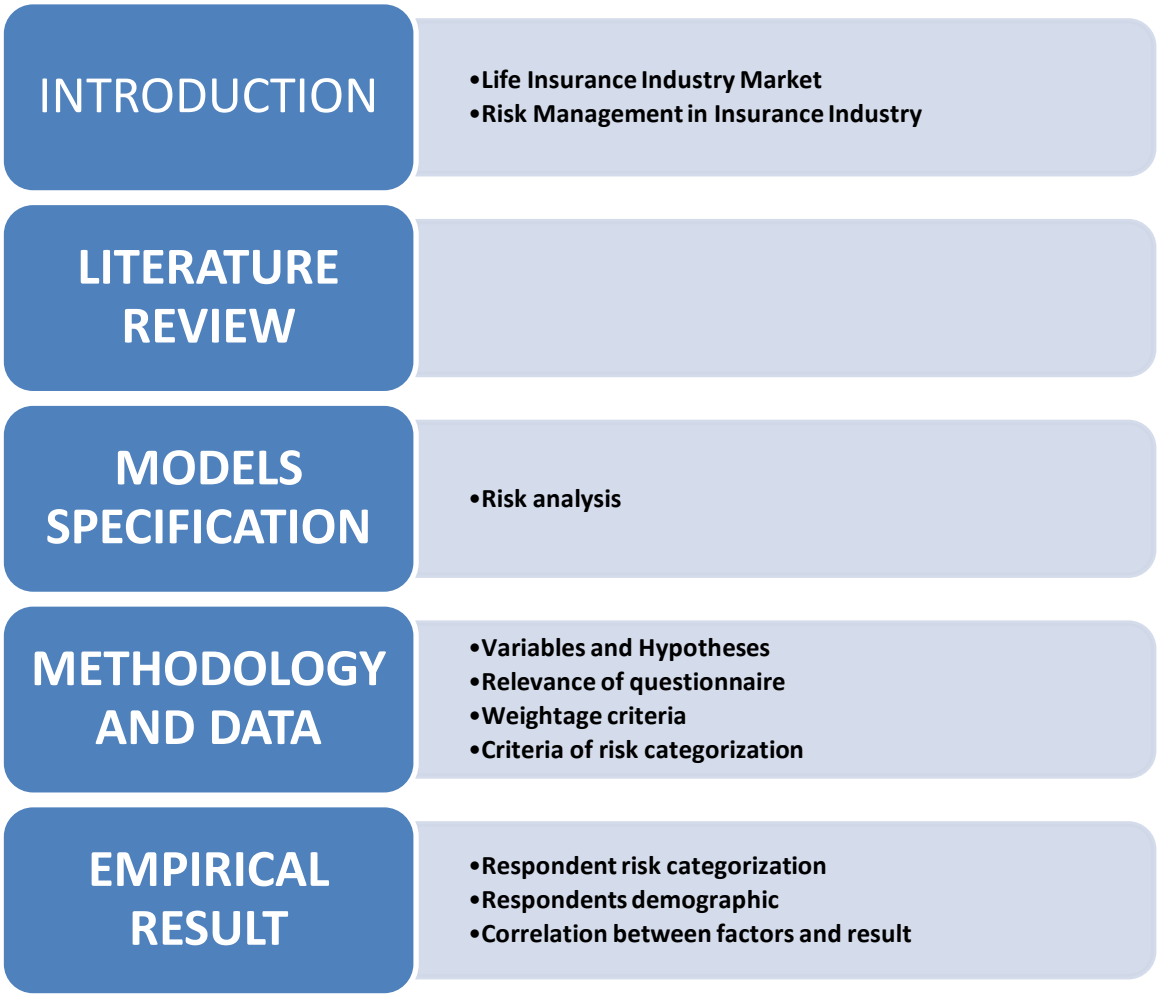


**Figure 1** – Structure of research paper
**Source** – Author's compilation

However, after the outbreak of COVID-19, the insurance business has experienced losses in terms of decreased demand for an insurance policy, lower return on investment, and increased claim settlement. On the other hand, the need for life insurance policies was not the same as before COVID-19 (Aguenaou et al., 2015; Chaabane, 2002). Thus, risk management plays a significant role in mitigating the risk for businesses.

### 1.2 Risk Management in Insurance Industry

Before understanding the management of risk in the insurance industry, it is essential to understand the risks that life insurance companies are exposed to. In terms of the life insurance business, types of risk

can be categorized as environmental, liquidity, asset-liability, credit, investment, and insurance (Delavallade et al., 2015; Gordon, 1999). For example, the outbreak of COVID-19 is a type of environmental risk that is not under the control of life insurance companies (Peter, 2017). However, some risks can be mitigated by life insurance companies, such as insurance risk (Mahdzan and Diacon, 2009). Therefore, the current study will focus on life insurance companies' risk management of insurance risk.

Before moving further, let us understand the term insurance risk.

A. Insurance risk – the risk which arises due to inappropriate designing, underwriting, price determination, management of the claim, or reinsurance resulting in increased liabilities and losses for insurance companies is called insurance risk. The primary segment of insurance risk is -

A.1 Product design risk includes the underwritten risk such as disability or death. It also consists of insurance options, such as guaranteed minimum interest rate or opportunities for surrender, premium adjustment, resumption, and paid-up.

A.2 Underwriting risk includes the stake that arises due to weakness in the underwriting process and level/types of system/controls in the life insurance company, amongst others. This results in an unexpected claim leading to increased liability or loss to an insurance company.

Life insurance companies can mitigate these risks by risk management. Thus, the current study focuses on mitigating insurance risk by performing risk management in the life insurance industry.

### 1.3 Preferred risk in life insurance

The insurance companies are well aware that certain populations show better mortality than others throughout the life insurance business. For example, if it is assumed that all other factors are the same in a population and only mortality rate is considered, then women live longer than men (Aarbu and Schroyen, 2009). Also, a person consuming Tabaco will have lower mortality than the one who does not consume tobacco. Thus, to mitigate this risk of difference in the mortality rate of different groups, life insurance companies charge different premiums for other groups of people (Yaari, 1965). Thus, life insurance companies charge different premiums to a 23 year older adult and a 45 yr older adult and different premiums for smokers and non-smokers. In short, life insurance companies mitigate this risk by pooling risk so that the high mortality group offsets the cost of the low mortality group of people. This cost is included in the premium paid by the customers. Thus, the following section explains life insurance companies' risk management and management process.

### 1.4 Risk Management

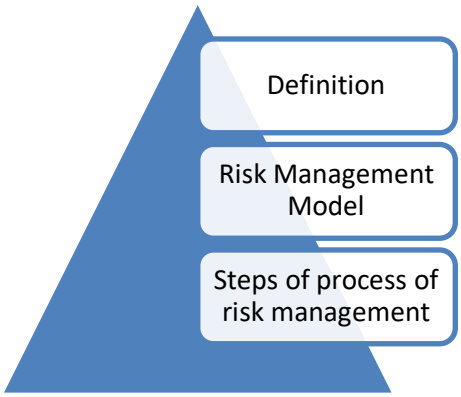


**Figure 2**- Description of 'Risk Management
**Source**- Author's compilation

### 1.4.1 Definition

Risk management is restricted as a predefined approach for managing threats of uncertainty resulting from the activity or error of humans. The risk management process includes assessing risk and developing a strategy to mitigate or manage risk (Kurdyś-Kujawska and Sompolska-Rzechuła, 2019). Thus, the approach for supervision of risk comprises -


**Figure 3** – Ways of Risk Management
**Source**- Author's compilation

- Transferring risk to another party
- Avoiding risk
- Reducing the detrimental consequence of risk
- To bear little or whole part of the risk's consequence/cost/loss.

There are a few techniques of risk management, namely 'conventional risk management, which deals with mitigating the risk that will result in life insurance companies' legal obligations, such as lawsuits related to death, accident, or natural disaster (Bommier, 2014). On the other hand, financial risk management emphasizes risk, which can be mitigated using financial assets. Thus, the motive of risk management is to reduce various risks arising due to human errors using the resources available to the company.

### 1.4.2 Risk management Model

A risk management model should be able to prioritize the risk and then should focus on handling the risk resulting in maximum loss first. However, it is easier said than done. It is not easy to prioritize the risk and calculate the amount of loss resulting from it. Additionally, it will include calculating the probability of occurrence of the risk. Moreover, it is up to the insurance company whether it opts for transferring risk or accepting/bearing the risk. For instance, when the probability of risk occurrence is 100%, insurance companies opt to take the risk. The reason can be a lack of ability to identify such risks. The inability to identify risk is the mistake of the life insurance company itself. Moreover, there are a few risks, such as intangible risks, namely lack of knowledge or ignorance, resulting in a loss for a life insurance company. Additionally, there are risks termed 'process-engagement risks' arising from inappropriate procedures or operations.

Due to such risk, the efficiency and productivity of employees are reduced, and the cost is increased, leading to poor services by life insurance companies to customers. In addition, it impacts the brand image and worth of the company. Thus, risk management of such intangible risks will lead to cost reduction, better services, improved brand image, and value of the company.

Risk management also deals with the proper allocation of resources, as improper usage of resources also increases the company's cost. Thus, the amount spent by life insurance companies on risk management leads to increased profits. Therefore, if the cost of managing risk is more than the risk, the company opts to bear the risk. Hence, it can be said that an appropriate risk management model will lead to reduced costs for the company.

### 1.4.3 Steps of the process of risk management


**Figure 4**- Steps in Risk Management Process
**Source**- Author's compilation

#### I. Establishment of background

Figure 6 – explains the establishment of background for risk management for any organization.

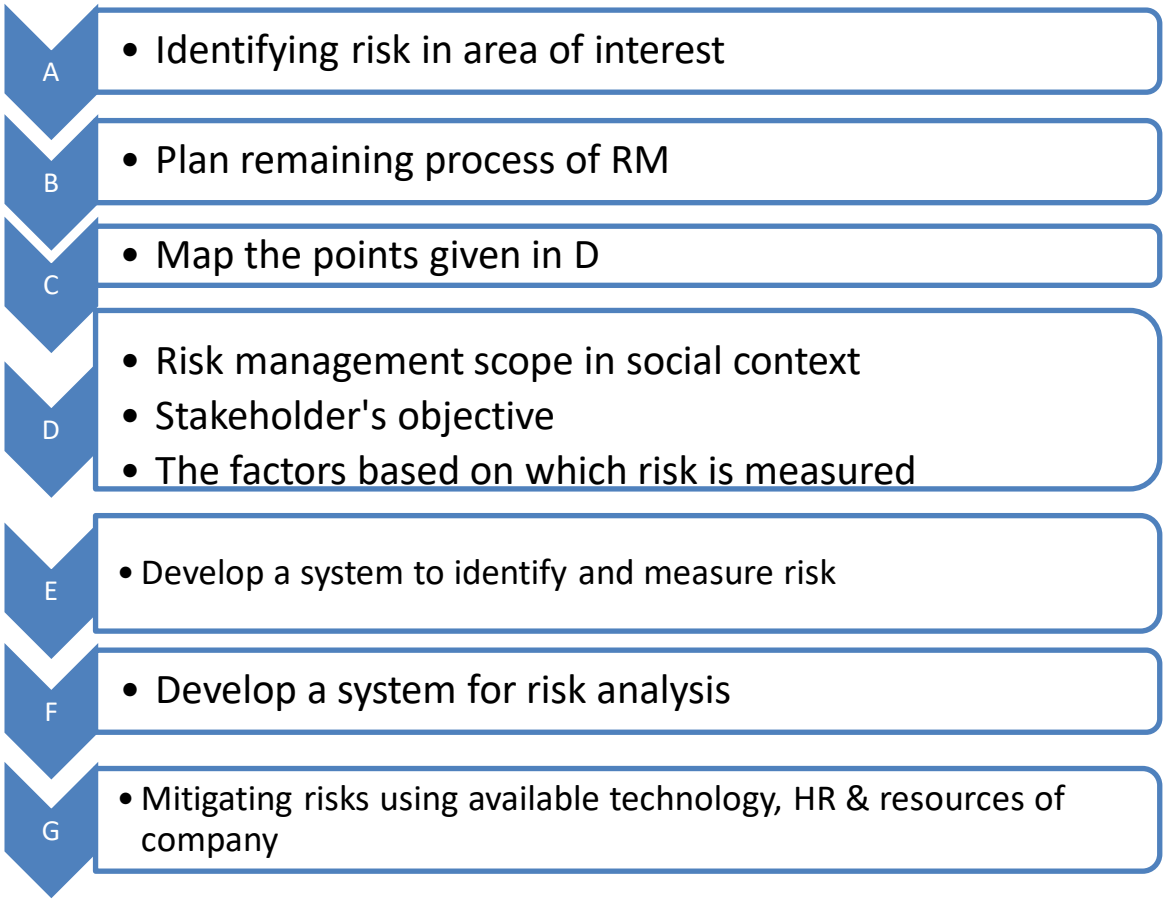


**Figure 5**- Establishment of background
**Source** – Author's compilation

**II. Identifying**

After establishing background, the life insurance company should identify the possible risks it is exposed to. Anything that triggers problems or increases the company's cost is called risk. Thus, risk can be the 'problem source' or the 'problem' itself. The life insurance company can identify possible risks by identifying the problem and its source.

## Source analysis:

- Risks can come from both inside and outside the system that needs to be managed. Stakeholders in a project, company personnel, or the weather over an airport are all examples of risk sources.

## Problem analysis

- Risks are linked to the identification of threats. For example, the risk of losing money, the risk of personal information being misused, or the risk of accidents and casualties. Threats could come from a variety of sources, including shareholders, customers, and legislative authorities such as the government.


**Figure 6**- Identifying possible risk
**Source** – Trivedi, 2017

Common methods to identify risk:-

Figure 8 explains the common methods to identify risk.


**Figure 7** – Common method to identify risk
**Source**- Author's compilation

**III. Assessment**

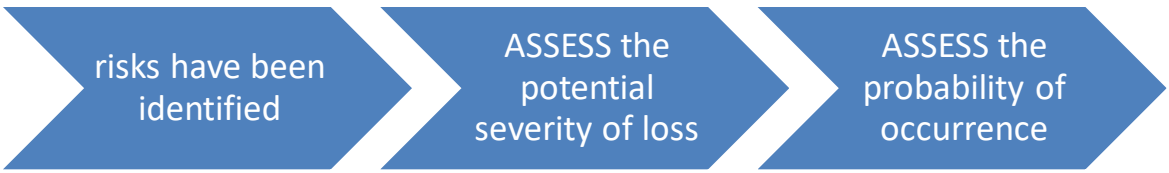

**Figure 8** – Assessing Risk
**Source** – Author's compilation

Assessment is a critical and significant step for positively implementing a risk management plan. It is sometimes difficult and impossible to identify and evaluate the occurrence and severity of a probable loss. For instance, it is easy to calculate the worth of a building lost in a fire, but it is difficult to estimate the chances of a building catching fire. Thus, the most critical and complex step in risk management is determining the probability of an event's occurrence and its severity. One of the ways is to determine the same based on past data available related to such incidents. Thus, the probable solution to assess the risk is to gather preliminary information. Hence, life insurance companies need to collect the primary data and prioritize the risk. Various theories describe the quantification of trouble, but the most acceptable method to quantify risk is -

RISK = RATE OF OCCURRENCE x IMPACT OF EVENT

The primary concern here is not how a life insurance company quantifies the risk but the company's consistency in assessing the risk. The following section presents various authors who have worked on risk management in the life insurance industry.

## 2. LITERATURE REVIEW

This section explains the literature review of research papers in risk management and life insurance beyond 2015.

Andreeva (2021), in his paper, studied and systemized risk management by insurance companies. He explained the types of risk to which an insurance company is exposed. He also outlined the possible ways insurance companies can deal with these risks. Thus, he explained the purpose and importance of risk management, a method to calculate the premium of insurance, the pricing of products/policy of insurance, and covered other aspects such as investment, reinsurance, and the allocation of reserves.

Hsieh, Tsai & Wang (2021) used factor copulas to describe the structure of dependence among the insured people and their mortality, while Chen, MacMinn, and Sun (2015) explained the relationship between mortality index and pricing of securities. Thus, to reduce the systematic risk due to mortality, Hsieh, Tsai & Wang (2021) suggested that life insurance companies pool the insurers with the same systematic risk. They also offered a framework based on a two-factor copula to define an optimal investment amount in a particular asset. The paper showcases a dataset of hundreds of policies and data of thousands of customers to explain their point. Additionally, Zhu et al. (2018) presented a framework for constructing data sets of risk exposure to the banking industry in their article.

Furthermore, Nguyen (2021) explained the significance of keeping a heterogeneous mix in the customer pool to mitigate and manage the risk in his paper. Also, Flores, de Carvalho, & Sampaio (2021)

explained the impact of interest rates on the development of the life insurance market. They applied the time series method to describe the same, taking into account the data from 1998 to 2017 across 34 countries. The result of the study was that the penetration of life insurance was low in the countries with prevailing high-interest rates. They also studied the relationship between the operational and financial income of life insurance companies and the prevailing interest rates of the company. The paper suggests that the government's lack of control over interest rate fluctuation in a country acts as an opportunity for insurance companies.

On the other hand, Ballotta et al. (2021) suggested a framework to manage and evaluate complex life insurance contracts. These life insurance contracts have an intricate design based on more than one triggering event. Moreover, these triggering events are monitored individually over the life insurance policy term. Furthermore, Hamidoğlu (2021) has developed a model for life insurance companies using the point of view of game theory for creating marketing plans for insurance companies. The paper provides a numerical instance for a better explanation. This study is one of its types, where game theory is used to develop the model.

Furthermore, Ruß and Schelling (2021) explained that returns are the most attractive factor for investing in life insurance policies. The study shows that investors invest in life insurance policies for the long term, even when any return guarantee is not promised. It also shows that investors are aware of charges applied by insurance companies, but they still prefer to invest in life insurance policies for the long term. In this paper, the descriptive model describes the reason behind people investing in life insurance policies.

Additionally, Wang, Chiu, and Wong (2021) suggested 'Volterra mortality models', including LRD in retaining tractability and actuarial valuation and are constant with the prevailing mortality model of continuous-time affinal. In this paper, the probability of survival is calculated using past data on customers' health. The tractability and flexibility of the model allow it to be beneficial for evaluating mortality-related like longevity bonds, annuities, and death benefits and presenting the optimum 'mean-variance' mortality rule of hedging. The studies based on numeric data are conducted to examine the effect of combining mortality rates into LRD on hedging efficiency and insurance products.

Also, in their study, Islam et al. (2021) analyzed the behaviour of life insurance policyholders to recognize adverse behaviour. In their study, a new rule of association based on an approach to learning such as ARLAS to sense the negative behaviour of policyholders was used. The study was conducted among 30,000 policyholders in Australia to reach their results.

Furthermore, in their paper, Denuit and Robert (2021) studied three insurance business models: carrier, broker, and self-governing. In the current paper, the author proposed an actuarial based model on 'conditional mean risk sharing',

This paper aims to formalize the three business models dominating peer-to-peer (P2P) property and casualty insurance: self-governing, broker, and carrier. The present paper proposes actuarial modelling based on conditional mean risk-sharing for backing the expansion of this novel P-2-P offer based on the three business models.

## 3. MODELS SPECIFICATION

This section proposes a risk management model to mitigate insurance risk. This model will help life insurance companies to select the appropriate customer pool for insurance with the right premium amount charged to reduce the loss probability, which may occur due to a wrong choice of customer pool.

The section below explains the steps to analyze the risk-

### 3.1 RISK ANALYSIS

**Steps involved in Risk Analysis**

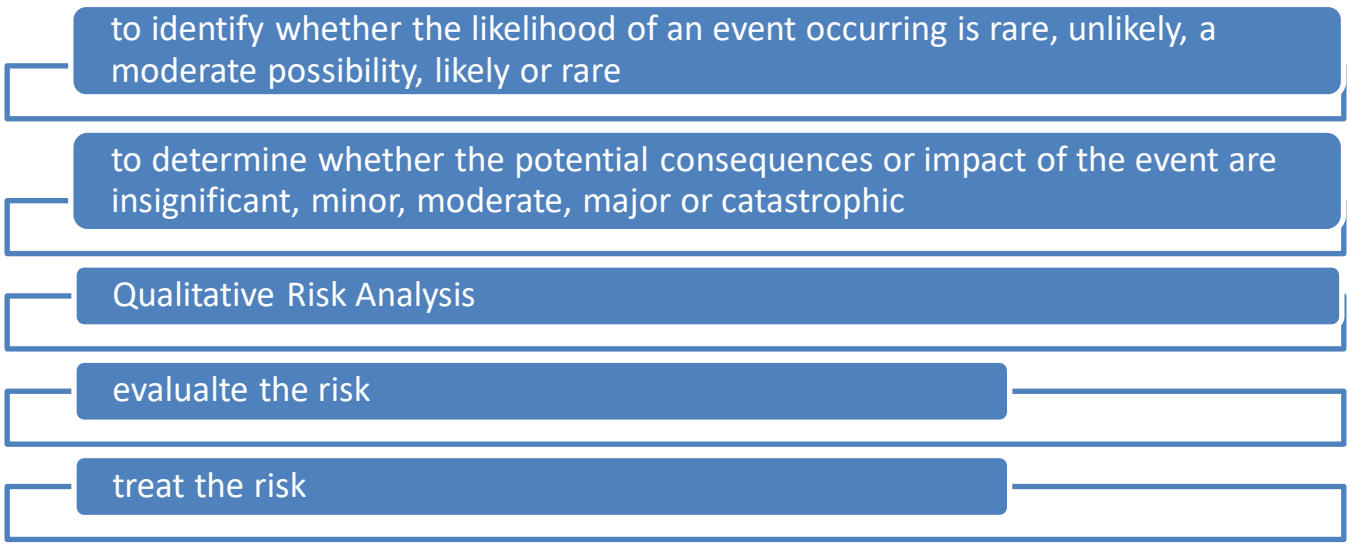


**Figure 9**- Steps for risk management
**Source-** Author's compilation

**STEP 1:** ***ANALYZING THE PROBABILITY OF THE RISK***

**Table 1**- Principle framework to select the probability

| RATING | SIGNIFIER | EXPLANATION | |
|---|---|---|---|
| | | **Likely to occur** | **Meaning** |
| 1 | Almost certain | Less than10 times per year | Not rare to occur |
| 2 | Likely | 1-10 times per year | The occurrence has happened multiple times during a person's occupied tenure in a specific job location & it will last in the same manner. |

| | | | |
|---|---|---|---|
| 3 | Moderate | once<br>every 2-5 years | The occurrence may happen only once in a certain area of work, and it could happen at any point in time. |
| 4 | Seldom | once<br>every 6 to20 years | It is possible that the event has not happened yet. It has happened in the past, and it may happen again. |
| 5 | Unlikely | Once every<br>20 years or more | Something similar to this has happened before. |

**STEP 2:** ***STUDY THE VALUES OF THE RISK***

**Table 2**- Principle framework for estimating the value of risk

| RATING | SIGNIFIER | EXPLANATION |
|---|---|---|
| 1 | Insignificant | No injury or no loss<br>Minor damage or minor loss<br>Cost/loss less than $5000. |
| 2 | Minor | Injury resulting in 3 days leave from job<br>Cost/loss between $5000 to $ 50000 |
| 3 | Moderate | Injury resulting in more than 3 days leave from the job to weeks<br>Cost/loss between $ 50000 to $ 1 M |
| 4 | Major | Injury resulting in more than 4 weeks leave from job<br>Cost/loss between $ 1 M to $ 10 M |
| 5 | Catastrophic | Death at the workplace due to illness or accident<br>Cost/loss of more than $ 10 M |

**STEP 3:** ***ANALYSINGQUALITATIVE RISK***

A qualitative risk analysis matrix is provided in the table below. The usage of this table is to regulate the amount of risk (Salem and Naouali, 2015; Olszewska, 2015; Millo and Carmeci, 2015; Milewska et al. 2012; Machowska-Szewczyk, Małgorzata, and Sompolska-Rzechuła, 2012; Sompolska-Rzechuła, 2010; Greenacre, 1993):

**Table 3** -Qualitative Risk Analysis Matrix – Level of risk

| **Likelihood** | **RISK** | | | | |
|---|---|---|---|---|---|
| | **Insignificant 1** | **Minor 2** | **Moderate 3** | **Major 4** | **Catastrophic 5** |
| **Almost certain** | M | S | S | S | S |
| **Likely** | M | M | S | S | S |
| **Moderate** | L | M | M | S | S |
| **Unlikely** | L | L | M | M | S |
| **Rare** | L | L | L | M | M |

Source- Trivedi, 2017

**Table 4** - Legend:

| SYMBOL | STANDS FOR | REMARKS |
|---|---|---|
| S | Significant RISK | senior management attention needed |
| M | Moderate RISK | management responsibility must be specified |
| L | Low RISK | manage by routine procedures |

Source- Trivedi, 2017

***ANALYZING THE RISKS***

The objective of this step is:-

- It is used to assess the possibility of an event happening and forecast the insurance company's economic effect.
- The distinction between little dangers that can be tolerated and large ones must be addressed. This is accomplished by assigning qualitative qualities to "almost certain", "likely", "possible", "unlikely" or "rare" for the probability of occurring of an event & "catastrophic", "major", "moderate", "minor" or "insignificant" for defining the impact after the event occurs.

**STEP 4: *EVALUATING RISK***

The goal of this stage is to determine the risk level. This stage is critical as it establishes a framework for deciding which hazards should be handled first and in what sequence. As a result, the method identifies the risks that the insurance firm may accept and manage using basic measures. If any hazards are intolerable, risk management procedures may be essential.

**STEP 5: *TREATING RISK***

The goal of the given step is to identify and implement risk management & mitigation alternatives. The amount of risk is determined by the risk evaluation procedure. Therefore, the objectives of the passed action are as follows:

• identifying and assessing the array of risk treatment alternatives available, and

• preparing and implementing a plan for treating risk.

Separately from the goals mentioned above, this step also has a reporting method. If individuals identify a risk, they can say the same to their management. The managers will then decide which event of trouble shall be put forth to the council (for instance, all high risks).

**The options for risk treatment are:**

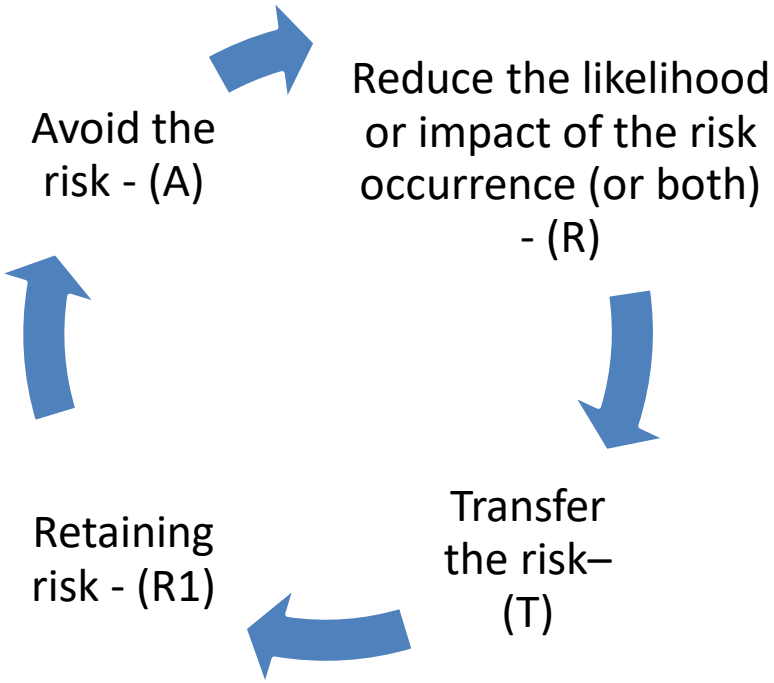


**Table 5**- Explanation

| | | |
|---|---|---|
| Avoiding risk - (A) | Decisions related to - | a. Not providing insurance to the individual with risk, which is unacceptable<br>b. Choosing an individual to ensure who meets the goals and objectives of the firm (Davidoff, Brown & Diamond, 2005)<br>c. Choosing a process or methodology to define the limit or range of acceptable risk |
| Reducing the impact or probability of occurrence of risk (R) | Any decision from the alternatives available is chosen | a. Make the individual aware of the danger they are exposed to<br>b. Providing him with a suggestion to improve his lifestyle<br>c. Increasing the charges of premium |
| Transferring risk (T) | Part or entire risk is transferred | For instance, reinsurance |
| Retaining risk (R1) | Risk is retained by taking measures of risk mitigation | a. If the risk identified is low, then the company may decide to retain the risk<br>b. in the case when no method is available to avoid the risk, the company decides to retain the risk |

Based on the above model, the risk management technique is applied to reduce the insurance risk for a life insurance company. The following section presents the methodology used to conduct the study.

## 4. METHODOLOGY AND DATA

The data is collected from both primary and secondary sources. First, the data of individuals is collected systematically by making respondents fill out the questionnaire. The sample size taken is 500, and the sampling method is stratified sampling. The sample of 500 individuals was selected based on their occupation, namely the service sector, manufacturing sector, government sector, business class, and others, including retired people, homemakers, and farmers residing in the northern region of India. Then, the data collected is used to calculate the score and test the model suggested in the current study.

### 4.1 Variables and Hypotheses

Dependent Variables:

- Density – Ratio of 'volume of life insurance premium' to 'total country population.'
- Penetration – Ratio of 'volume of life insurance premium' to 'GDP.'

Independent Variables

The determinants of life insurance consumption help in determining the independent variables affecting the purchase of a life insurance policy (Sanjeewa et al., 2019; Šatrović, 2018; Dragos et al., 2017, Zerriaa et al., 2017; Zerriaa and Noubbigh, 2016; Geda and Yimer, 2016; Alhassan et al. 2016; Luciano et al. 2016; Sulaiman, Migiro and Yeshihareg, 2015; Brokešová et al. 2014; Sen and Madheswaran, 2013; Sliwinski, Michalski and Roszkiewicz, 2013; Liebenberg, Carson & Dumm, 2012; Li et al. 2007; Lenten & Rulli, 2006; Esho et al. 2004; Beck et al. 2000; Beck and Webb, 2003; Showers and Shock, 1994; Browne & Kim, 1993; Truett and Truett,1990; Lewis, 1989; Beenstock, Dickinson & Khajuria, 1986; Goldsmith, 1983; Friedman, 1957). Ando abd Modigliani (1963) has defined the hypothesis development of saving, its consequences, and testing.

Based on the guidelines of IRDA, the following independent variables are identified:

a. Income

Hypothesis 1: There is a positive relationship between income and life insurance demand.

b. Age -

Hypothesis 2: There is a positive relationship between age and life insurance demand.

c. Height & weight

Hypothesis 3: There is a positive relationship between height & weight and life insurance demand.

d. Personal health record

Hypothesis 4: There is a positive relationship between personal health records and life insurance demand.

e. Drinking & Smoking habits

Hypothesis 5: There is a positive relationship between drinking & smoking habits and life insurance demand.

f. Driving habits

Hypothesis 6: There is a positive relationship between driving habits and life insurance demand.

g. Insurance history

Hypothesis 7: There is a positive relationship between insurance history and life insurance demand.

h. Occupation

Hypothesis 8: There is a positive relationship between occupation and life insurance demand.

### 4.2 Relevance of independent variables and their usage in life-insurance policy form

- The form contains the information on the 'Income' of the individual to estimate whether the individual can make timely and regular payments of premium.
- The form contains the information of the individual's 'date of birth' to estimate his age, as with increasing age, the likelihood of death increases. Thus, the company charges an extra premium for people above 50 years to mitigate this risk.
- The form contains the information of ‘height & weight’ to estimate whether the individual is overweight or under-weight as such individual becomes more susceptible to diseases. Thus, to mitigate such risk, companies can charge extra premiums from them.
- The form contains the information of the individual's 'personal health record' to identify whether the individual has some chronic disease or not, as in such a case, the surety of death of an individual is certain. If insured by the company, such an individual is charged a higher premium. The premium is estimated by underwriters at the head office taking consultation of medical officers.
- The form contains information about 'habits' such as drinking or smoking, as such habits shorten an individual's life. If a company insures such individuals, they can charge a high premium.
- The form contains information on 'driving habits' by asking if any accidents occurred in the past five years. This information is collected as an individual with rash driving habits is more likely to have an accident. It is risky for insurance companies to provide insurance to such an

individual. However, if the company decides to insure such an individual, it can charge an increased premium.

- The form contains the information of 'insurance history of individual' by asking the individual to specify if there is any family history of a particular disease like BP or diabetes or any other hereditary disorders. Such information is collected as the chances of individuals being exposed to a similar illness in the future increase. Thus, it is risky for insurance companies to provide insurance to such individuals, and they can charge increased premiums.
- The form contains information on 'occupation' to identify whether the individual is exposed to any risk at his workplace. If the individual is exposed to risk, the company can charge an extra premium.

The following section presents the result of this weight-age criterion used on 500 people.

### 4.3 Weight-age criteria

This section explains the treatment of independent variables in calculating an individual's premium by using the method of weight-age. The weight-age of each independent variable is given in a flowing manner - minimum weight-age is 1, and maximum weight-age is 7.

It is assumed that the maximum score gained by each factor should be equal for calculating the score. The value of the highest weight-age estimates the highest score, and the lowest score is estimated at the lowest weight-age. The calculation is explained below-

| Independent variable | Determinants | Weight-age | Calculation | Highest score | Lowest score |
|---|---|---|---|---|---|
| Income | 7 lacs+ | 4 | 7*4=28 | 28 | |
| | 7-5 lacs | 3 | 7*3=21 | | |
| | 5-3 lacs | 2 | 7*2=14 | | |
| | <3 lacs | 1 | 7*1=7 | | 7 |
| Height & weight | Normal | 2 | 14*2=28 | 28 | |
| | Fatty | 1 | 14*1=14 | | 14 |
| BP | Low | 2 | 14*2=28 | 28 | |
| | High | 1 | 14*1=14 | | 14 |
| Personal health | Healthy | 2 | 14*2=28 | 28 | |
| | Unhealthy | 1 | 14*1=14 | | 14 |
| Habits | None | 7 | 4*7=28 | 28 | |
| | Mild 1 | 6 | 4*6=24 | | |
| | Mild 2 | 5 | 4*5=20 | | |
| | Mild all | 4 | 4*4=16 | | |
| | Heavy 1 | 3 | 4*3=12 | | |
| | Heavy 2 | 2 | 4*2=8 | | |
| | Heavy all | 1 | 4*1=4 | | 4 |

| | | | | | |
|---|---|---|---|---|---|
| Driving | Others | 2 | 14*2=28 | 28 | |
| | Self | 1 | 14*1=14 | | 14 |
| Insurance history | Healthy | 2 | 14*2=28 | 28 | |
| | Disease | 1 | 14*1=14 | | 14 |
| Nature of work | Desk work | 2 | 14*2=28 | 28 | |
| | Fieldwork | 1 | 14*1=14 | | 14 |
| TOTAL | | | | 252 | 92 |
| PERCENT | | | | 100% | 36.51% |

**Table 6** – Calculation of Risk score of individual

The following section presents how individuals can be categorized based on their calculation of scores.

### 4.4 Criteria of risk categorization

In this section, four risk categories are defined for insuring an individual based on their score (Ward, 1963).

- The First category is (A) individuals whose scores fall between 84% & 100%. Such individuals are ideal for an insurance company to insure them, as in such a situation, the life insurance company is least at risk.
- The second category is B, whose score falls between 83.99% & 68%. Such individuals are not as ideal as category A but still safe for the company to insure at a premium more than category A.
- The Third category is C, whose score falls between 67.99% & 52%. Such individuals are not as ideal as category B but still safe for the company to insure at a premium more than category B.
- The Fourth category is D, whose score falls between 51.99% & 36.50%. Such individuals are not as ideal as category C but still safe for the company to insure at a premium more than category C.

## 5. EMPIRICAL RESULT

The given table is created after calculating the score of 500 people. The sampling method used is stratified. The sample of 500 people is taken from people across the ages of 25 to 60 with different occupational categories including Business class, Government employee, Manufacturing sector, Service sector, and others including housewife & retired persons. The demography of respondents is given below-

### 5.1 DEMOGRAPHY OF RESPONDENTS

**Table 7 –** Respondent's Demography

| VARIABLE | CATEGORY | NUMBER | PERCENTAGE |
|---|---|---|---|
| **GENDER** | Male | 280 | 56% |
| | Female | 220 | 44% |
| **AGE** | Less than 35 YRS | 170 | 34% |
| | 36 to 45 YRS | 60 | 13% |
| | 46 to 55 YRS | 160 | 32% |
| | More than 56 YRS | 110 | 22% |
| **OCCUPATION** | Business-class | 95 | 19% |
| | Govt. employee | 55 | 11% |
| | Manufacturing sector | 125 | 25% |
| | Service sector | 170 | 34% |
| | Others include homemakers & retired person | 55 | 11% |
| **INCOME** | Less than three lacs | 20 | 4% |
| | 3 - 5 lacs | 125 | 25% |
| | 5 – 7 lacs | 185 | 37% |
| | More than 7 Lacs | 110 | 22% |
| | Not Disclosed | 60 | 12% |

The above table shows that the number of male respondents is more than females. The majority of those who took part in this study were under 35 years of age. There was also a group of respondents who were not working. However, the major number of respondents worked in the service sector. The bulk of responders has a yearly income of between 5 and 7 lacs.

The sample is not uniformly distributed, despite stratified sampling.

The following section presents the number and percentage of people falling into each category according to their scores.

## 5.2 RESPONDENT RISK CATEGORIZATION

The given table presents the number and percentage of people falling into each category according to their scores.

**Table 8** – Risk categorization of respondents

| FEATURES | | A | B | C | D |
|---|---|---|---|---|---|
| TOTAL | | 230 | 170 | 70 | 30 |
| PERCENTAGE | | 46% | 34% | 14% | 6% |
| **AGE** | <35 YRS | 132 (57.3%) | 34 (20%) | 4 (5.7%) | 0 |
| | 36- 45 YRS | 39 (16.9%) | 17 (10%) | 13 (18.6%) | 3 (10%) |
| | 46 – 55 YRS | 35 (15.2%) | 76 (44.7%) | 35 (50%) | 12 (40%) |
| | 56+ YRS | 24 (10.43%) | 43 (25.3%) | 18 (25.7%) | 15 (50%) |
| **INCOME** | 7 LAC + | 74 (32.17%) | 18 (10.6%) | 7 (10%) | 0 |
| | 7- 5 LACS | 96 (41.73%) | 76 (44.7%) | 10 (14.3%) | 2 (6.7%) |
| | 5 – 3 LACS | 18 (7.82%) | 56 (32.9%) | 45(64.28%) | 7 (23.3%) |
| | <3 LACS | 0 | 0 | 8 (11.42%) | 7 (23.3%) |

| | | | | | |
|---|---|---|---|---|---|
| | Income not disclosed | 42 (18.26%) | 20 (11.8%) | 0 | 14 (46.7%) |
| **HABITS** | NONE | 60 (26.09%) | 53(31.18%) | 3 (4.28%) | 0 |
| | MILD 1 | 94 (40.87%) | 73(42.94%) | 18(25.72%) | 15 (50%) |
| | MILD 2 | 53 (23.04%) | 20(11.76%) | 20(28.57%) | 9 (30%) |
| | HEAVY 1 | 23 (10%) | 24(14.12%) | 29(41.43%) | 6 (20%) |

The next presents the correlation between factors to test the hypothesis.

## 5.3 FINDING AND RESULTS

The given section presents the correlation between factors.

**Table 9** – Calculation of co-relation to test the hypothesis

| FACTOR | | Calculation of CORRELATION to test the hypothesis |
|---|---|---|
| AGE | Less than 35 | 0.88 |
| | 36 to 45 | 0.95 |
| | 46 to 55 | 0.51 |
| | Above 56 | 0.55 |
| INCOME (in lacs) | More than 7 lacs | 0.88 |
| | 7 lacs – 5 lacs | 0.99 |
| | 5 lacs – 3 lacs | 0.24 |
| | Less than 3 lacs | -0.95 |
| HABITS | None | 0.98 |
| | mild 1 | 0.99 |
| | mild 2 | 0.86 |
| | heavy 1 | 0.38 |

In the majority of factors, the result shows a very positive correlation. Thus, the hypothesis is accepted.

## 5.4 DISCUSSION

Based on the above data, the positive correlation between the independent variable and dependent variable taken in the study, it can be said that the hypothesis is accepted. Thus, this study suggests that life insurance companies should consider all the variables, such as age, income, occupation, and others, to reduce the insurance risk while selecting a suitable pool of candidates. Furthermore, adopting a framework to categorize the individuals into risk classes for providing insurance will reduce the company's loss in terms of reduced claim settlement.

## 6. CONCLUSION

The business of an organization in insurance is to reduce the risk associated with an individual's life. If the insurance company is liable to pay a claim to an individual who has not paid an equivalent premium for the policy, it is a loss for the business. Pooling of insured decreases this risk. Thus, corporations should frame and create a pool of high-risk customers. Aggressive selling is one of the marketing

methods used in the insurance industry. Therefore a sales agent may choose a hazardous individual as a potential consumer to meet his sales target. For this reason, firms insure against danger. As a result, the company might charge varying premiums from various consumers for the same sum assured. To compute tips, each firm has its calculator. This research merely attempts to understand the likelihood that an insurance organization will choose a dangerous consumer for insurance when the number of the less risky prospective consumers is more. It is also known as a company's opportunity cost. The framework suggested in this paper will help life insurance companies to mitigate the risk.

## 7. SCOPE OF FUTURE RESEARCH

Several factors determine the risk to which an individual is exposed. The COVID-19 outbreak has given a new challenge to life insurance industries concerning risk management. Thus, the risk environment changes rapidly, and risk other than financial risk to the insurance business increases. Therefore, it is significant for life insurance industries to determine the risk factors that the market expert has not identified. There is future scope of research in identifying the risk to which an individual is exposed. At the same time, the insurance industry is also exposed to risks in providing life insurance to such individuals.


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