Chapter 3

Research Methodology

This research is a qualitative research The details about the research method as follows:

1. Research Design
2. Population and Sample Size
3. Research Instruments
4. Data Collection
5. Data Analysis

Research Design

The study will employ a quantitative research method, utilizing a survey questionnaire to gather information from key individuals at Company B, including project managers, risk managers, safety officers, and senior management. The sample selection will employ a random sampling technique, ensuring representation from different departments and levels of seniority. Statistical power analysis will determine the appropriate sample size for achieving adequate representation. Data collection will involve preparing a survey questionnaire based on a literature review and expert input. The questionnaire will employ a 5-point Likert scale to gauge respondents' perceptions regarding the factors influencing risk management at Company B and their impact on the effectiveness of risk management techniques. Descriptive statistics will be used to analyze the survey data, providing insights into respondents' perceptions of the factors affecting risk management within Company B. Inferential statistics, such as regression analysis, will be employed to identify significant determinants of effective risk management practices. The research aims to enhance understanding of the factors influencing risk management at Company B and their impact on the effectiveness of risk management methods. The findings will assist the company in developing plans to improve risk management processes, leading to improved project outcomes, cost reduction, enhanced safety measures, and a competitive advantage in the industry.

Population and Sample Size

$$\text{Unlimited population: } n = \frac{z^2 \times \hat{p}(1-\hat{p})}{\varepsilon^2}$$

$$\text{Finite population: } n' = \frac{n}{1 + \frac{z^2 \times \hat{p}(1-\hat{p})}{\varepsilon^2 N}}$$

Figure 3.1 Statistics of a Random Sample Size Calculation

(Where "z" is the z score=95%;"ε" is the margin of error=9.16%;"N" is the population size=1111; "N"is the population proportion=104)

Therefore, a sample size of approximately 104 would be required to achieve the desired level of precision and confidence level. However, depending on the research design and sampling method used, a larger or smaller sample size may be appropriate. It is important to carefully consider the research design and sampling method to ensure that the sample is representative of the population and that the results are reliable and generalizable.

1. Simple Random Sampling

First, establish a sampling frame of all eligible Company B employees to use simple random sampling in this research. Risk management employees may include project managers, risk managers, safety officers, senior management, and others. The researcher gives each person a unique number after establishing the sample frame. A random number generator or equivalent approach would then select a subset of persons from the sample frame. This selection mechanism would be fair and unbiased, giving everyone in the sample frame an equal chance of being chosen. Complete the survey questionnaire to participate in the study. Simple random sampling may yield a diversified sample of Company B employees from various departments and levels of seniority, providing a comprehensive view of risk management methods.

Research Instrument

The questionnaire should be made to find out about the different things that affect risk management in the company, such as the company's risk management policies, etc. The questionnaire should have closed-ended questions where respondents can rate how much they agree or disagree with statements about different parts of risk management in the company, such as how often risk assessments are done, how well

the company meets regulatory requirements, and how well risk management communication channels work. Likert scales or other comparable rating scales can be used to find out how much people agree or disagree with each statement. The questionnaire should also have questions regarding the work roles, degree of seniority, and department of the people who fill it out. To make sure the instrument is valid and reliable, it is vital to do a pilot test with a small number of respondents to find and fix any problems with the way the questionnaire is set up or how it is written. Using the right statistical methods, the data from the survey can then be used to figure out which factors have the biggest effect on risk management in Company B.

Wenjuanxing

Wenjuanxing is a popular online survey platform that makes conducting surveys and collecting data simple and quick. It is an easy-to-use interface that allows researchers to construct and adjust surveys based on their individual research objectives. Researchers can quickly send surveys to participants using Wenjuanxing via email or social media sites, assuring a broad reach and maximizing response rates. The platform also includes a number of data analysis tools and features that enable researchers to create informative reports and analyze survey results in a complete and methodical manner. Overall, Wenjuanxing simplifies the survey research process by providing researchers with a dependable and quick data collection and analysis tool.

1. Likert Scale

In social science research, the Likert scale is a typical way to measure attitudes, perceptions, and views. In a typical Likert scale, people are asked to rate how much they agree or disagree with a series of statements on a scale from 1 to 5 or 1 to 7. The 1–5 Likert scale has been used in many studies to measure things like job happiness, customer satisfaction, organizational commitment, and academic success. For example, Tijani and Hassan's study from 2017 employed a 1–5 Likert scale to find out how happy students were with the quality of education they got at their institution. The authors observed that most of the students were happy with the quality of their education at the university Alsubaie and Alrowais (2020, pp. 1361-1370) did another study using the 1–5 Likert scale to find out how nurses felt about adopting mobile health technologies in their clinical work. The study found that nurses were generally open to using mobile health technology. It also found things that could help or hurt the use of these technologies. The 1-5 Likert scale has also been used in research that looked at the relationship between job satisfaction and organizational commitment (Bahadori, et al., 2017, pp. 675-684) and studies that looked at customer satisfaction with different products or services. (Nazir, et al., 2019, pp. 23-33).

The criteria for interpreting the meaning of the mean from the data analysis are as follows:

Mean 4.51 – 5.00 means the highest opinion level.

Mean 3.51 – 4.50 means a high level of opinions.

Mean 2.51 – 3.50 means moderate opinion level.

Mean 1.51 – 2.50 means low level of opinion.

Mean 1.00 – 1.50 means the lowest level of opinion.

2. Validity & Reliability

2.1 Validity

The content was validated by three experts, and the Index of "Item Objective Congruence" (IOC) was calculated for the survey questionnaire. Points of congruence were assigned based on the Index of Item Objective Congruence (IOC) (Hambleton & Rovinelli, 1976, pp. 157-169). IOC ratings attained the highest levels of 0.95 and 1. The IOC points in calculations are provided in three rating schemes for consistency and congruency of items. All experts were required to select only one answer as the provided grade from the following three alternatives:

If specialists are certain that an item is a measure of an objective, add one point.

If specialists are unsure whether the item is a measure of an objective, the score is 0.

If specialists are certain that an item is not a measure of an objective, the item is not a measure.

The consistency value for each item's total points must be at least 0.50 (Rovinelli & Hampleton, 1976).

IOC is calculated using the formula R/N where: IOC equals Item Objective Conformity

R	=	Sum of distinct expert ratings
ΣR	=	total ratings from every authority
N	=	Number of specialists

In addition, three experts evaluated it for the IOC analysis, which ranges from +1 to -1. The sum of all experts' ratings for each item resulted in disparate outcomes. However, the concept of examining the IOC for consistency as validity cannot fall below 0.50. the result for this item was 0.88.

2.2 Reliability

Cronbach's alpha is a commonly used measure of reliability in research studies, especially in the disciplines of psychology, education, and the social sciences. It evaluates the internal consistency or reliability of a scale or questionnaire by measuring the degree of correlation between items within the scale. Cronbach's alpha ranges from 0 to 1, with greater internal consistency corresponding to higher values.

The following is the interpretation of Cronbach's alpha values:

Below 0.6, the internal consistency is poor, suggesting that the items on the scale are not strongly related to one another. In such instances, the results should be interpreted with caution. Alpha between 0.6 and 0.7: This indicates acceptable internal consistency, but it is on the lower end of the acceptable range. It suggests that some of the items may not be significantly correlated with one another, and that additional examination or revision of the scale may be required. Alpha values between 0.7 and 0.8 indicate that the items on the scale are moderately correlated with one another. The scale is regarded as trustworthy for research purposes. Alpha values between 0.8 and 0.9 are indicative of excellent internal consistency. It indicates that the items on the scale are highly correlated, indicating a high degree of dependability. The scale is regarded as highly reliable for scientific investigation. Alpha greater than 0.9 indicates outstanding internal consistency. It indicates that the scale's items are nearly precisely correlated with one another. Nonetheless, extremely high alpha values may also indicate item redundancy or excessive similarity. For this questionnaire test alpha value is equal to 0.81

Data Collection

1. Make a questionnaire: Create a questionnaire with all of the pertinent questions and items to measure the constructs of interest based on the study objectives and theoretical framework. Avoid ambiguity and uncertainty by using precise and simple language.

2. Set up the online survey: Once the questionnaire is complete, use Wenjuanxing to construct the online survey. Customize the survey to reflect the study needs and design, and include participant instructions and contact information.

3. Before distributing the survey to the target company, pilot test it with a small group of people to check for any flaws or issues with the survey design or questions. This will help to ensure the survey's reliability and validity.

4. Choose a sample: Based on the sampling method used, identify and select the sample for the study. Select individuals who meet the set criteria, for example, if you're employing a purposive sample.

5. Distribute the survey as follows: Send the survey link to the individuals you've chosen by email, social media, or other channels. Include a brief introduction and explanation of the study, as well as any participation incentives or prizes.

6. capture the data: After distributing the survey, watch the responses and capture the data as it comes in. Set a response submission date to ensure that the data gathering period does not exceed the intended timetable.

7. Report the results: Write up the study's findings in a clear and succinct manner, adding tables and graphs as needed. Include a summary of the study's shortcomings as well as recommendations for further research.

Data Analysis

1. Descriptive Analysis

Age distribution: The mean, median, mode, range, and standard deviation of the age variable can be used to summarize the sample's age distribution. These measurements can help to provide a clear idea of the sample's age range and distribution.

Gender: The sample's gender distribution can be displayed as a frequency table or a bar chart. This will assist in determining the proportion of male and female participants in the sample

Furthermore, bivariate analysis can be performed to investigate the association between age and gender with other factors in the questionnaire. For example, the mean risk perception score for each age and gender group can be determined to evaluate if there are any significant differences between the groups.

2. Linear Regression

Model specification: Along with the independent factors, the dependent variable (risk management) should also be named. (rules and regulations, risk impact, risk nature, and strategy priority). Here are some ways to describe the model:

Model estimation: Statistical tools can be used to get an estimate of the regression coefficients. Estimates of the slope and regression coefficients, as well as measures of how well the model fits, will be shown. (e.g., R-squared, adjusted R-squared).

Model interpretation: Here's how to understand the regression coefficients:

Model evaluation: The R-squared value, which shows how much of the variation in the dependent variable can be explained by the independent variables, can be used to assess the model. There are other ways to figure out how accurate the regression coefficients are, such as the standard error of the guess.