Chapter 3

Research Methodology

This chapter is quantitative research. The details about the research method are as follows:
- Research design
- Population and sample size
- Research instruments
- Data collection
- Data analysis

Research Design

To fully comprehend the present state of digital integration within small and medium-sized enterprises (SMEs) in the northwest region of China, we will deploy several research methodologies. These methodologies include questionnaires, field visits, and interviews. The aim is to understand the construction and utilization of digital technology in the business context, identify existing gaps in digital integration, and analyze factors that impact the current state of digital integration. We have divided our investigation into four main sections:

1. Investigating SMEs: We will collect fundamental information about these SMEs, including their industry, size, and the region they operate in. Furthermore, we will gauge their attitude and initiative towards digital transformation to understand their willingness to participate in this transformation. Their familiarity and proficiency with digital tools and technologies will also be evaluated, serving as an important basis for understanding their digital literacy and potential barriers to digital transformation.

2. Understanding the Digital Infrastructure: We will investigate the digital infrastructure available to these SMEs. This includes understanding their access to high-speed internet, the digital maturity of their traditional infrastructure, and the existence of a robust IT support system. The quality of their digital services, including equipment maintenance, replacements, on-site support, etc., will also be assessed to determine whether their digital service capabilities are well developed.

3. Assessing the Digital Environment: This involves examining the quality of their internet connectivity and their cybersecurity measures. We will also explore the

construction and application of digital technology within their business operations and management. This includes an assessment of their digital platforms and data systems, their functionality, and areas needing improvement. The frequency and efficiency of their use of digital platforms for business operations will be investigated to unearth any gaps in their current digital transformation strategy.

4. Reviewing the Digital Transformation System: Lastly, we will examine the systems that support digital transformation within these SMEs. This includes the leadership's attitude toward digital transformation, the policies supporting digital integration, talent acquisition, and upskilling, and the mechanisms that ensure the smooth implementation of the digital transformation strategy aim is to judge the efficacy of their digital transformation system and provide suggestions for its enhancement.

Through these extensive investigations and detailed analyses, we hope to devise a comprehensive report on the current state of digital transformation in SMEs in the northwest region of China and provide a roadmap for their future digital journey.

Population and Sample Size

Our research is aimed at studying and comprehending the current state of digital transformation within small and medium-sized enterprises (SMEs) in a city in northwest China. The focus is on various aspects, including their awareness, participation, and satisfaction with digital transformation, as well as their use of digital technology and related platforms. The primary goal is to understand the ground realities of digital transformation in SMEs from a multi-dimensional perspective, particularly emphasizing existing challenges.

Sample:

The examples include People in urban areas in northwest China. Due to the large population and the exact population unknown, the sample size can be calculated from W.G. Cochran's unknown sample size formula, which defines a 95% confidence level and a 5% tolerance (Kalyavanichbanban, 2006, p. 74).

Formula $\quad n = \dfrac{P(1-P)Z^2}{E^2}$

where   n   represents the sample size.

            P   represents the proportion of the population used by random researchers, equal to .50.

            Z   represents the confidence level given by the researcher, Z is 1.96. At 95% confidence level (.05 level)

            E   represents the error of .05.

The value can be substituted as follows:

$$n = \dfrac{0.5(1-0.5)(1.96)^2}{(0.05)^2}$$

n = 384.16

To ensure appropriateness in evaluating and analyzing data, and to cater for any possible non-responses or ineligible responses, we rounded up the sample size to 400. Consequently, we distributed 400 questionnaires to SMEs within our target population for the research.

Research Instruments

Our research methodology deploys a structured questionnaire as the primary research instrument, designed to gather qualitative and quantitative data about the digital transformation within the SMEs. This questionnaire includes a variety of question types such as multiple-choice questions, Likert scale questions, and open-ended questions to provide a comprehensive understanding of the topic.

The participants for the questionnaire survey are selected using a stratified random sampling technique. Given the absence of a fixed sampling framework, we aim to ensure a representative sample by randomly selecting SMEs across different sectors and sizes within the targeted city in northwest China. This random selection minimizes bias and enhances the representativeness of the sample, thereby increasing the accuracy and generalizability of our research findings.

During the sampling process, precautions are taken to prevent the introduction of any personal preference factors by the researcher. The sampling is done adhering

to principles of objectivity and fairness, ensuring that all SMEs within the defined population have an equal opportunity to be included in the study.

The collected data from the questionnaires will be analyzed using statistical methods to calculate sample indicators and extrapolate the overall indicators for the research. The results will then be interpreted and discussed in light of existing literature on the digital transformation of SMEs.

Data Collection

According to the prepared interview outline, interviews were conducted with small and medium-sized enterprises, residents, and rural cadres around a city in Northwest China to understand their views on the construction of digital countryside, their specific understanding, attitude, and willingness to the construction of digital countryside, current achievements, difficulties encountered, areas in need of improvement, and opinions and suggestions for future planning. Then a transcript of the interview was formed. Finally, the obtained survey data and interview records are classified and sorted. Form histograms, pie charts, bar charts, and other charts to display the survey results more visually. At the same time, the opinions and suggestions of the survey objects and respondents on the construction of digital countryside are sorted out, and the causes and solutions behind the problems are analyzed.

Data analysis

Used the SPSS analysis method to make a specific analysis of the collected valid data. To analyze the data, we conducted the following data analysis.

1. Analysis and conclusion from data collection from the research questionnaire.

2. Statistics used to analyze data require that the answers be a rating scale, which allows respondents to choose to answer according to their own opinions divided into 5 levels. as follows.

5	means	most demanded.
4	means	are very demanding.
3	means	moderate demand.
2	means	less demanding.
1	means	minimal demand.

Criteria for assessing the level of demand.

4.50 – 5.00	means	highest level.
3.50 – 4.49	means	high level.
2.50 – 3.49	means	moderate level.
1.50 – 2.49	means	less level.
1.00 – 1.49	means	minimal level.

Statistics used to analyze user needs include IOC, Average, Standard Deviation, Percentile, Multiple Linear Regression Analysis, Pearson correlation, and KMO. and Bartlett's test of sphericity.