INSTITUTO
UNIVERSITÁRIO
DE LISBOA

How to Improve the Service Quality of the Donghua University Science and Technology Park to support the development of start-up enterprises

Fu Yuli

Master in Applied Management

Supervisor:
Professor Doctor Sofia Lopes Portela, Assistant Professor,
ISCTE-IUL

June, 2023

BUSINESS
SCHOOL

Department of Marketing, Operations and General Management

How to Improve the Service Quality of the Donghua University Science and Technology Park to support the development of start-up enterprises

Fu Yuli

Master in Applied Management

Supervisor:
Professor Doctor Sofia Lopes Portela, Assistant Professor
ISCTE-IUL

June, 2023

Acknowledgements

This thesis was completed under the careful guidance by Professor Sofia Portela. Her profound professional knowledge, rigorous academic attitude, continuous improvement work style, noble teacher ethics, passion and beauty deeply affect me. From the topic selection to the thesis completion, Professor Sofia, my supervisor, provided careful guidance and devoted a lot of efforts. Here, I would like to express my highest respect and heartfelt gratitude to Professor Sofia.

Thanks to ISCTE-IUL for providing a platform for my master studies. Thanks to ISCTE-IUL Professors for your lectures, which provided knowledge and research methods and supported my research project. Thanks to my research team, Hong Ji, Li Xingxing, Jin Jindi, and others for their research assistance. Thanks to Professor Wang, Professor Shi, and Professor Tao for theirs help and guidance. Thanks to Donghua University Science and Technology Park for their research support.

Abstract

The construction of university entrepreneurship services has become a global trend in the higher education sector. China also attaches great importance to university entrepreneurship work and has been establishing national university science and technology parks in batches since 2002. Faced with inexperienced entrepreneurs and relatively short incubation periods, how to enhance the service quality of university science and technology parks and provide comprehensive support and guidance for the operation and development of high-tech startups, so as to promote their healthy and sustainable growth, has become an important topic.

The objective of this project is to evaluate the service quality of Donghua University Science and Technology Park using the SERVQUAL scale and propose recommendations to improve it. This project begins with a discussion about the relationship between service quality and innovation entrepreneurship. A survey was conducted to enterprises who are currently or have previously been stationed in various divisions of the Donghua University Science and Technology Science Park, as well as potential enterprises who have consulted about starting a business in the park. A total of 96 responses were obtained. The results were analysed using descriptive statistical analysis, gap analysis, and IPA (Importance-Performance Analysis) method. Finally, the evaluation results are summarized, and corresponding strategies and recommendations are proposed, aiming to provide new ideas and directions for the improvement of this university technology park.

Keywords: University Science and Technology Parks， SERVQUAL， Service Quality， Innovation and Entrepreneurship

JEL Classification: I23，L25

Resumo

A construção de serviços de empreendedorismo universitário tornou-se uma tendência global no setor do ensino superior. A China também atribui grande importância ao trabalho de empreendedorismo universitário e vem estabelecendo parques nacionais universitários de ciência e tecnologia em lotes desde 2002. Diante de empreendedores inexperientes e períodos de incubação relativamente curtos, como melhorar a qualidade do serviço dos parques científicos e tecnológicos universitários e fornecer apoio e orientação abrangentes para a operação e desenvolvimento de startups de alta tecnologia, de modo a promover seu crescimento saudável e sustentável, tornou-se um tópico importante.

O objetivo deste projeto é avaliar a qualidade de serviço do Parque de Ciência e Tecnologia da Universidade de Donghua usando a escala SERVQUAL e propor melhorias no mesmo. Este artigo começa com a discussão da relação entre qualidade de serviço e empreendedorismo de inovação. Foi aplicado um questionário a empresas que se encontram localizadas ou que estiveram previamente localizadas em várias divisões deste parque tecnológico, assim como a empresas que procuraram informações para se instalarem no parque. Foram obtidas 96 respostas. Os resultados foram analisados usando estatística descritiva, análise de gap e o método IPA (Análise de Importância – Performance). Finalmente, os resultados obtidos foram sistematizados e foram propostas estratégias e recomendações c o objetivo de indicar ideias e direções para melhorar a qualidade de serviço do parque tecnológico universitário em estudo.

Palavras-Chave: Parques Universitários de Ciência e Tecnologia, SERVQUAL, Qualidade de Serviços, Inovação e Empreendedorismo

JEL Classification: I23，L25

Contents

List of Tables

List of Figures

Glossary

AURP	American Association of University Research Parks
IASP	International Association of Science Parks
STIPs	Science and Technology Industrial Parks
STP	Science and Technology Park
SUEs	Start-up Enterprises
UKSPA	United Kingdom Science Park Association
ZGC	Zhong Guan Cun

1. Introduction

Developing entrepreneurship service in university has become a trend in the field of higher education internationally. China also attaches great importance to encouraging entrepreneurship in university. As early as 2002, national university science parks began to be established in batches. In China, the National University Science and Technology Park has multiple meanings. It is an incubator relying on universities for the transformation of latest high technologies and innovative enterprises, an entrepreneurial practice base for teachers and students of local application-oriented universities, a comprehensive platform to train innovative and entrepreneurial talents, an important carrier for building innovative universities, and an important force for promoting local economic development.

At the same time, the number of Chinese students studying abroad has increased significantly in recent years, and the government's attention to this group of students is increasing gradually. Entrepreneurs account for a considerable proportion of the returned students. Facing entrepreneurs with insufficient experience and a relatively short incubation period, how to improve the service quality of university science and technology parks to provide beneficial guarantee and guidance for the operation and development of high-tech start-ups in an all-round way, and help the healthy and sustainable development of start-ups has become an important issue.

The literature research carried out in support of this topic mainly focuses on the meaning, content and evaluation method of service quality, the current development and service level of university science and technology parks, as well as services related to innovation and entrepreneurship. It aims to better understand the research and suggestions in these specific fields in combination with theory and practice, so as to lay the foundation for finding problems and proposing solutions, thus having a positive impact on improving the service level of university science and technology parks and helping the development of start-ups.

Semi-structured interviews with park management and operational personnel were conducted. Additionally, questionnaire surveys were administered to start-up enterprise management teams, employees, and entrepreneurs.

The structure of this project is as follows: Chapter 1 introduces the research purpose and background; Chapter 2 conducts a literature review to provide a theoretical foundation for the study; Chapter 3 explains the used research methods; Chapter 4 constructs a service quality evaluation system for university science and technology parks; Chapter 5 presents the data analysis; and Chapter 6 presents the proposals to improve the service quality of the park and finally, Chapter 7 presents the conclusions of this study.

2. Literature Review

2.1. Service quality

2.1.1. Definition and characteristics of the service

Service is a concept that has been widely studied in the field of business and management. It is a special commodity, which is usually compared with physical products. Sasser et al. (1978) pointed out that the precise definition of products and services must be distinguished according to their characteristics: product are tangible objects, which can be created and transmitted, which are a kind of existence beyond time, so it can be manufactured and used in the future; service, on the other hand, is non-volatile and perishable. It is an event or process whose formation and use occur at the same time or almost at the same time. Quinn et al. (1987) believed that the service sector includes all the economic activities whose outputs are not physical products or buildings. It is usually consumed while being produced and provides added value in some form (such as convenience, entertainment, timeliness, comfort, or health). It particularly emphasizes the intangibility related to customers. Grönroos (1990, 2011) referred to service as an activity or a series of activities with more or less intangible characteristics. It is usually but not necessarily an interactive activity between customers and service employees or between material resources and service supplier systems. It provides solutions to problems raised by customers, usually involving the use of professional skills and knowledge, and is implemented rather than produced. Zeithaml et al. (1996) simply summarized services are deeds, processes and performances. A service is an intangible product that is provided to customers to fulfill a need or a desire. It involves an interaction between the provider and the customer, where the provider delivers value to the customer through the service (Zeithaml et al., 2006). Lovelock and Wirtz (2011) and Kotler et al. (2019) believe that a service is a set of activities or benefits that are intangible and do not result in the ownership of anything, whose production may or may not be tied to a physical product. Vargo and Lusch (2016) referred to service as a system that delivers value to customers by facilitating outcomes that customers want to achieve, without requiring the customers to assume specific costs and risks.

According to the definition of service raised by many scholars, this research defines the concept of service as providing intangible products or activities to meet customer needs. Its characteristics can be summarized as invisibility, heterogeneity, perishability and the simultaneity of production and consumption.

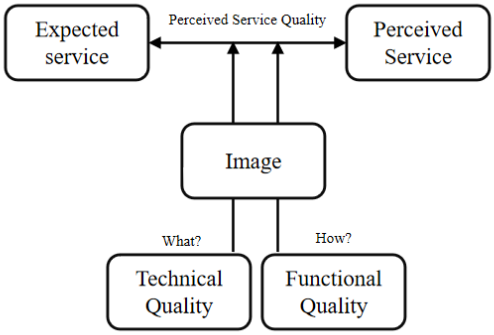
2.1.2. Definition and measurement of service quality

For decades, the concept of service quality has attracted much attention in the business community. The definition of "quality" first originated from physical products. Crosby (1979) defined quality as "conforming to requirements". After 1960, services revolving around products gradually began to receive attention in developed economies, and discussions on service quality rose accordingly (Godfrey, 1999). However, it was not until the 1980s that service quality began to receive more extensive attention from scholars, researchers and enterprises, and a large number of studies and discussions were conducted on the factors affecting service quality. Bitner and Hubbert (1994) referred to service quality as the customer's impression of the relative superiority/ inferiority of a service provider and its services.

The mainstream service quality theory can be divided into two schools, one is the Nordic school represented by Christian Grönroos, and the other is the American school represented by Parasuraman, Zeithaml and Berry. Both schools are essentially based on the disconfirmation paradigm theory applied to physical products.

Grönroos (1984) proposed the concept of Perceived Service Quality (see Figure 2.1). The perceived quality of service is the result of the service evaluation process. In this process, customers compare their expectations with the services they really perceive, and the result is perceived quality. Perceived service quality depends on two variables: expected service and perceived service. Grönroos (1984) also pointed out two dimensions of service quality: technical quality and functional quality. Functional quality refers to how customers receive services during the service process; and technical quality refers to the result that customers receive in the end.

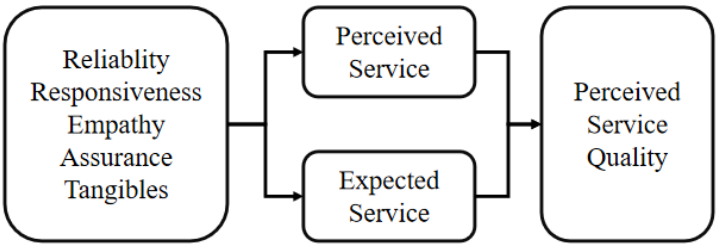
Figure 2.1 Perceived Service Quality



Source: Grönroos (1984)

Parasuraman et al. (1985) proposed the SERVQUAL model (see Figure 2.2), which is of great importance for measuring service quality. They considered service quality as the difference between the expected and actual perceived levels of service for customers. Unlike Grönroos's theory, the SERVQUAL model proposed by Parasuraman et al. (1985) covers five dimensions to measure service quality, which are reliability, responsiveness, assurance, empathy, and tangibles. Reliability means the ability to perform promised services accurately and dependably. Assurance means the knowledge and courtesy of employees and their ability to inspire trust and confidence in customers. Tangibles means the physical facilities, equipment, and appearance of personnel related to the service delivery. Empathy means the caring, individualized attention provided to customers and the extent to which the service provider understands and meets their needs. Responsiveness means the willingness to help customers and provide prompt service.

Figure 2.2 SERVQUAL model

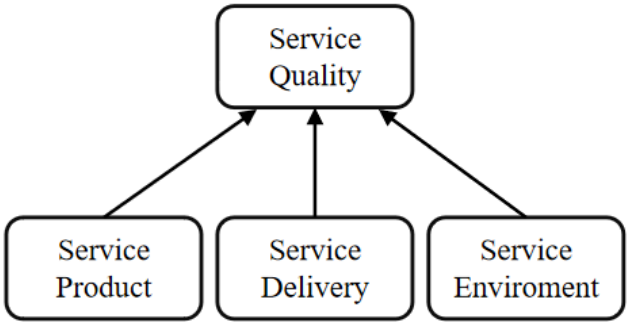


Source: Parasuraman et al. (1985)

Based on these two different schools of theory, more models and methods of evaluating service quality were developed. Based on the model of service quality proposed by Grönroos

et al. (1994) (see Figure 2.3), service quality incorporates three elements: service product (i.e., technical quality), service delivery (i.e., functional quality), and service environment. Service Product refers to the core features and attributes of the service being offered. It focuses on the technical aspects of the service, such as its functionality, reliability, and performance. The service product component primarily addresses the outcome or result of the service experience. Service Delivery focuses on the process of delivering the service to the customer. It includes factors such as the behavior, competence, and efficiency of the service providers, as well as the effectiveness of the service systems and processes. It is concerned with how well the service is delivered and the interactions between the service provider and the customer. The service environment encompasses the physical and social aspects of the service setting in which the service is delivered. It includes elements such as the ambiance, layout, cleanliness, and comfort of the physical surroundings, as well as the atmosphere, social interactions, and overall atmosphere of the service environment.

Figure 2.3 Model of service quality evaluation



Source: Grönroos et al. (1994)

Meanwhile, some studies also proposed service quality evaluation models derived from SERVQUAL. Cronin and Taylor (1992) proposed the SERVPERF model. Compared to SERVQUAL, SERVPERF does not change in dimensions and measurement metrics; its change is mainly reflected in the content of measurement, it only measures customer perception, and does not consider the customer expectations, and directly uses the performance of service to evaluate service quality. Boulding et al. (1993) added more dimensions to the part of expectation in the SERVQUAL model. Carman (2000)and DeSarbo et al. (1994) use approaches different from the SERVQUAL model (e.g., conjoint

analysis) to evaluate service level perceived by customers.

To evaluate the service quality of University Science and Technology Park, this research will use the SERVQUAL model.

2.2. University Science and Technology Park

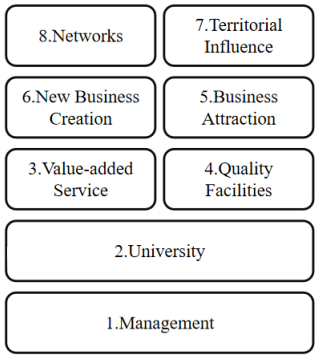
2.2.1. The definition of university science and technology park

To understand the concept of university science and technology park, we should start with the definition of science and technology park. There are three main definitions of science and technology park. According to the International Association of Science Parks (IASP), a science park is an organization managed by specialized professionals, whose main aim is to increase the wealth of its community by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions. The United Kingdom Science Park Association (UKSPA) defines a science park as a business support and technology transfer initiative that encourages and supports the start-ups and incubation of innovation-led, high-growth, knowledge-based businesses; it provides an environment where larger and international businesses can develop specific and close interactions with a particular center of knowledge creation for their mutual benefit; and it has formal and operational links with centers of knowledge creation such as universities, higher education institutes and research organizations. The American Association of University Research Parks (AURP) refers to a university research park as a property-based venture, which masters plans property designed for research and commercialization, creates partnerships with universities and research institutions, encourages the growth of new companies, translates technology, and drives technology-led economic development.

The term “Science and Technology Park” (STP) encompasses any kind of high-tech cluster such as: technopolis, science park, science city, cyber park, hi tech (industrial) park, innovation center, R&D park, university research park, research and technology park, science and technology park, science city, science town, technology park, technology incubator, technology park, techno park, technopole and technology business incubator. Bellavista

(2009) believes that the science and technology park has eight main components (see Figure 2.4), including the concept of university. In other words, we can roughly equate university science and technology park with science and technology park.

Figure 2.4 Main bullding blocks of STPs



Source: Bellavista（2009）

However, some scholars have made a further distinction between the concept of university science and technology park and science and technology park. Albahari et al. (2017) distinguished four types of STPs, ranging from parks wholly or partly owned and managed by a university, which are described as Pure Science Parks to parks with no formal links to a university, which are described as Pure Technology Parks. Between these extremes are STPs where a university is a minority shareholder, described as Mixed Parks and parks where a university (although not a shareholder) has some research facilities located in the STP, which are described as Technology Parks with University.

We have reason to believe that there is an inseparable relationship between STPs and universities, while university science and technology parks are different from ordinary STPs. Based on the definition of the International Association of Science and Technology Parks, we define university science and technology parks as technology-based, professionally-managed organizations located in or near the university campus. As an important academic and scientific research platform, universities increase the wealth of their communities by promoting innovation and the competition of related enterprises and knowledge-based institutions (Kelsi et al., 2017). Meanwhile, academic research is conducted in parallel with business activities in the STPs (Bellavista and Sanz, 2009).

2.2.2. Previous research about university science and technology park

Through sorting out past research, the relevant research of university science and technology parks can be mainly divided into the following aspects: Internal elements of the parks, performance evaluation of the parks, impact of the parks, and development of the parks.

Internal elements of the parks

Guadix et al. (2016) analyzed the variables for the success of science and technology parks and established a series of models or operation strategies. Urriago et al. (2016) studied the impact of the location of the science and technology parks on the innovation achievements of enterprises in the park and the mechanism behind it. Poonjan et al. (2020) analyzed the role of regional contextual factors for science and technology parks. Mora-Valentín et al. (2018) studied the conceptual structure and the evolution of concepts and themes in the field of science and technology parks through the method of co-word analysis, and mapped the conceptual structure of science and technology parks, revealing five main thematic networks: innovation, park, interorganizational relationship, spillover and technology.

Performance evaluation of the parks

Albahari (2017) evaluated the performance of tenants in the park, indicating that the greater participation of the university in the STP is positively related to the number of patent applications, but negatively related to the innovation sales of tenants. Albahari (2018) studied how STP create value for tenants. Value is created through a combination of the configuration-oriented component and the process-oriented component of business support. The configuration-oriented component, which encompasses the static design of support, ensures that the park's infrastructure and ecosystem align with tenants' needs. The process-oriented component, provided by park management, involves active and hands-on support such as mentoring, networking, and business development assistance. Steruska et al. (2019) used case studies to illustrate the contribution of science and technology parks to technology transformation: science and technology parks provide space for technology and knowledge transformation between universities, companies and commercial markets to

improve research quality and bring innovation.

Impact of the parks

Albahari et al. (2010) emphasized the role of the park in the research and development activities of public research organizations and companies, and studied its impact on tenant organizations, which can be classified into three dimensions: impacts on the economic performance of firms, impacts on innovative activities, and impacts on firms' links with universities or public research centers or with other centers that create knowledge. Tan (2006) investigated a specific example of an industry cluster in China, the Beijing Zhongguancun (ZGC) Science Park and discussed its role in promoting technology transfer and innovation, and the challenges firms might face in the future. The backing of government agencies is particularly important in the Chinese transitional economy, and the ZGC Science Park has been the primary regulatory framework for managing new-tech firms. Firms in STPs and industrial districts in China face challenges in adapting to the changing economic environment, especially as China becomes more closely integrated into the global economy. On one hand, indigenous firms are on the brink of extinction in the face of multinationals armed with enormous resources and competitive strengths. On the other hand, firms are also presented with a unique opportunity to adapt to the changing environment, transform themselves, and survive the historical transition. Shearmur (2000) studied the relationship between science and technology parks and employment growth. The research findings indicate that there is no correlation between the establishment of a STP and the growth of employment in high-tech sectors.

Development of the parks

Hobbs et al. (2016) reviewed the academic achievements of the Science Park through literature review, with the goal of stimulating more research on this important global theme and laying a foundation for future research. Steruska et al. (2019) analyzed the development of science parks in the United States and determined the relationship between the distance between the park and the university and its impact on the performance of science and technology parks. The strategic location of the park near the university is one of the factors

that contribute to the overall success of the STP. Additionally, being close to universities geographically brings about the benefits of collaboration with the university, including access to new scientific knowledge and research facilities. Therefore, it can be inferred that proximity to the university may have a positive impact on the performance of STPs. Zhang (2011) used data on high-tech firms within and outside the STIPs (Science and Technology Industrial Parks) in China to further investigate the effectiveness of these parks, while paying special attention to the issues related to agglomeration economies and congestion problems.

Through sorting out the existing research, we have learnt that there is little research on the service quality of university science and technology parks at present, as well as relevant research on the business model of university science and technology parks.

2.3. Innovation, entrepreneurship and start-ups

2.3.1. The definition of innovation and entrepreneurship

The definition of innovation and entrepreneurship can be broken down. Freeman and Soete (1982) believe that the industrial innovation involves technical design, manufacturing, administrative and commercial activities related to the marketing of few (or improved) products or with the first commercial use of a new (or improved) process or equipment. Crumpton (2012) mentioned that innovation was defined as creating better or more effective or more efficient processes and services or generating the ideas or culture that would breed this creativity. Carayannis (2015) referred to the term Innovation as the process-conversion of an idea into a merchandised product or service, a new form of business organization, a new or improved functional production method, a new product presentation way (design, marketing) or even to a new service rendering method. Innovation is mainly achieved by developing new products and services or by restructuring the production and operation process. In particular, the innovation of some emerging markets such as China, India and Brazil is defined as frugal, flexible and inclusive (Prabhu & Jain, 2015).

Entrepreneurship can be defined as a creative act whereby something is built/created that

did not exist previously; creation is opportunity driven rather than resource driven, i.e. if the opportunity is perceived as significant, resource will be found. Thus entrepreneurship, in its narrowest sense, involves capturing ideas, converting them into products or services and then building a venture to take the product to market (Johnson, 2001). Entrepreneurship is an activity that involves the discovery, evaluation, and utilization of opportunities to introduce new products and services (Soriano, 2013). According to Timmons (2004), three main elements underline the entrepreneurial process of starting a new venture: the identification or recognition of an opportunity, the configuration of the entrepreneurial team, and the selection of the resources to efficiently exploit the idea.

Innovation and entrepreneurship are a core part of organizations today and are an integral component of the organization's strategy (Hisrich & Kearney, 2013). From the perspective of the relationship between innovation and entrepreneurship, innovation is a tool for entrepreneurs and thus innovation is a specific instrument of entrepreneurship (Drucker, 1985). From the perspective of innovation within organizations, corporate entrepreneurship offers another way to innovate (Guth & Ginsberg, 1990). Although innovation and entrepreneurship generally go hand in hand, forming a distinction between the two concepts is possible. The definitions for entrepreneurship may vary; however, one of the most popular works on the subject defines this concept as the process of identification, evaluation and implementation of business opportunities (Shane & Venkataraman, 2000). In terms of purpose, innovation, as an enterprise spirit, is generally considered to improve the productivity of resources through "new" ways (Drucker, 1985).

2.3.2. The definition and characteristics of start-ups

A start-up is a human institution designed to deliver new value in the form of a product or service under conditions of extreme uncertainty (Ries,2010). Klofsten (1994) believes technology-based start-ups can be understood as new ventures where know-how and advanced technological discoveries are capitalized and exploited through new products and services. Their opportunities for success mainly depend on the rapid and effective management of knowledge-intensive assets and the development and utilization of

technology (Nonaka et al., 2017). It can be inferred that the central activity of a start-up is to turn ideas into products, measure customers' response, and decide whether to change strategies (Trimi et al., 2012). Rajagopal (2020) believes SUEs (Start-up Enterprises) are also founded on the maxim of low capital and human resources alike small business. However, SUEs emerge as disruptive organizations with innovation and technology intended to develop an impactful business model. SUEs are oriented towards innovation and technology led disruption. The search for a flexible and appropriate business model is an imperative for any start-up (Trimi & Berbegal-Mirabent, 2012). SUEs are developed in team leadership with objectives of short-run business performance (Zaech & Baldegger, 2017)

Start-ups have the following characteristics: they are generally more open to new ideas, because they lack an already existing organizational culture (Schick et al., 2002). Start-ups commonly operate, or aim to operate, in competitive industry contexts (Mills et al., 2011). Startups are usually small and need versatile employees and are more flexible and adaptable (Long et al., 2020). Financial issues are an important issue for start-ups (Fielden et al., 2000).

According to Gibb (1987), there are four key success factors in the establishment of an independent small business, which are:

1) the motivation and commitment to set up and sustain the business;
2) the ability — technical, managerial and professional;
3) the idea — its validity and acceptability in the marketplace.
4) the resource requirement — physical and financial.

3. Methodology

3.1. Research objective

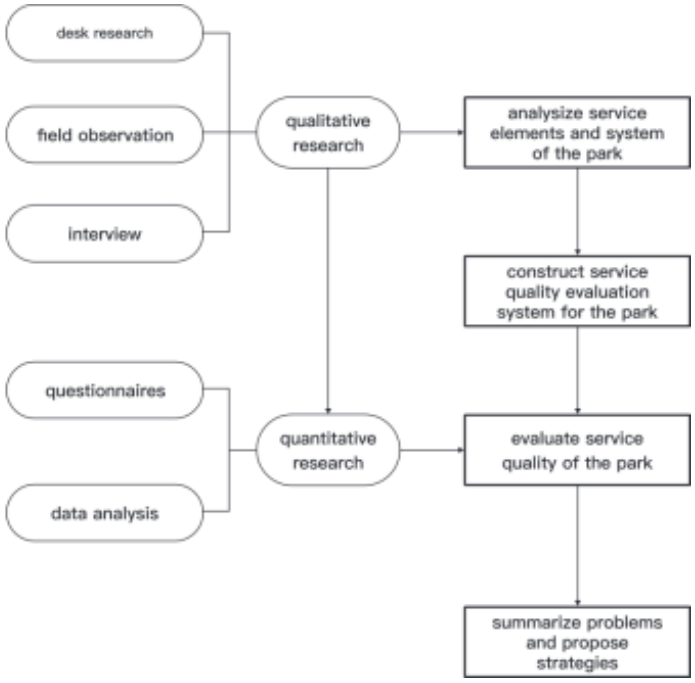
This project aims to evaluate the service quality of Donghua University Science and Technology Park and to propose recommendations to enhance its service quality.

It conducts research and evaluation on the service quality of the park, utilizing both qualitative and quantitative methods to analyze the issues and propose solutions. Based on these findings, specific strategies are formulated to improve the service quality of Donghua University Science and Technology Park.

3.2. Overview of research methods

This research used the following methods to conduct a qualitative and quantitative analysis of the current service elements and system of the park (see Figure 3.1).

Figure 3.1 Research Framework



Source: the author(2023)

1) Documental research: Documental research is a research method based on literature, reports, cases, and other materials. This research used the official website and

WeChat public account of the science and technology park to understand information about the park's history, development, organizational structure, service model, and other aspects. Through documental research, a large amount of information was collected to outline the background and current situation of the university science and technology park.

2) Field observation: Field observation is a method of directly observing and recording phenomena. Through field observation, information about the park's hardware facilities, the behavior and attitude of science and technology park employees, and the problems and challenges in the service process can be observed.

3) Interview: Interview is a method of in-depth communication with individuals or groups. Interviewing park management and operational personnel allows to obtain information about the service philosophy, service objectives, and service processes of the university science and technology park. Additionally, interviews provide insights about the internal management mechanisms, employee training, and management methods of the park.

After sorting and analyzing the information obtained through qualitative research, this research conducted quantitative research to discover problems in the service quality of the science and technology park in study. Based on the five dimensions of the SERVQUAL model and combined with existing research results, this research proposed a service quality evaluation system that is more suitable for university science and technology parks. By collecting data through questionnaires and objectively and systematically evaluating the service quality of the university science and technology park by measuring and comparing the gap between the actual service level and the expected level, this research can help managers understand the expected values and actual perceived satisfaction of startup companies for different service items, identify potential service defects, and provide improvement suggestions to improve service quality and entrepreneurial satisfaction.

After obtaining quantitative data, this research analyzed the data using the following methods:

1) Reliability and validity test: testing the stability and consistency of the data and whether the data accurately reflect the research objectives and problems.

2) Descriptive statistical analysis: summarizing and describing the basic characteristics of the data.

3) Gap analysis: a method to compare the gap between customers' expectations and actual experiences. This research uses gap analysis to compare the gaps between

customers' expectations and actual experiences of various service quality dimensions.

4) IPA analysis: IPA (Importance-Performance Analysis) analysis can indeed help identify key issues and improvement directions for park services. The goal of using this analysis is to enable the park to effectively enhance its service quality in a short period of time. In this study, IPA analysis is utilized to determine the priority of service improvement in the park. By assessing the importance and performance of various service attributes, the analysis can identify areas that require immediate attention and action for enhancing the overall service quality.

After completing the quantitative analysis, this research will describe and explain the conclusions obtained from the data, and provide specific suggestions for improving the service quality of the university science and technology park.

3.3. The interview

This study adopts a semi-structured interview approach, in which a set of questions or topics were prepared in advance, without enforcing a specific order or strict limitations on response format. The interviews were conducted with the personnel responsible for the park services, aiming to understand the organizational structure and service model of the park. This information helps gain insights into the park and serves as a basis for questionnaire design. The information and insights obtained from the interviews are arranged, compiled, and presented in Chapter Four.

Five park managers were interviewed, with the interviews conducted between April 3rd and 13th. The details of the interviewees are as follows:

Table 3.1 Interviewee Information

NO.	Division	Responsibility
A	The Science and Technology Park (Lane 658, Jinzhong Road)	General Manager
B		Assistant Manager
C	Shang Chuanghui (Lane 829, Zhongshan West Road)	Project teacher
D		Consulting leader
E		Instructor

Below is the semi-structured interview outline:

Admission Criteria and Evaluation Standards

1) What are the admission criteria for the Science and Technology Park?
2) What are the evaluation standards and requirements for companies seeking to be

admitted?

Resources and Support Provided

1) What resources and support does the Science and Technology Park provide?

2) Does the Science and Technology Park offer investment mechanisms to assist the growth and development of startups?

3) Does the Science and Technology Park have cooperative plans with the government and companies? What impact do these plans have on the development of the park and the growth of startups and entrepreneurial companies?

Incubation Process and Communication

1) How is the office environment and facilities in the Science and Technology Park? What are their characteristics and advantages? What do these features or advantages mean for startups?

2) How do companies typically communicate with the staff of the Science and Technology Park? Is the efficiency high?

3) What is the incubation process for companies within the Science and Technology Park?

Organization and Management of the Science and Technology Park

1) With which external institutions and organizations has the Science and Technology Park established connections and cooperative relationships?

2) What is the business model of the Science and Technology Park? How does it generate profits? Is the profit model transparent?

3) Are there any issues and challenges in the management and operation of the Science and Technology Park? How should these challenges be addressed?

3.4. The questionnaire

As a widely used service quality measurement model, the SERVQUAL model has been supported by many studies for its effectiveness and reliability. More and more scholars have applied this model to evaluate service quality in different fields. The model divides service quality into five dimensions:

1) Tangibles: Refers to the physical facilities, equipment, and service personnel provided by the service provider;

2) Reliability: Refers to the service provider's ability to provide accurate and consistent service levels reliably within the promised time and scope;

3) Responsiveness: Refers to the service provider's ability to respond quickly and timely

to customer questions, requests, or complaints and provide assistance;

4) Assurance: Refers to the service provider's employees possessing professionalism, knowledge, politeness, and reputation, able to provide customers with a sense of security, confidence, and trust;

5) Empathy: Refers to the service provider's ability to understand and provide personalized services for customer needs and requests, making customers feel cared for and valued.

Based on the current situation of Donghua University Science and Technology Park and the opinions of the management personnel, this project further defines and designs corresponding indicators for the five dimensions of the SERVQUAL model, as presented below (see Table 3.2).

1) Tangibles: Refers to the tangible conditions displayed by the park, including hardware facilities, service department settings;

2) Reliability: Refers to the park having a clear and concise service process, able to provide accurate and consistent services reliably within the promised time and scope;

3) Responsiveness: Refers to the park's ability to respond quickly and timely to the enterprise's questions or needs and provide effective solutions;

4) Assurance: Refers to the park have abundant entrepreneurial resources and their staff possessing sufficient professional knowledge and experience, able to make the enterprise feel a sense of trust;

5) Empathy: Refers to the park caring about the enterprise's development, understanding the characteristics and needs of the enterprise, and making the enterprise feel valued.

Table 3.2 The Five Dimensions of the SERVQUAL Model adapted to Donghua University Science and Technology Park

Dimension	Item	Content
Tangibles	Complete hardware facilities	The science and technology park provides complete hardware facilities such as office space and research equipment.
	Reasonable department settings	The science and technology park has clear department settings where everyone has their own responsibilities and can meet the different needs of enterprises.
Reliability	Accessible staff	Enterprises can easily find staff who provide various services.
	Clear service process	The science and technology park has clear and specific service processes and standards.

	Timely and high-quality services	The science and technology park promises to complete various services on time, and the quality of service is guaranteed.
	Accurate information recording	The science and technology park can accurately record various information of enterprises.
Responsiveness	Rapid response mechanism	The science and technology park can respond to feedback and demands from enterprises in a timely manner.
	Timely and effective solutions	When enterprises encounter problems, the science and technology park can provide effective solutions to the best of their abilities.
	High-quality and efficient service personnel.	Science and technology park staff are polite, good communicators, and highly professional.
Assurance	Targeted policy support	The science and technology park can match corresponding policies and funding support according to the specific situation of enterprises.
	Professional entrepreneurship guidance	Entrepreneurship mentors and other consultants have sufficient professional knowledge and rich experience to provide effective guidance.
	Establishing government relationships	The science and technology park can help enterprises establish good relationships with government departments.
	Providing social resources	The science and technology park can provide enterprises with more business opportunities and social resources.
	Expanding social visibility	The science and technology park can help enterprises promote and expand industry or social visibility.
Empathy	Attention to enterprise development	The science and technology park is willing to proactively understand the development of enterprises and provide some assistance.
	Proactively understanding enterprise demands	The science and technology park is willing to proactively understand the unmet needs of enterprises.

The questionnaire used in this research consists of three main parts. The first part collects basic information about the respondents, including the park they are located in, the nature of their enterprise, and their time of entry. The second part involves survey respondents rating

their expectations and actual experiences of various services provided by Donghua University Science and Technology Park (the adapted SERVQUAL as presented in Table 4.1). The questionnaire consists of 16 items organized into five dimensions. A Likert 7-point scale is used for rating the questions, where "7" represents "strongly agree," "6" represents "agree," "5" represents "somewhat agree," "4" represents "neutral," "3" represents "somewhat disagree," "2" represents "disagree," and "1" represents "strongly disagree." In the third part, respondents will rank the importance of each dimension in the scale. The ranking is as follows: 5 points for the 1st rank, 4 points for the 2nd rank, 3 points for the 3rd rank, 2 points for the 4th rank, and 1 point for the 5th rank. Appendix A presents the questionnaire.

3.5. Population and sample

This study distributed questionnaires through a combination of on-site visits and online electronic surveys. The target respondents were enterprises who could provide quality evaluation for the Donghua University Science and Technology Science Park. This included enterprises who are currently or have previously been stationed in various division of the Donghua University Science and Technology Science Park, as well as potential enterprises who have consulted about starting a business in the park. A total of 120 questionnaires were distributed, and 96 questionnaires were collected, resulting in a response rate of 80%. The questionnaire survey was conducted between April 20th and 30th.

4. Description of Donghua University Science and Technology Park and its Service

4.1. Description of Donghua University Science and Technology Park

Donghua University is a national key university under the direct supervision of the Ministry of Education of China, and a participant in the national "211 Project" and "Double First-Class" initiative. It has developed into a high-level university with distinctive characteristics in textile, materials, fashion, and design. Donghua University Science and Technology Park was established in June 2000 and was one of the first university science and technology parks in Shanghai approved by the Shanghai Education Commission. In October 2003, it was recognized as a national university science and technology park by the Ministry of Science and Technology and the Ministry of Education. The science and technology park is a department of Donghua University and serves as a platform for technology transfer and entrepreneurship for the university's faculty and students. It is also a market-oriented entity engaged in business operations. Due to Donghua University's academic achievements and industry influence in the textile field, the park's enterprises are mainly in the textile, material, and fashion industries. In recent years, it has actively attracted various emerging industrial enterprises, including artificial intelligence, the Internet, and information technology. The Park is known for its innovation and entrepreneurship in both "scientific innovation" and "fashion creativity".

As of November 2022, Donghua University Science and Technology Park had 316 on-site enterprises and 168 incubating enterprises. Among them, there were 9 high-tech enterprises and 25 small and medium-sized technology enterprises.

The innovation and entrepreneurship service system of Donghua University Science and Technology Park consists of four parts: (1) the national university science and technology park operation entity (hereinafter referred to as the S&T Park); (2) the national registered entrepreneurial space - Donghua University Student Innovation and Entrepreneurship Incubation Base (hereinafter referred to as Shangchuanghui); (3) the municipal incubator - Donghua University Science and Technology Enterprise Incubation Center (hereinafter referred to as the Incubator), and (4) the newly built Jiaxing Industrial Park Branch (hereinafter referred to as Jiaxing Branch). These four parts are targeted at different types of

enterprises and entrepreneurial stages.

1) Shangchuanghui: Mainly serves start-ups from Donghua University students, with the majority of enterprises being in the fashion and creative industries. It provides start-up teams with funding (such as the Shanghai College Students' Science and Technology Entrepreneurship Fund - Donghua University Fund), incubation office space, start-up consulting, and supporting start-up services, as well as cheaper office space. It forms a closed-loop for innovation and entrepreneurship talent development with the collaboration of the school, government, and market.

2) The S&T Park: Compared to Shangchuanghui, the S&T Park serves more non-Donghua University student start-ups and has a higher proportion of technology-based start-ups. Therefore, the enterprise incubation services it provides are more technology-oriented, such as enterprise innovation technology promotion, etc.

3) Incubator: The Incubator currently has 20 incubating enterprises, with a focus on cultural and creative industries, providing more targeted incubation services for start-ups.

4) Jiaxing Branch: In order to serve the national strategy of integrated development of the Yangtze River Delta, Donghua University's National University Science and Technology Park established a branch in Jiaxing, Zhejiang in July 2020, aiming to fully utilize Donghua University's disciplinary advantages, extend incubation space, gather start-up enterprises, and serve regional and industry economic and social development.

Additionally, there are other affiliated divisions associated with Donghua University Science and Technology Park, such as the Chuangyiyuan and Zhishangyuan. These divisions primarily provide office spaces for enterprises.

4.2. Description of the service elements of the park

Tangible Facilities

The tangible facilities provided by the park can be divided into office space, research equipment, and documentation.

1) Office space: the S&T Park main building has six floors. The first floor is the introduction area and reception hall, and the 2nd to 6th floors are offices. The 5th floor is the incubator consulting center. Shangchuanghui has a start-up coffee shop for enterprise roadshows, as well as office spaces such as a start-up nursery, start-up consulting room, start-up training room, public conference room, and independent office.

2) Research equipment: the park has established an innovative resource sharing mechanism with school research institutes and asset management departments. The school's

research infrastructure, large-scale scientific research instruments, and fashion think-tank data published by the press are open to companies within the park. Enterprises can also use the testing services of the "Shanghai R&D Public Service Platform" and the "Shanghai Nano-Materials Detection Professional Service Platform" analysis and testing center.

3) Documentation: Donghua University Library provides corporate literature, electronic resources, patent information, literature information analysis, technology search services, etc. to enterprises within the Science and Technology Park.

Policy and Funding Support

The park provides different types of exclusive funding policy support for enterprises in different fields. In addition, the park provides entrepreneurship subsidies, including interest subsidies, loans, and funding subsidies, to all entrepreneurial enterprises.

Business Management

The enterprise management services provided by the park include industrial and commercial registration, agent accounting, investment, and financing services, etc.

1) Industrial and commercial registration: The park provides centralized registration addresses and consulting services for entrepreneurs who need to register and establish companies and assists in completing relevant procedures.

2) Agent accounting: The park provides enterprises with entrusted services such as agent accounting.

3) Investment and financing services: The park provides enterprises with multi-fund investment and financing docking services for entrepreneurship.

4) Others: The investment promotion department of the park is responsible for project entry and exit, collection, daily management, data sorting, tracking, and evaluation.

Entrepreneurship Assistance

The entrepreneurship assistance services provided by the park include entrepreneurship guidance, entrepreneurship policy consultation, and talent recruitment support.

1) Entrepreneurship guidance: The park hires entrepreneurship mentors, investors, entrepreneurs, domestic and foreign professors, etc. to establish entrepreneurship consulting studios and conduct one-to-many and many-to-one entrepreneurship counseling, equipped with entrepreneurship counselors and entrepreneurship liaison officers. The park holds at least one free entrepreneurship event every month, including designer salons, mentor

consultations, policy lectures, special lectures, exchange and exhibition activities, etc.

2) Entrepreneurship policy consultation: The park provides policy consultation and planning services for enterprises to help implement various preferential policies.

3) Talent recruitment support: The park provides enterprises with a recruitment platform to connect with campus job fairs.

Public Relations

The public relations services provided by the park include government relations, external openness, and online publicity.

1) Government relations: The park has established relationships with government departments such as the Science and Technology Commission and the Human Resources and Social Security Bureau to understand various entrepreneurial policies in a timely manner and help companies connect with them.

2) External openness: The park organizes irregular open and visit activities and is responsible for writing and promoting materials about these events.

3) Online publicity: The park uses online platforms such as official website and WeChat official account.

4.3. Description of the service system of the park

The service goals of the Donghua University Science and Technology Park mainly target student entrepreneurship enterprises, Donghua University teachers' scientific research achievements transformation enterprises, and innovative enterprises with technological attributes at the social level. The service system can be divided into the entry stage and the incubation stage. According to the entrepreneurial groups and the entrepreneurship stages of the enterprises, the park matches the suitable carriers for their development, which can be categorized as the Shangchuanghui, the S&T Park, and incubator. The different carriers have differences in the service process.

Entry Stage

The entry process for the S&T (see Figure 4.1) and Shangchuanghui (see Figure 4.2) is generally the same, with the main differences being:

- Shangchuanghui's entry enterprises need to be established by full-time students

currently studying at Donghua University or full-time Donghua University graduates within 5 years, while the S&T Park has no such restriction;

- After the material review is passed, Shangchuanghui needs to conduct roadshows, and can only enter after the roadshows are passed, while the S&T Park only requires material submission and review approval for entry.

Figure 4.1 Shangchuanghui Entry Process

Source: the author(2023)

Figure 4.2 The S&T Park Entry Process

Source: the author(2023)

Incubation Stage

In the incubation stage, the S&T Park and Shangchuanghui provide different services to

resident enterprises according to their needs to help them operate and develop. The specific service contents are listed in 4.1.2. The differences in services provided by Shangchuanghui and the S&T Park are mainly due to the different nature of the enterprises in the two parks. Enterprises that are incubated in Shangchuanghui are student entrepreneurship enterprises, which have identity advantages and can therefore enjoy policy support targeting this group. At the same time, such enterprises have limited entrepreneurial experience, and Shangchuanghui provides them with more guidance and consulting services.

5. Findings

5.1. Reliability and validity verification

This study conducted reliability and validity analysis of the questionnaire scales using the statistical software SPSS 26.0.

Reliability analysis

Reliability is a measure that describes the consistency and stability of test data. The magnitude of reliability indicates the consistency and accuracy of the scale. Cronbach's Alpha is a commonly used method to assess reliability, introduced by Cronbach in 1951. The coefficient ranges from 0 to 1. If the value is between 0.6 and 0.8, it indicates good consistency and accuracy of the scale. If the value is above 0.8, it indicates excellent consistency and accuracy of the scale.

Table 5.1 Reliability Analysis

Dimension Number	Dimension Name	Number of Indicators	Expected Value Cronbach's Alpha	Actual Perception Cronbach's Alpha
1	Tangibles	2	0.834	0.892
2	Reliability	4	0.925	0.929
3	Responsiveness	3	0.886	0.917
4	Assurance	5	0.934	0.939
5	Empathy	2	0.914	0.897

According to Table 5.1, it can be observed that the Cronbach's Alpha values for both the expected value and actual perception of the customer satisfaction scale in the Donghua University Science and Technology Science Park are above 0.8 for each dimension, indicating excellent consistency and accuracy. The questionnaire demonstrates high reliability and stability. Therefore, the questionnaire is well-designed and can be considered trustworthy.

Validity analysis

Validity refers to the extent to which a measurement tool accurately and effectively

measures the intended concept or variable. In this study, the focus is on exploring the construct validity of the customer satisfaction scale in the Donghua University Science and Technology Science Park. It involves examining the relationships and structure among the various components of the scale. The higher the alignment between the measurement results and the content being investigated, the higher the validity. Conversely, if there is a low alignment between the measurement results and the content being investigated, the validity is considered lower.

In this study, factor analysis and principal component analysis were conducted using the SPSS software to examine the construct validity of the scale. Firstly, the suitability of the data for factor analysis and principal component analysis was assessed using the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity. The KMO measure ranges from 0 to 1, with values closer to 1 indicating higher intercorrelations between variables and greater suitability for factor analysis. Generally, a KMO value above 0.6 is considered acceptable, while a value above 0.8 is considered good. As shown in Table 5.2, the KMO value for the scale in this study was 0.955, and the Bartlett's test of sphericity yielded a significance value of less than 0.05. These results indicate that the scale is highly suitable for factor analysis and principal component analysis.

Table 5.2 KMO and Bartlett's Test

Kaiser Meyer-Olkin casure of Sampling		0.955
Bartlett's Test of Approx Sphericity	Approx	3263.935
	df	120
	Sig	0.000

A principal component analysis was conducted on the 16 items of the scale. The rotated component matrix is presented in Table 5.3. The five extracted components explains 85.03% of the total variance. Specifically, items 1 to 2 mainly influence Factor 5, items 3 to 6 mainly influence Factor 2, items 7 to 9 mainly influence Factor 3, items 10 to 14 mainly influenceFactor 1, and items 15 to 16 mainly influence Factor 4. The results of the factor analysis were satisfactory and aligned with the initial setup of the five-dimensional indicator scale in this study, indicating a well-structured scale.

Table 5.3 Rotated Component Matrix

Index	Component				
	1	2	3	4	5
1.Complete hardware facilities					0.718
2.Reasonable department settings					0.692
3.Accessible staff		0.667			
4.Clear service process		0.748			
5.Timely and high-quality services		0.700			
6.Accurate information recording		0.632			
7.Rapid response mechanism			0.633		
8.Timely and effective solutions			0.704		
9.High quality and efficient service staff			0.673		
10.Targeted policy support	0.505				
11.Professional entrepreneurship guidance	0.543				
12.Establishing government relationships	0.620				
13.Providing social resources	0.750				
14.Expanding social visibility	0.832				
15.Attention to enterprise development				0.739	
16.Proactively understanding enterprise demands				0.568	

Extraction method: Principal component analysis

5.2. Sample characterization

The basic information of the surveyed enterprises, as shown in Table 5.4, indicates that the majority of the surveyed customers are located in the The Science and Technology Park (Lane 658, Jinzhong Road) and Shangchuanhui, which are the two main divisions of Donghua University Science and Technology Park. The Science and Technology Park has the highest number of enterprises, accounting for nearly half of the respondents, while a small number of customers are located in Zhishangyuan. Most of the surveyed enterprises are in cultural and creative industry or science and technology industry, with a relatively even distribution. A few enterprises are from the fashion industry, while others are involved in sectors such as construction materials, logistics, and advertising and marketing. This indicates that Donghua University Science and Technology Park primarily attracts and accommodates cultural and creative enterprises as well as technology-related enterprises. The surveyed enterprises

mostly hold employee positions, accounting for more than half of the respondents, while a few are founders or managers, which aligns with the typical organizational structure of companies. The majority of enterprises moved in to the park between 2020 and 2023, with the highest number of customers moving in during 2023. Only about a quarter of enterprises moved in between 2008 and 2019. This suggests that the customers' evaluations of service quality are more closely related to recent conditions of the park, which adds credibility to their assessments.

Table 5.4 Description of the respondents

Category	Item	Quantity	Percentage
Division	The Science and Technology Park (Lane 658, Jinzhong Road)	47	48.96%
	Shang Chuanghui (Lane 829, Zhongshan West Road)	37	38.54%
	Zhishangyuan(Lane 258, Yangzhai Road)	12	12.50%
Enterprise Type	Cultural	36	37.50%
	Technology	37	38.54%
	Fashion	14	14.58%
	Other	9	9.38%
Responsibility	Founder	14	14.58%
	Manager	12	12.50%
	Employee	70	72.92%
Entry Time	2023	22	22.92%
	2022	17	17.71%
	2021	19	19.79%
	2020	13	13.54%
	2019~2008	25	26.04%

5.3. Customer expectations and perceptions of service quality of Donghua University Science and Technology Science Park

Table 5.5. presents the results of the respondents' evaluation of the service quality of Donghua University Science and Technology Park. The mean values represent the extent of customer expectations and perceptions for each item. Standard deviation is a measure of data dispersion. A larger standard deviation indicates greater deviation of data points from the mean, while a smaller standard deviation indicates less deviation from the mean. According to Table 5.5, the standard deviations for each item in the scale are relatively small, indicating that the data points are, on average, close to the mean and the data do not have lots of dispersion.

Table 5.5 Evaluation of Service Quality of Donghua University Science and Technology Park

Dimension	Item	Expected Value (E)		Perceived value (P)	
		Average value	Standard deviation	Average value	Standard deviation
Tangibles	Complete hardware facilities	5.11	1.25	4.97	1.21
	Reasonable department settings	5.14	1.19	5.08	1.23
Reliability	Accessible staff	5.19	1.23	5.06	1.32
	Clear service process	5.20	1.22	5.23	1.25
	Timely and high-quality services	5.30	1.20	5.28	1.17
	Accurate information recording	5.06	1.21	5.23	1.19
Responsiveness	Rapid response mechanism	5.19	1.17	5.30	1.16
	Timely and effective solutions	5.28	1.13	5.39	1.16
	High quality and efficient service staff	5.36	1.09	5.50	1.17
Assurance	Targeted policy support	5.38	1.14	5.23	1.17
	Professional entrepreneurship guidance	5.25	1.21	5.22	1.24
	Establishing government relationships	4.95	1.27	5.13	1.25
	Providing social resources	5.22	1.14	5.13	1.31
	Expanding social visibility	5.00	1.21	4.94	1.38
Empathy	Attention to enterprise development	5.09	1.22	5.27	1.14
	Proactively understanding enterprise demands	5.02	1.12	5.16	1.14

Based on the research findings, it can be observed that respondents have the highest mean expectation value for targeted policy support (5.38), indicating a high demand for this aspect. On the other hand, respondents have the lowest mean expectation value for establishing government relationships (4.95), indicating a lower demand for this aspect.

respondents have the highest mean perception value for high-quality and efficient service personnel (5.50), indicating that the Donghua University Science and Technology Park performs well in this aspect. However, respondents have the lowest mean perception value for expanding social visibility (4.94), indicating that the Donghua University Science and Technology Park's performance in this aspect is relatively poor.

5.4. How importance is each service dimension to respondents

The importance of service dimensions is determined based on the ranking of repondents' importance for the five dimensions. A higher ranking indicates a higher level of importance for that dimension according to respondents. Please refer toTable 5.6 for detailed results.

Table 5.6 Importance of Service Dimensions

Dimension	Overall Score	1st place	2nd place	3rd place	4th place	5th place
Tangibles	2.91	19（19.79%）	18（18.75%）	18（18.75%）	17（17.71%）	24（25.00%）
Reliability	3.07	18（18.75%）	23（23.96%）	20（20.83%）	18（18.75%）	17（17.71%）
Responsiveness	3.20	24（25.00%）	20（20.83%）	19（19.79%）	17（17.71%）	16（16.67%）
Assurance	3.02	20（20.83%）	19（19.79%）	17（17.71%）	23（23.96%）	17（17.71%）
Empathy	2.80	15（15.63%）	16（16.67%）	22（22.92%）	21（21.88%）	22（22.93%）

Based on the research results, it can be observed that the most important service dimension for respondents is responsiveness (3.20), followed by reliability (3.07). Assurance (3.02) and tangibles (2.91) are ranked next, while empathy (2.80) is considered the least important by customers. As such, respondents have the highest level of concern for responsiveness and the lowest level of concern for empathy.

5.5. Gap analysis – The gap between the customer expectations and perceptions of service quality of Donghua University Science and Technology Science Park

Table 5.5 presents the results of the evaluation of the service quality of Donghua University Science and Technology Park. Service quality is the difference between the mean perception

value and the mean expectation value of each item of the scale. When service quality value is positive, it indicates that the service quality provided by the technology park exceeds users' expectations, indicating good quality. When service quality value is negative, it indicates that the service quality provided by the Donghua University Science and Technology Park is lower than users' expectations, indicating poor quality. The AHP (Analytic Hierarchy Process) itself is a method that uses expert ratings to assign weights, describing the relative importance of criteria or alternatives. In this process, the article calculates the average values of the analysis items and uses this average information to determine the relative importance. This allows the construction of the pairwise comparison matrices required by the AHP method, which are then used to calculate the weights. The Analytic Hierarchy Process (AHP) was used to allocate weights to the 16 indicators within the 5 dimensions, and the weighted calculations were performed to obtain the final service quality score, scores for each dimension of service quality, and the overall service quality score.

Table 5.7 Service quality assessment results of Donghua University Science and Technology Park

Dimension	Item	Expected Mean （E）	Perceived Mean (P)	Gap (P-E)	AHP Weighting value	Service Quality （Item）	Service Quality （Dimension）
Tangibles	Complete hardware facilities	5.11	4.97	-0.14	0.06092	-0.0086	-0.0124
	Reasonable department settings	5.14	5.08	-0.06	0.06169	-0.0039	
Reliability	Accessible staff	5.19	5.06	-0.13	0.06187	-0.0077	0.0039
	Clear service process	5.20	5.23	0.03	0.06290	0.0020	
	Timely and high-quality services	5.30	5.28	-0.02	0.06367	-0.0010	
	Accurate information recording	5.06	5.23	0.17	0.06212	0.0107	
Responsiveness	Rapid response mechanism	5.19	5.30	0.11	0.06316	0.0069	0.0231
	Timely and effective solutions	5.28	5.39	0.11	0.06419	0.0070	
	High quality and efficient service staff	5.36	5.50	0.14	0.06522	0.0092	

Assurance	Targeted policy support	5.38	5.23	-0.14	0.06384	-0.0090	-0.0101
	Professional entrepreneurship guidance	5.25	5.22	-0.03	0.06307	-0.0020	
	Establishing government relationships	4.95	5.13	0.17	0.06092	0.0105	
	Providing social resources	5.22	5.13	-0.09	0.06238	-0.0059	
	Expanding social visibility	5.00	4.94	-0.06	0.06015	-0.0038	
Empathy	Attention to enterprise development	5.09	5.27	0.17	0.06247	0.0107	0.0194
	Proactively understanding enterprise demands	5.02	5.16	0.14	0.06144	0.0086	
Comprehensive Service Score							0.0239

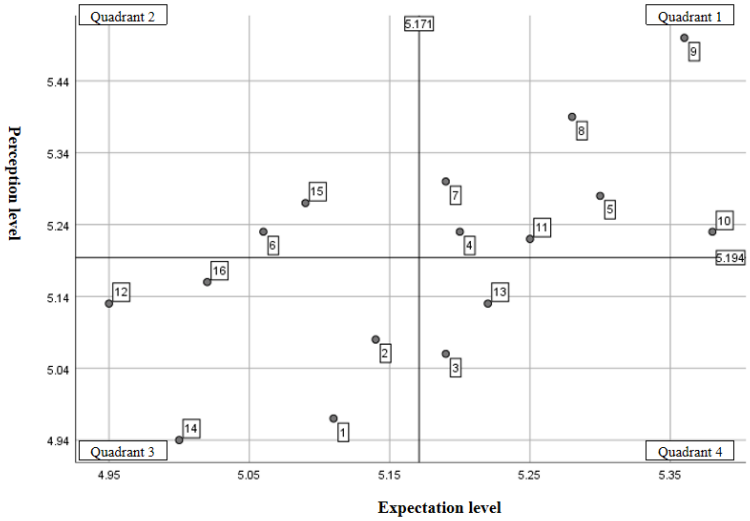
Based on the research findings, the overall service quality score for the park is a positive value (0.0239). Overall, the park can meet customers' needs, but the satisfaction level is relatively low, indicating a need for improvement. Analyzing the dimensions, the service quality levels from low to high are as follows: tangibility dimension (-0.0124), assurance dimension (-0.0101), reliability dimension (0.0039), empathy dimension (0.0194), and responsiveness dimension (0.0231). Donghua University Science and Technology Park should focus on improving the tangibility dimension by enhancing the quality of hardware facilities and strengthening the rationality of departmental arrangements. Analyzing the indicators, it is observed that eight items, including complete hardware facilities, reasonable departmental arrangements, and accessible staff, have negative service quality scores, indicating that these items have disappointed the respondents. Specifically, targeted policy support (-0.0090) has the lowest score, indicating the highest level of disappointment among respondents. Donghua University Science and Technology Park should optimize policy support to improve enterprises satisfaction.

5.6. Importance-Performance analysis

To evaluate and optimize the various services provided by the Donghua University Science and Technology Park, this study employs the Importance-Performance Analysis (IPA) method. IPA is a two-dimensional chart analysis that assesses customer importance and satisfaction with the park's services. It helps identify key issues and areas for improvement. The goal of using this analysis is to enable the park to enhance its current service quality level more effectively within a short period of time.

The detailed analysis results are shown in Figure 5.1. The horizontal axis represents the respondents' expectations of the Donghua University Science and Technology Park's services. The vertical axis represents the respondents' perceptions of the park's service. The dividing lines in the figure represent the overall mean expectation level and the overall mean perception level of the respondents. The lines divide the chart into four quadrants, each corresponding to a different strategic area. Based on the quadrant in which each indicator falls, corresponding improvement strategies can be identified.

Figure 5.1 Relationship between service expectation and perception of Donghua University Science and Technology Park



The first quadrant is indeed the major strengths quadrant. It represents areas where both the respondents' expectations and perceptions of the park's services are above average. There are 7 items located in this quadrant. It indicates that the park performs well in terms of responsiveness. For these items, the park should continue to maintain and further develop its performance to sustain its competitive advantage.

The second quadrant is indeed the minor strengths quadrant. It represents areas where the respondents' expectations of the park's services are not high, but their perceptions are above average. There are 2 items located in this quadrant. It indicates that the park has allocated excessive resources to information recording and emphasizing enterprise development, which are of low importance in overall business success. The park may consider reducing resource allocation to these service projects in order to allocate resources to more important areas.

The third quadrant is indeed the minor challenges quadrant. It represents areas where both the respondents' expectations and perceptions of the park's services are below average. There are 5 items located in this quadrant. It indicates that the park can improve its services in terms of tangibility and assurance. For these projects, the park can gradually enhance the service details and functionalities to meet customer expectations.

The fourth quadrant is indeed the major challenges quadrant. It represents areas where the respondents' expectations for the park's services are high, but their perceptions of the

services are low. There are 2 items located in this quadrant. It indicates that the park's performance in terms of accessible staff and providing social resources is poor. These projects are critical issues that require special attention. It is important to prioritize the improvement of these projects and allocate resources and efforts towards them. Doing so can enhance the park's competitiveness and customer satisfaction.

5.7. Comprehensive analysis of the park service quality evaluation results

Based on the SERVQUAL theory, this study adapted the scale for evaluating the service quality of Donghua University Science and Technology Park. Descriptive statistical analysis, gap analysis, and IPA analysis were conducted based on the data collected from the questionnaire survey. The following are the comprehensive analysis results for the park based on the aforementioned data analysis.

The comprehensive score (0.0239) obtained from the gap analysis of service quality indicates that, overall, the services provided by the park can meet the basic needs of the enterprises. This means that Donghua University Science and Technology Park performs well in certain aspects, exceeding the expectations of the respondents. The park has a competitive advantage and surpasses competitors in some key areas. This can help attract new enterprises, improve retention rates, and enhance reputation. However, this does not imply that every service provided by the park is excellent, as there are still some services that fail to meet the requirements of the enterprises. Improvement opportunities exist in these dimensions. In particular, the tangibles dimension shows poor performance in service quality, and the park should focus on implementing effective measures to address this. The park needs to continue to pay attention and make efforts to ensure the consistent delivery of excellent service experiences.

5.8. Analysis of the service quality of the park, per dimension

5.8.1. Analysis of tangibles

The tangibles dimension is the most direct experience that businesses can perceive and it can greatly influence their initial impression of the park. From the gap analysis of service quality scores across different dimensions, Donghua University Science and Technology Park has the lowest score in the tangibles dimension (-0.0124), indicating the poorest service quality in this aspect. This suggests that the park's tangible facilities are inadequate in meeting the expectations of the businesses, which can negatively impact their perception of the park's image.

The statistical analysis of the data indicates that the park's performance in two aspects, namely complete hardware facilities and reasonable departmental setup, has disappointed the businesses. The service quality score for complete hardware facilities is -0.0086, and for reasonable departmental setup, it is -0.0039. Within the tangibles dimension, complete hardware facilities have the lowest score, indicating the poorest performance in this area. This reflects that Donghua University Science and Technology Park has outdated hardware facilities that fail to meet the current needs of the businesses. Additionally, the departmental setup in the park lacks a high level of rationality, which falls short of meeting the expectations of the businesses.

5.8.2. Analysis of reliability

The reliability dimension is the reliability or stability of the park's services or facilities as perceived by enterprises, which is expressed as the degree of fulfillment of the park's commitment and trust to enterprises. From the service quality scores of each dimension of the indicator gap analysis, the reliability dimension (0.0039) of Donghua University Science and Technology Park performs better in terms of service quality, which indicates that the services and facilities of the park can operate stably, be provided on time, as well as have a good degree of trustworthiness, and enterprises hold a positive evaluation of the reliability of the services or facilities provided by the park.

The data analysis indicates that the park's performance in terms of clear service processes and accurate information recording has satisfied businesses. The service quality score for clear service processes is 0.0020, while the score for accurate information recording is 0.0107. In the reliability dimension, businesses express higher satisfaction with accurate information recording, indicating that the park is able to consistently and accurately record the information provided by businesses. Additionally, the park demonstrates a reasonable service process that helps businesses understand the logical flow of services.

The data analysis reveals that the park's performance in terms of accessible staff and punctual and high-quality service has disappointed businesses. The service quality score for accessible staff is -0.0077, and the score for punctual and high-quality service is -0.0010. In

the reliability dimension, the park's performance in terms of accessible staff is poor, indicating that businesses are unable to conveniently and accurately locate the necessary staff. This may be related to the earlier mention of inadequate departmental arrangements. Additionally, the park's services fall short in terms of punctuality and quality.

5.8.3. Analysis of responsiveness

According to the gap analysis of service quality scores, the responsiveness dimension of Donghua University Science and Technology Park received the highest score of 0.0231, indicating excellent performance. This suggests that the park demonstrates a high level of responsiveness in addressing the needs, concerns, and feedback of businesses. The positive evaluation reflects the park's proactive and timely response to the demands, issues, or complaints raised by businesses, enhancing their satisfaction with the park's services.、

The data analysis indicates that Donghua University Science and Technology Park has received high satisfaction scores from businesses in three aspects: prompt response mechanism, timely and effective solutions, and high-quality and efficient service personnel. The scores for these three indicators are 0.0069, 0.0070, and 0.0092, respectively. Within the responsiveness dimension, the highest satisfaction is attributed to the high-quality and efficient service personnel. Moreover, the perceived mean score for this aspect is also the highest, indicating that businesses are highly satisfied with the performance of the park's service personnel. This reflects the professionalism, effective communication, and courteous behavior of the park's staff, demonstrating their efficient communication and high service quality. Additionally, the park has a well-designed response mechanism that allows for swift gathering of feedback from businesses and provides efficient feedback solutions to address their issues. These factors contribute to building trust between businesses and the science and technology park.

5.8.4. Analysis of assurance

The assurance dimension focuses on the extent to which the science and technology park

meets the needs of businesses and provides a sense of security, confidence, and trust. Based on the results of the gap analysis, Donghua University Science and Technology Park has received a relatively low service quality score in the assurance dimension (-0.0101), indicating a poor performance. This suggests that the park's resource allocation and management capabilities are insufficient, lacking the necessary technological, human, or material resources to meet the needs of businesses, resulting in a decrease in their satisfaction with the science and technology park.

The data analysis indicates that the science and technology park has performed very well in establishing government relations, with a score of 0.0105, reflecting a high level of satisfaction. This shows that the park is capable of assisting businesses in establishing positive relationships with government departments and obtaining targeted government support. However, the expectation mean for this particular service is the lowest, suggesting that businesses perceive this service as having minimal impact on their needs and goals. This indicates that achieving satisfaction with this service is relatively easy for businesses.

The data analysis reveals that the science and technology park has performed poorly in four aspects of assurance: targeted policy support, professional entrepreneurial guidance, provision of social resources, and enhancing social reputation. The scores for these four indicators are -0.0090, -0.0020, -0.0059, and -0.0038, respectively. Among them, targeted policy support has the lowest service quality score and the highest expectation mean, indicating a significant gap between the park's performance and the expectations of businesses. This area requires particular attention.Furthermore, the perception mean for enhancing social reputation is the lowest, indicating the poorest service performance in this area. This reflects the park's inability to provide tailored policy and financial support based on the specific needs of businesses. Additionally, there is a lack of knowledge and professionalism among entrepreneurial mentors, and the park's social resources are insufficient. The park's ability to assist businesses with publicity is limited. Overall, the park's soft service quality is unsatisfactory. Considering the previous analysis of tangible facility quality, the park's poor performance in professionalism may undermine its position and influence in the field of technological innovation.

5.8.5. Analysis of empathy

The Empathy dimension reflects the level of attention and concern that the science and technology park shows towards its enterprises, as well as its ability to empathize with them. According to the service quality scores obtained from the gap analysis, Donghua University Science and Technology Park excels in the caring dimension with a service quality score of 0.0194, indicating that the park actively pays attention to the needs, issues, and feedback of the enterprises, and takes appropriate measures to meet their expectations and requirements. The enterprises have given positive evaluations regarding the park's understanding and fulfillment of individual needs.

Statistical analysis of the data indicates that the science and technology park excels in two aspects: valuing the development of enterprises and proactively understanding their needs. The service quality score for valuing the development of enterprises is 0.0107, while the score for proactively understanding the needs of enterprises is 0.0086. In the caring dimension, the satisfaction level is high for valuing the development of enterprises, and it also has the highest service quality score, indicating excellent performance in this area. It reflects the park's willingness to proactively understand the development and needs of enterprises, consider their perspective, and provide active assistance. Combined with the previous analysis of the responsiveness dimension, it demonstrates the park's high level of human care.

6. Improvement measures

6.1. Implementation measures to improve tangibles

The goal of a startup is to achieve short-term business performance by quickly translating ideas into products. Comprehensive hardware facilities can provide efficient production capacity for startups. Science and technology parks need to increase investment appropriately and establish relationships with more investors, building high-speed internet connections, rich databases, and secure facilities, among other things. Shared equipment and laboratories should be provided to alleviate the equipment investment burden for startups. This includes high-end research equipment, laboratory space, and technical support to aid companies in research and development, testing, and prototype production. The park can be gradually improved by starting with the formulation of improvement plans and maintaining and refurbishing existing facilities.

A well-designed departmental structure helps meet the diverse needs of companies and provides comprehensive, multi-level support and services. The science and technology park should establish a clear departmental system, including technology support departments and enterprise service departments, with specific departmental norms and requirements, forming a complete entrepreneurial ecosystem that enables companies to quickly and accurately find the staff they need. The park needs to first clarify the functions and responsibilities of existing departments and make adjustments and optimizations to enhance their service levels and efficiency.

6.2. Implementation measures to improve reliability

Accurate information recording has shown good performance in service quality. However, since this project is in a secondary advantage area of the park, cost-saving measures can be taken by reducing investment and focusing resources on service areas that require improvement. An automated information recording system can be established, with regular optimization and evaluation, such as creating a dedicated database. Streamline the recording process and focus on the core and key information of the companies.

Accessible staff members contribute to improving the efficiency of companies when

seeking consultation and receiving services in the science and technology park, guiding them through the park's services. The park can optimize its service navigation platform by adding a staff allocation section, listing the services provided by the park and the contact information of relevant staff members. This enables companies to accurately search for the required services and directly contact the appropriate staff members. Additionally, internal communication mechanisms among staff members need to be strengthened to facilitate collaboration. Establishing a service center with staff members who have good service awareness and professional knowledge can facilitate communication and coordination between companies and the science and technology park. This service is a major challenge for the park and should be implemented as soon as possible.

6.3. Implementation measures to improve responsiveness

The science and technology park has shown excellent performance in terms of rapid response mechanisms, timely and effective solutions, and high-quality and efficient service personnel. The park can further develop based on its existing policies and maintain its competitive advantage.

6.4. Implementation measures to improve assurance

Resources play a crucial role among the key factors for the success of startups. Social resources can facilitate business growth and sustainable development for companies. The science and technology park can strengthen its own marketing and brand promotion efforts to enhance its visibility and influence within the entrepreneurial ecosystem. Expanding the network of collaboration partners can enrich avenues for accessing resources. Establishing an investment matchmaking platform can connect companies with suitable investment institutions. Additionally, the science and technology park can organize entrepreneurial events and competitions to attract entrepreneurs and stimulate social resource investment. This service represents a major challenge for the park and requires focused attention.

Increasing the social visibility of companies helps improve their effectiveness and acceptance, as well as expanding business networks to secure funding and financial support.

The science and technology park can increase promotional and outreach activities, such as hosting industry seminars, entrepreneurship competitions, and forums. Enhancing the effectiveness of online platforms for publicity, expanding coverage of companies, and increasing their visibility. Strengthening collaborations with stakeholders supporting startups, such as industry associations, to jointly organize events and engage in project collaborations.

6.5. Implementation measures to improve empathy

The service quality in terms of prioritizing the development of companies has been good. However, since this project is located in a secondary advantage area of the park, cost-saving measures can be taken by reducing investment and focusing resources on service areas that require improvement. The science and technology park can appropriately reduce excessive attention to companies and set clear development goals, providing more targeted support and services.

7. Conclusions

7.1. Research conclusions

In the context of the Chinese government's strong promotion of innovation and entrepreneurship, this project aims to investigate how to enhance the service quality of university science and technology parks to support the development of startups founded by overseas returnees. Taking Donghua University Science and Technology Park as a case study, this research evaluates its service quality using qualitative and quantitative methods and designs a science and technology park service quality assessment scale based on the SERVQUAL model. Through descriptive statistical analysis, gap analysis of indicators, and IPA analysis, specific strategies for improving the park's service quality are provided. Based on the research findings, the main areas for improvement in the park currently are the accessibility of staff and the provision of social resources. Therefore, the park should optimize its service navigation platform, establish an employee service center, and expand its network of partners to enrich the channels for accessing resources.

7.2. Research limitations

Due to the limited number of companies in the Donghua University Science and Technology Park and the limited number of relevant personnel accessible, the sample size of the survey conducted in this study is relatively small. Additionally, focusing solely on the Donghua University Science and Technology Park as the research object lacks breadth in the scope of the study.

7.3. Suggestions of Future Research

It would be interesting expanding the sample size to include more university science and technology parks to enhance the generalizability of research results. Additionally, it would be interesting to compare the differences in service quality among different types of university

science and technology parks, such as comprehensive universities and specialized universities' science parks, or conducting comparative studies across regions to analyze the impact of geographical factors on science parks.

Introducing other research methods and tools, such as in-depth interviews, observations, or qualitative analysis, to obtain multidimensional and rich data that comprehensively elucidate the diversity and complexity of service quality in university science and technology parks could be another upgrade of the present study.

Other related and interesting areas of study about university science and technology would be in-depth analyses of the underlying causes behind various manifestations, possible research directions include organizational culture, employee competence, management strategies, etc., to gain a deeper understanding of how these factors impact service quality.

Bibliography

Albahari, A., Klofsten, M., & Rubio-Romero, J. C. (2019). Science and Technology Parks: a study of value creation for park tenants. *The Journal of Technology Transfer*, 44(4), 1256-1272. https://doi.org/10.1007/s10961-018-9661-9

Albahari, A., Pérez-Canto, S., & Landoni, P. (2010). Science and Technology Parks impacts on tenant organisations: a review of literature. https://mpra.ub.uni-muenchen.de/41914/

Albahari, A., Pérez-Canto, S., Barge-Gil, A., & Modrego, A. (2017). Technology Parks versus Science Parks: Does the university make the difference?. *Technological Forecasting and Social Change*, *116*, 13-28.https://doi.org/10.1016/j.techfore.2016.11.012

Basile, A. (2011). Networking system and innovation outputs: the role of science and technology parks. *International Journal of Business and Management*, *6*(5), 3-15. https://doi:10.5539/ijbm.v6n5p3

Bellavista, J., & Sanz, L. (2009). Science and technology parks: habitats of innovation: introduction to special section. *Science and Public Policy*, *36*(7), 499-510. https://doi.org/10.3152/030234209x465543

Bitner, M. J., & Hubbert, A. R. (1994). Encounter satisfaction versus overall satisfaction versus quality. *Service quality: New directions in theory and practice*, *34*(2), 72-94.https://doi.org/10.4135/9781452229102.n3

Boulding, W., Kalra, A., Staelin, R., & Zeithaml, V. A. (1993). A dynamic process model of service quality: from expectations to behavioral intentions. *Journal of marketing research*, *30*(1), 7-27.https://doi.org/10.2307/3172510

Carayannis, E. G., Samara, E. T., & Bakouros, Y. L. (2015). Innovation and entrepreneurship. *Innovation, Technology, and Knowledge Management.[Online]. Cham, Springer International Publishing.* https://doi.org/10.1007/978-3-319-11242-8

Carman, J. M. (2000). Patient perceptions of service quality: combining the dimensions. *Journal of services marketing*, *14*(4), 337-352.https://doi.org/10.1108/08876040010334565

Cronin Jr, J. J., & Taylor, S. A. (1992). Measuring service quality: a reexamination and extension. *Journal of marketing*, *56*(3), 55-68.https://doi.org/10.2307/1252296

Corsby, P. B. (1979). Quality is free: The art of making quality certain. *New York: New American Library.*

Crumpton, M. A. (2012). Innovation and entrepreneurship. *The Bottom Line*, *25*(3), 98-101.https://doi.org/10.1108/08880451211276539

DeSarbo, W. S., Huff, L., Rolandelli, M., & Choi, J. (1994). On the measurement of perceived service quality: a conjoint analysis approach. *Service quality: New directions in theory and practice*, 201-22.https://doi.org/10.4135/9781452229102.n9

Drucker, P. (1985). *Innovation and entrepreneurship: practice and principles.* New York: Harper & Row.https://doi.org/10.1002/hrm.3930240410

Fielden, S. L., Davidson, M. J., & Makin, P. J. (2000). Barriers encountered during micro and small business start‐up in North‐West England. *Journal of small business and enterprise development*, *7*(4), 295-304.https://doi.org/10.1108/eum0000000006852

Gibb, A. A. (1987). Designing Effective Programmes for Encouraging the Business Start‐up Process: Lessons from UK Experience. *Journal of European Industrial Training*.https://doi.org/10.1108/eb002229

Godfrey, A. B. (1999). *Juran's quality handbook.* McGraw-Hill Publishing.doi:9780071165396

Grönroos, C. (1984). A service quality model and its marketing implications. *European Journal of marketing*, *18*(4), 36-44.https://doi.org/10.1108/eum0000000004784

Grönroos, C. (1990). *Service management and marketing: Managing the moments of truth in service competition*. Jossey-Bass.https://doi.org/10.5860/choice.27-6416

Grönroos, C. (2011). A service perspective on business relationships: The value creation, interaction and marketing interface. *Industrial marketing management*, *40*(2), 240-247.https://doi.org/10.1016/j.indmarman.2010.06.036

Guadix, J., Carrillo-Castrillo, J., Onieva, L., & Navascues, J. (2016). Success variables in science and technology parks. *Journal of Business Research*, *69*(11), 4870-4875.https://doi.org/10.1016/j.jbusres.2016.04.045

Guth, W. D., & Ginsberg, A. (1990). Guest editors' introduction: corporate entrepre neurship. *Strategic Management* Journal, 11(4), 5–15. http://www.jstor.org/stable/2486666

Hisrich, R. D., & Kearney, C. (2013). *Managing innovation and entrepreneurship*. Sage Publications.https://doi.org/10.4135/9781506374512

Hobbs, K. G., Link, A. N., & Scott, J. T. (2017). Science and technology parks: an annotated and analytical literature review. *The Journal of Technology Transfer*, *42*, 957-976.https://doi.org/10.1007/s10961-016-9522-3

Hobbs, K. G., Link, A. N., & Scott, J. T. (2017). The growth of US science and technology parks: does proximity to a university matter?. *The Annals of Regional Science*, *59*, 495-511.https://doi.org/10.1007/s00168-017-0842-5

Johnson, D. (2001). What is innovation and entrepreneurship? Lessons for larger organisations. *Industrial and commercial training*, *33*(4), 135-140. https://doi.org/10.1108/00197850110395245

Klofsten, M. (1994). Technology-based firms: Critical aspects of their early development. *Journal of Enterprising Culture,* *2*(1), 535–557. https://doi.org/10.1142/s0218495894000148

Liberati, D., Marinucci, M., & Tanzi, G. M. (2016). Science and technology parks in Italy: main

features and analysis of their effects on the firms hosted. *The Journal of Technology Transfer*, *41*, 694-729. https://doi.org/10.1007/s10961-015-9397-8

Long, T. B., Blok, V., Dorrestijn, S., & Macnaghten, P. (2020). The design and testing of a tool for developing responsible innovation in start-up enterprises. *Journal of Responsible Innovation*, *7*(1), 45-75. https://doi.org/10.1080/23299460.2019.1608785

Lovelock, C. H., & Wirtz, J. (2004). *Services marketing: People, technology, strategy*. https://doi.org/10.1108/09564230510587186

Lv, M., Zhang, H., Georgescu, P., Li, T., & Zhang, B. (2022). Improving education for innovation and entrepreneurship in Chinese technical universities: a quest for building a sustainable framework. *Sustainability, 14*(2), 595. https://doi.org/10.3390/su14020595

Mills, C. (2011). Enterprise orientations: A framework for making sense of fashion sector start‐up. *International Journal of Entrepreneurial Behavior & Research.17*(3),275-241. https://doi.org/10.1108/13552551111130709

Mora-Valentín, E. M., Ortiz-de-Urbina-Criado, M., & Nájera-Sánchez, J. J. (2018). Mapping the conceptual structure of science and technology parks. *The Journal of Technology Transfer*, *43*(5), 1410-1435. https://doi.org/10.1007/s10961-018-9654-8

Nonaka, I., Toyama, R., & Konno, N. (2000). SECI, BA and leadership: a unified model of dynamic knowledge creation. *Long Range Planning,* 33(1), 5–34. https://doi.org/10.1016/s0024-6301(99)00115-6

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1985). A conceptual model of service quality and its implications for future research. *Journal of marketing*, *49*(4), 41-50. https://doi.org/10.2307/1251430

Poonjan, A., & Tanner, A. N. (2020). The role of regional contextual factors for science and technology parks: a conceptual framework. *European Planning Studies*, *28*(2), 400-420. https://doi.org/10.1080/09654313.2019.1679093

Prabhu, J., & Jain, S. (2015). Innovation and entrepreneurship in India: Understanding jugaad. *Asia Pacific Journal of Management, 32*(4), 843-868. https://doi.org/10.1007/s10490-015-9445-9

Prakash, A., & Mohanty, R. P. (2013). Understanding service quality. *Production Planning & Control, 24*(12), 1050-1065. https://doi.org/10.1080/09537287.2011.643929

Quinn, J. B., Baruch, J. J., & Paquette, P. C. (1987). Technology in services. *Scientific American*, *257*(6), 50-59. https://doi.org/10.1038/scientificamerican1287-50

Rajagopal, A., & Davila, F. A. M. (2020). Marketing strategies for start-up enterprises: conceptual framework to analyse business performance through cross-sectional metrics. *International Journal of Business Innovation and Research*, *21*(2), 238-258. https://doi.org/10.1504/ijbir.2020.104821

Ries, E. (2010). What is a startup?

http://www.startuplessonslearned.com/2010/06/what-is-startup.html.
Accessed 3 August 2012.

Rust, R. T., & Oliver, R. L. (1994). Service quality: insights and managerial implications from the frontier. *Service quality: New directions in theory and practice*, *7*(12), 1-19. https://doi.org/10.4135/9781452229102.n1

Sasser, W. E., Olsen, R. P., & Wyckoff, D. D. (1978). *Management of service operations: Text, cases, and readings*. Allyn & Bacon.

Schick, H., Marxen, S., & Freimann, J. (2002). Sustainability issues for start-up entrepreneurs. *Greener management international*, 2002(38), 59-70. https://doi.org/10.9774/gleaf.3062.2002.su.00007

Shane, S., & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of management review*, *25*(1), 217-226. https://doi.org/10.5465/amr.2000.2791611

Shearmur, R., & Doloreux, D. (2000). Science parks: actors or reactors? Canadian science parks in their urban context. *Environment and Planning a*, *32*(6), 1065-1082. https://doi.org/10.1068/a32126

Soriano, D. R., & Huarng, K. H. (2013). Innovation and entrepreneurship in knowledge industries. *Journal of business research*, *66*(10), 1964-1969. https://doi.org/10.1016/j.jbusres.2013.02.019

Steruska, J., Simkova, N., & Pitner, T. (2019). Do science and technology parks improve technology transfer?. *Technology in Society*, *59*, 101127. https://doi.org/10.1016/j.techsoc.2019.04.003

Tan, J. (2006). Growth of industry clusters and innovation: Lessons from Beijing Zhongguancun Science Park. *Journal of business venturing*, *21*(6), 827-850. https://doi.org/10.1016/j.jbusvent.2005.06.006

Teece, D. J. (2010). Business models, business strategy and innovation. *Long range planning*, *43*(2-3), 172-194.https://doi.org/10.1016/j.lrp.2009.07.003

Timmons, J. A., Spinelli, S., & Tan, Y. (2004). *New venture creation: Entrepreneurship for the 21st century* (Vol. 6). New York: McGraw-Hill/Irwin.

Trimi, S., & Berbegal-Mirabent, J. (2012). Business model innovation in entrepreneurship. *International Entrepreneurship and Management Journal*, *8*(4), 449-465. https://doi.org/10.1007/s11365-012-0234-3

Vargo, S. L., & Lusch, R. F. (2016). Institutions and axioms: an extension and update of service-dominant logic. *Journal of the Academy of Marketing Science*, *44*(1), 5-23. https://doi.org/10.1007/s11747-015-0456-3

Vásquez-Urriago, Á. R., Barge-Gil, A., & Rico, A. M. (2016). Science and technology parks and cooperation for innovation: Empirical evidence from Spain. *Research Policy*, *45*(1),

137-147. https://doi.org/10.1016/j.respol.2015.07.006

Zaech, S., & Baldegger, U. (2017). Leadership in start-ups. *International Small Business Journal*, *35*(2), 157-177. https://doi.org/10.1177/0266242616676883

Zeithami, V. A., Bitner, M. J., & Gremler, D. (1996). Services marketing. *New York*.

Zeithaml, V. A., Bitner, M. J., & Gremler, D. D. (2006). *Services marketing: Integrating customer focus across the firm*. McGraw-Hill/Irwin.

Zhang, H., & Sonobe, T. (2011). Development of science and technology parks in China, 1988–2008. *Economics*, *5*(1). https://doi.org/10.5018/economics-ejournal.ja.2011-6

Yang Mengfei & Liu Shuai.(2023). Study on the factors influencing the efficiency of business incubation in National University Science and Technology Park. *Heilongjiang Researches on Higher Education.* (01),62-67. https://doi:10.19903/j.cnki.cn23-1074/g.2023.01.016.

Appendices

Appendix A – [Questionnaire]

Basic Information	
1. Which park is your company located?	(1) The Science and Technology Park (Lane 658, Jinzhong Road) (2) Shang Chuanghui (Lane 829, Zhongshan West Road) (3) zhishangyuan(Lane 258, Yangzhai Road)
2. What is the type of your company?	(1) Fashion (2) Science and Technology (3) Culture and Creativity (4) Commerce (5) Others
3. When did your company settle in?	Year: Month:
4. What is your position within the company?	(1) Founder (2) Manager (3) Employees

Service Quality Evaluation

No.	Item	Expectations / Actual perception (strongly disagree→strongly agree)						
A1	The science and technology park provides complete hardware facilities such as office space and research equipment.	1	2	3	4	5	6	7
A2	The science and technology park has clear department settings where everyone has their own responsibilities and can meet the different needs of enterprises.	1	2	3	4	5	6	7
B1	Enterprises can easily find staff who provide various services.	1	2	3	4	5	6	7
B2	The science and technology park has clear and specific service processes and standards.	1	2	3	4	5	6	7
B3	The science and technology park promises to complete various services on time, and the quality of service is guaranteed.	1	2	3	4	5	6	7
B4	The science and technology park can accurately record various information of enterprises.	1	2	3	4	5	6	7

C1	The science and technology park can respond to feedback and demands from enterprises in a timely manner.	1	2	3	4	5	6	7
C2	When enterprises encounter problems, the science and technology park can provide effective solutions to the best of their abilities.	1	2	3	4	5	6	7
C3	Science and technology park staff are polite, good communicators, and highly professional.	1	2	3	4	5	6	7
D1	The science and technology park can match corresponding policies and funding support according to the specific situation of enterprises.	1	2	3	4	5	6	7
D2	Entrepreneurship mentors and other consultants have sufficient professional knowledge and rich experience to provide effective guidance.	1	2	3	4	5	6	7
D3	The science and technology park can help enterprises establish good relationships with government departments.	1	2	3	4	5	6	7
D4	The science and technology park can provide enterprises with more business opportunities and social resources.	1	2	3	4	5	6	7
D5	The science and technology park can help enterprises promote and expand industry or social visibility.	1	2	3	4	5	6	7
E1	The science and technology park is willing to proactively understand the development of enterprises and provide some assistance.	1	2	3	4	5	6	7
E2	The science and technology park is willing to proactively understand the unmet needs of enterprises.	1	2	3	4	5	6	7

Ranking of Service Dimension Importance:		
NO.	Dimension	Ranking (1→5)
1	Tangibles (Includes the physical conditions of the science and technology park, such as hardware facilities and the setup of service departments)	
2	Reliability (The science and technology park has clear and defined service processes, providing accurate and consistent services)	
3	Responsiveness (The speed and ability of the science and technology park to respond and resolve issues raised by enterprises)	
4	Assurance (The science and technology park offers abundant entrepreneurial resources and professional staff)	
5	Empathy (The science and technology park demonstrates care and understanding towards enterprises, emphasizing their development)	