

Chapter 3

Research Methodology

This study is a mixed methods quantitative and qualitative study. 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 research methodology mainly includes the following aspects

1. Quantitative research using inferential statistics method to obtain relevant data by conducting questionnaires to smart door lock companies and general consumers, and multiple regression analysis using jamovi software to determine the influence of independent variables (planning, sourcing, make/production, delivery and return) on the dependent variables (flexibility and responsiveness, cost and trust and assets), analyze the impact of smart door lock supply chain management on enterprise performance, and gain an in-depth understanding of the current situation and market demand of smart door lock supply chain management.
2. Qualitative research by using in-depth interview method, using interview form as a research tool.

Population and Sample Size

This study takes Wenzhou City, Zhejiang Province, China as a sample to analyze the supply chain development of China smart door lock market over the past decade. The city has a total population of 95,729,903 in 2020 (Wenzhou Bureau of Statistics, 2021). The sample of this study includes general consumers and smart door lock enterprises. To ensure the objectivity and reliability of the results, a random sample of 400 people (aged 15-59) was taken as the general consumer sample, and

400 questionnaires were distributed, and due to various factors, we received a total of 388 valid questionnaires.

For the smart door lock enterprise section, we randomly selected seven smart door lock enterprises in Wenzhou for in-depth interviews and analysis, as follows:

1. Zhejiang Weishi Technology Co., Ltd (Ouhai District): 7 respondents (2 managers, 3 technicians, 2 sales staff)

2. Wenzhou Bock Electronic Co. Ltd. (Ouhai District): 8 respondents (2 executives, 3 technicians, 2 sales staff, 1 after-sales staff).

3. Baodeli Industrial Co. Ltd (Ouhai District): 9 respondents (2 executives, 3 technicians, 2 sales staff, 2 after-sales staff).

4. Wenzhou Longpei Hardware Manufacturing Co., Ltd (Lucheng District): 10 respondents (2 executives, 4 technicians, 2 sales staff, 2 after-sales staff)

5. Wenzhou Wisdom Point Information Technology Co., Ltd (Longwan District): 8 respondents (2 executives, 3 technicians, 2 sales staff, 1 after-sales staff).

6. Zhejiang Harman Digital Technology Co., Ltd (Pingyang County): 8 respondents (2 executives, 3 technicians, 2 sales staff, 1 after-sales staff)

7. Yueqing Linyi Hardware Technology Co., Ltd (Yueqing City): 7 respondents (2 executives, 2 technicians, 2 sales staff, 1 after-sales staff).

Through interviews and questionnaires, we listened to the opinions of business owners and employees to gain an in-depth understanding of their production processes, product development, marketing strategies and service quality, and analyzed the development trend of the overall smart door lock market in the context of market trends and consumer demand.

Research Instruments

1. Quantitative research with a question Nair method

The researcher conducted a questionnaire survey of managers involved in the supply chain management of smart door locks in the participating companies, using various forms of scoring as the response method. The questionnaire was designed to cover the five dimensions of the SCOR model (Planning, Sourcing, Make/Production, Deliver and Return) and the five dimensions of Firm Performance (Flexibility, Responsiveness, Cost, Trust and Assets).

The answers to these questions will provide insight into the current status and bottlenecks of smart door lock supply chain management and more accurate market analysis.

The researcher cooperates with Wenzhou University to conduct social practice survey activities, and students are responsible for general consumer questionnaires. We hope to obtain a more comprehensive market situation through questionnaires, in order to provide more accurate market analysis and suggestions for participating enterprises. To achieve this purpose, we will cover the following aspects of the smart door lock products survey:

1) Security: Survey participants' concerns about the security of smart door lock products and its impact on market demand, including biometric identification, password protection, remote control, and other security features.

2) Price: Investigate respondents' sensitivity, expectations and affordability of smart door lock products and analyze the market distribution in different price ranges.

3) Functionality: Investigate the participants' demand for smart door lock product functions and features, as well as the importance of key functions.

4) Ease of use: survey participants' evaluation and demand for the ease of use of smart door lock products, some detailed considerations, such as attention to user experience and user interface.

5) Lifetime and after-sales service: To investigate consumers' needs and evaluation of the lifespan and after-sales service of smart door lock products, as well as their concern about the warranty policy and maintenance service.

By collecting, organizing and analyzing these data, we will understand the demand and trend of the smart door lock market and provide more accurate market analysis for participating companies.

2. Qualitative research by Interview form

Interviews and in-depth analysis of randomly selected companies in the smart door lock industry. By communicating with interviewees to obtain their views and experiences, we deepen our understanding and knowledge of specific issues. During the interviews, we will understand their experiences and opinions on various aspects of smart door lock product design, production, sales, and supply chain management through face-to-face or remote communication with relevant company personnel (e.g., executives, technicians, sales personnel, etc.) In the interview method, we can integrate the independent variables (the four stages under the SCOR model) with the Q&A of the interviews to help us further understand the issues related to supply chain operations in the smart door lock industry.

Using the 5 phases of the SCOR model (Planning, Sourcing, Make/Production, Deliver, and Return) as a basis for interview questions, ask detailed questions related to these phases to better understand how the supply chain works.

The performance indicators in the SCOR model (e.g., Flexibility and Responsiveness, Cost, and Trust and Assets) were used as the primary targets for the interview questions to better understand how product manufacturers perform in their supply chain operations in order to derive analysis and recommendations related to them.

Combining the independent and dependent variables, relevant questions for different performance indicators were asked during the interview process in order to gain a more comprehensive and in-depth understanding of the challenges, successes and best practices of supply chain operations within the smart door lock industry, in order to gain a more comprehensive and in-depth understanding of the current situation and future development trends of supply chain operations within the smart door lock industry, in order to propose corresponding improvement recommendations and research directions.

Data Collection

Data collection is a very important part of the research work, in the context of the study A Study of Smart Door Lock Supply Chain Management Affecting Firm Performance, we used company interviews, distribution of questionnaires for data collection, and also, the literature review method was used for data collection.

1. Literature review method

Literature review is an effective method for data collection. By reviewing relevant research literature and market reports, we can quickly understand the overview, trends and development of the smart door lock industry. The specific process is generally as follows:

First, I used search engines and academic databases to find information related to A Study of Smart Door Lock Supply Chain Management

Influence on company performance

First, I searched for literature related to A Study of Smart Door Lock Supply Chain Management Affecting Firm Performance through search engines and academic databases, such as Google Scholar, Baidu Scholar, Web of Science, Scopus, etc... When searching, I used keywords and phrases related to the topic, such as "smart

door lock supply chain management", "supply chain process optimization", "new chip applications", "smart home security", etc., "smart home security", etc.

Second, I collected data related to new chip applications by searching the official websites, reports, and literature of related institutions and companies. These institutions and companies may include chip manufacturers, smart door lock manufacturers, research institutions, government departments, etc. The official websites and reports of these organizations and companies usually provide detailed information about their products and businesses, from which we can collect some data related to A Study of Smart Door Lock Supply Chain Management Influence on company performance.

We can collect some data related to A Study of Smart Door Lock Supply Chain Management Affecting Firm Performance.

Data Analysis

The relevant data collected will be analyzed as follows.

Questionnaire data: After the questionnaire is completed, the SCOR model-based process questionnaire is analyzed using statistical analysis methods to derive the data results. In this questionnaire, descriptive statistical analysis methods can be used to calculate the mean and standard deviation for each question to assess respondents' attitudes and perceptions about various aspects of the supply chain management process. In addition, multiple regression methods are used to understand the strength and direction of correlations between variables and to identify problems and bottlenecks in supply chain management.

For general consumers, detailed information on user needs, options, and prices of smart door locks was collected. Data that can be analyzed include consumer demand for smart door locks, purchasing habits and behavior, satisfaction and shortcomings of existing products, information sources and channels, etc.

Consumer demand and behavior analysis: Through questionnaire survey data, we understand consumers' demand for smart door locks, their purchasing habits and behavior, their satisfaction with existing products and their shortcomings, and provide reference and guidance for companies in product design and development.

Interview data: Through in-depth interviews and case studies of seven companies in the smart door lock industry, we understand the companies'

Scale, history and current situation, consumer demand and behavior, product design and development, supply chain management and logistics capabilities,

marketing strategies and market positioning, technological innovation and future trends, business models and profitability models, and other data. Data that can be analyzed include data on company size, market share, product development process, supply chain management advantages and disadvantages, marketing strategy and market positioning, technological innovation and future trends.

Supply chain management and logistics capability analysis: Through interview data and questionnaire data, we understand the advantages and disadvantages of enterprises' supply chain management and logistics capability, and analyze their upstream and downstream supply chain relationships, to provide reference and guidance for enterprises to optimize their supply chain management processes.

มหาวิทยาลัยราชภัฏธนบุรี