INSTITUTO
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Effective Service Recovery Strategies in Hospital Services—An Empirical Analysis of Two Chinese Hospitals (Based on Patient Perspective)

LIU Jin

Doctor of Management

Supervisors:
PhD Paulo Bento, Assistant Professor with Habilitation
ISCTE University Institute of Lisbon
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BUSINESS
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Jury:

PhD Sofia de Sousa Vale, Associate Professor with Habilitation,
Iscte - Instituto Universitário de Lisboa
PhD Renato Telo de Freitas de Barbosa Pereira, Assistant Professor with Habilitation,
Iscte - Instituto Universitário de Lisboa
PhD Rute Sofia Barbosa Xavier Lino, Assistant Professor,
Universidade Católica Portuguesa
PhD Zhang Chichen, Professor,
SMU – Southern Medical University (China)
PhD Paulo Alexandre Bento Fernandes, Assistant Professor with Habilitation,
Iscte – Instituto Universitário de Lisboa

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Abstract

This research investigates the impact of hospital service recovery strategies on patients' subsequent behavioral intentions following service failures. It creates a theoretical model of "service failure scenario - service recovery strategy - perceived fairness - patients' subsequent behavioral intentions", gathers data from 555 complaining patients at two tertiary hospitals in Guangzhou, through questionnaires, and uses structural equation modeling to test the hypotheses. The results show that service failure scenarios have a strongly negative impact on service recovery strategies, indicating that increased failure severity and perceived controllability of the attribution reduce patients' perceived effectiveness of recovery strategies. Awareness of service recovery policies has a significant positive effect on recovery strategies. In turn, recovery strategies significantly positively influence perceived fairness, which partially mediates the relationship between recovery strategies and patients' subsequent behavioral intentions. The model accounts for 72.1% of the variance in patients' behavioral intentions, supporting the proposed process of "service failure - recovery strategy - fairness perception - behavioral intention." Theoretically, this study systematically confirms the links between service failure traits, recovery strategies, perceived fairness, and patient intentions within healthcare, expanding the application of social exchange and fairness theories. Practically, it provides hospitals with a management framework of "policy transparency - precise strategies - enhanced fairness perception", demonstrating that medical organizations can improve patient experiences by publicizing complaint procedures, tailoring recovery measures to specific types of failures, and optimizing interaction processes. This has important implications for strengthening doctor-patient relationships and enhancing healthcare service quality.

Keywords: Service Failure; Service Recovery; Perceived Justice; Patients' subsequent intentional behavior

JEL: L84; D18

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Resumo

Esta investigação centra-se no sector da saúde e explora o impacto da recuperação do serviço nas intenções comportamentais subsequentes dos pacientes, em contexto de falhas na prestação do serviço. Constrói um modelo teórico de "cenário de falha do serviço - estratégia de recuperação do serviço - justiça percebida - intenções comportamentais subsequentes dos pacientes", testado com base em questionários a 555 pacientes reclamantes em dois hospitais de terceiro nível de Cantão e na modelação de equações estruturais. Os resultados demonstram que os cenários de falha de serviço têm um impacto negativo significativo nas estratégias de recuperação do mesmo, indicando que quanto mais grave a falha e a controlabilidade percebida da atribuição, menor a eficácia percebida das estratégias de recuperação por parte dos pacientes. O conhecimento das políticas de recuperação do serviço tem um impacto positivo significativo nas estratégias de recuperação do mesmo. As estratégias de recuperação do serviço exercem um impacto positivo significativo na justiça percebida e, através desta, um impacto positivo significativo nas intenções comportamentais subsequentes dos pacientes, com a justiça percebida a ter um papel mediador parcial. O modelo explica 72,1% da variância das intenções comportamentais subsequentes dos pacientes, validando a lógica de transmissão de "falha de serviço – estratégia de recuperação – perceção de justiça – intenção comportamental". Teoricamente, é validado de forma sistemática o mecanismo das características das falhas de serviço, das estratégias de recuperação, da justiça percebida e das intenções dos pacientes no contexto dos cuidados de saúde, alargando os cenários de aplicação da teoria da troca social e da teoria da justiça. Em termos práticos, a investigação fornece aos hospitais um percurso de gestão baseado na "transparência das políticas – estratégias precisas – melhoria da perceção de justiça", sugerindo que as instituições de saúde melhorem a experiência dos pacientes através da divulgação dos sistemas de reclamação, da adequação das medidas de recuperação aos diferentes tipos de falhas e da otimização dos processos de interação, com implicações relevantes para a melhoria da relação médico-doente e da qualidade dos serviços de saúde.

Palavras-chave: Falha de Serviço; Recuperação de Serviço; Justiça Percebida; Intenções Comportamentais Subsequentes dos Pacientes

JEL: L84, D18

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摘 要

本研究探讨了医院服务补救策略对服务失败后患者后续行为意向的影响。研究构建了“服务失败情形—服务补救策略—感知公平—患者后续意向”理论模型，并基于广州市两家三甲医院555份投诉患者问卷数据，运用结构方程模型进行验证。结果表明：服务失败的严重程度与归因可控性越高，患者对补救策略的感知有效性越低；服务补救政策知悉度提升能显著改善补救策略；有效的补救策略可增强患者的感知公平，并通过公平感知提升其后续积极行为意向，公平感知在其中发挥部分中介作用。该模型解释了患者行为意向72.1%的变异，验证了“服务失败—补救策略—公平感知—行为意向”的传导逻辑。在理论层面，本研究系统验证了医疗行业中服务失败情形、补救策略、感知公平性与患者意向之间的关联，拓展了社会交换与公平理论的应用范围。在实践层面，该框架为医院提供了“政策透明度-精准策略-公平感提升”的管理模型，表明医疗机构可通过公开投诉流程、针对特定类型失误制定定制化康复措施以及优化互动流程来改善患者体验。这对强化医患关系和提升医疗服务质量具有重要启示。

关键词：服务失败；服务补救；感知公平；患者后续意向行为

JEL: L84; D18

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Acknowledgements

At this moment, as I complete my doctoral dissertation, my heart is filled with gratitude. This long and fulfilling academic journey would not have been possible without the support and help of numerous teachers, classmates, family members, and colleagues. I want to thank everyone who has sincerely encouraged, guided, and assisted me throughout my doctoral studies.

First and foremost, I sincerely thank my Portuguese supervisor, Professor Paulo Bento. Professor Bento is a mentor with remarkable academic and personal charisma. He is highly rigorous in his research, carefully scrutinizing and verifying every piece of data, viewpoint, and even each word choice. This has deeply influenced my understanding of the seriousness and scientific nature of academic research. In our interactions, I am often impressed by his unique research perspectives and innovative thinking. He can uncover profound insights from seemingly ordinary phenomena, bringing new inspiration to my work.

Secondly, I would like to sincerely thank my Chinese supervisor, Professor Xia Weidong. With his deep academic knowledge and broad research experience, Professor Xia has guided me in the right direction. Throughout the research process, he has generously shared his expertise and taught me step by step. From choosing research methods to analyzing data, from building the thesis structure to refining the language, he has dedicated significant effort to every detail. His strict academic standards have deepened my understanding of research, and his thoughtful guidance has given me the courage to face challenges without fear. Professor Xia is not only my academic mentor but also a role model in life. His lessons have taught me how to approach research with a rigorous and scientific mindset, and how to confront life's obstacles with optimism.

For my research, both supervisors always patiently listened to my confusions and troubles and offered encouragement and support. It is a great honor in my academic career to be their student.

I also want to thank Professor Wang Dong, Director Ou Weiyuan, and Teacher Wang Sihan from Southern Medical University, as well as Professor Virginia Trigo and Professor Nelson Antonio from ISCTE. Thank you for giving me an excellent global learning and research platform, which has let me experience advanced concepts and research methods from various

countries and fields. This has expanded my academic views and improved my research skills. I also appreciate your patient guidance and support in my daily studies.

Furthermore, I want to thank my fellow students from the Class of 2021. We have tackled academic challenges together, shared our research experiences, and supported one another. I especially want to thank my classmates Chen Jianping, Min Rui, Yang Fan, Zu Chenxi, Lu Renjie, Liu Jun, Chen Liyun, Cai Dingbin, and Liu Anuo. When I faced difficulties and setbacks, your companionship helped me find my strength again; when I made progress and achieved success, your sharing brought me immense joy and excitement. These invaluable friendships will always be among the most beautiful memories of my life.

I would also like to thank my colleagues. They are the direct participants in my research and a strong support for my academic work. Despite their busy schedules, colleagues such as Xiang Junfang, Liang Xiaonan, Chen Liya, Chen Yuyin, Liang Yaoze, Li Xuefen, and Liu Fei uncomplainingly cooperated with my research and provided me with a wealth of firsthand data. Their selfless support has helped me gain a deep understanding of the current issues and challenges of hospital service failures, allowing me to connect theory with practice and to continuously explore and innovate.

I would like to give special thanks to my family, especially my husband, who has always encouraged and supported me, and assisted me with many household chores. This has provided me with the strongest spiritual motivation to dedicate myself to my doctoral research without any worries.

Finally, I want to thank everyone who has helped and supported me during my doctoral studies and research. Since space is limited, I can't list everyone, but I will never forget your support and encouragement. I will carry this gratitude and strength with me as I continue on my academic journey.

Once again, thank you to everyone who has helped and supported me! Thank you!

致 谢

在完成这篇博士论文的时刻，我的内心充满了感激之情。这段漫长而充实的学术旅程，离不开众多师长、同学、家人以及同行的支持与帮助。在此，我衷心感谢每一位在我博士生涯中给予我鼓励、指导和帮助的人。

首先，衷心感谢我的葡方导师Paulo Bento教授。Paulo教授是一位极具学术魅力与人格魅力的导师。他对待学术研究非常严谨，每一个数据、每一个观点，甚至每一个措辞都要反复推敲与验证，这让我深刻认识到学术研究的严肃性与科学性。在与他的交流中，我常常被他那独特的研究视角与创新思维所折服。他总能从看似平凡的现象中挖掘出深刻的内涵，为我的研究思路带来全新的启发。

其次，我要由衷感谢我的中方导师夏卫东教授。夏教授以其深厚的学术造诣和丰富的研究经验，为我指引了前行的方向。在研究过程中，夏教授倾囊相授，手把手的教我，从研究方法的选择到数据分析的处理，从论文结构的搭建到文字表达的润色，每一个环节都倾注了他大量的心血。他严谨的治学态度让我对学术研究有了更为深刻的理解，他的悉心指导让我在面对困难与挑战时从不畏惧。夏教授不仅是我学术道路上的引路人，更是我人生路上的榜样。他的言传身教，让我学会了如何以严谨、科学的态度对待学术研究，如何以积极、乐观的心态面对生活中的各种挑战。

对于我的研究，两位导师总是耐心倾听我的困惑与烦恼，给予我鼓励与支持，能够成为他们的学生，是我学术生涯中莫大的荣幸。

我亦要向南方医科大学的王冬教授、欧玮艳主任、王思涵老师和ISCTE的Virginia Trigo、Nelson Antonio教授表示感谢。感谢您们为我提供了一个卓越的全球化视角的学习和研究平台，让我有机会接触到不同国家、不同领域的先进理念与研究方法，拓宽了我的学术视野，提升了我的研究能力。也要感谢你们在日常学习中耐心的指导和帮助。

此外，我还要感谢2021级我的同学们。我们一起探讨学术问题，分享研究心得，互相鼓励，互相支持。在此特别要感谢陈建平、闵锐、杨帆、祖晨曦、陆人杰、刘珺、陈丽云、蔡定彬、刘安诺等同学，在遇到困难与挫折时，是你们的陪伴让我重新振作；

在取得进步与成果时，是你们的分享让我倍感喜悦和振奋。这段珍贵的同窗情谊，将成为我一生中最美好的回忆。

我还要感谢我的同事们。他们是我研究的直接参与者，更是我学术研究的坚实后盾。在繁忙的工作之余，向俊方、梁晓楠、陈莉雅、陈雨茵、梁耀泽、李雪芬、刘非等同事毫无怨言地配合我的研究工作，为我提供了大量的第一手资料。他们的无私支持让我得以深入了解医院服务失败的现状与问题，让我能够理论结合工作实际，不断探索与创新。

我还要特别感谢我的家人，尤其是我的先生，一直鼓励和支持我并帮我分担了大量的家庭事务，给予了我最强大的精神动力，让我能够全身心地投入到博士研究中，无后顾之忧。

最后，我要感谢所有在我博士学习与研究过程中给予过我帮助与支持的人们。由于篇幅有限，我无法一一列举，但你们的每一份支持与鼓励我都铭记在心。我将带着这份感恩与力量，继续在学术道路上努力前行。

再次感谢所有给予我帮助与支持的人们！谢谢！

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List of Abbreviations

AI — Artificial Intelligence

AMOS — Analysis of Moment Structures

AVE — Average Variance Extracted

CB-SEM — Covariance-Based Structural Equation Modeling

CMV — Common Method Variance

CNKI — China National Knowledge Infrastructure

COVID — Coronavirus Disease

CR — Composite Reliability

CSR — Corporate Social Responsibility

EFA — Exploratory Factor Analysis

FL — Factor Loading

GOSC — General Office of the State Council of the People's Republic of China

HTMT — Heterotrait-Monotrait Ratio

KMO — Kaiser-Meyer-Olkin

MOF — Ministry of Finance

MOHRSS — Ministry of Human Resources and Social Security of the People's Republic of China

NATCM — National-Administration-of-Traditional-Chinese-Medicine

NFI — Normed Fit Index

NDRC — National Development and Reform Commission

NHC — National Health Commission

NHSA — National Healthcare Security Administration

PCA — Principal Component Analysis

PLS — Partial Least Squares

PLS-SEM — Partial Least Squares Structural Equation Modeling

PRISMA — Preferred Reporting Items for Systematic Reviews and Meta-Analyses

QCC — Quality Control Circle

R^2 — coefficient of determination

RMSEA — Root Mean Square Error of Approximation

SEM — Structural Equation Modeling

SMS — Short Message Service

SPSS — Statistical Package for the Social Sciences

SRMR — Standardized Root Mean Square Residual

SRS — Service Recovery Strategy / Strategies

VIF — Variance Inflation Factor

WOM — Word of Mouth

Chapter 1: Introduction

This chapter introduces the research background from two aspects: the current management dilemmas in service recovery within the medical industry and the gaps in theoretical research, and further raises the research questions and research objectives.

1.1 Management challenges

Service failure refers to problems in the service that leave a negative impression on customers (Tran, 2024). Medical services are high-contact and complex, and service failure is almost unavoidable (Zhai et al., 2022). As a type of product, services possess characteristics such as intangibility, perishability, heterogeneity, non-storability, and inseparability. Therefore, when the services provided by medical institutions do not meet patients' expectations, service failure and patient complaints are likely. Additionally, achieving "zero defects" in the medical service process is difficult, which can lead to failures. Effective service recovery measures are essential responses to these failures (Hart et al., 1990). Due to the high level of professionalism in medical services, an inherent information asymmetry exists between doctors and patients, with patients generally having less information, which can lead to conflicts (J. i et al., 2020). According to *the White Paper on the Practice Status of Chinese Physicians* (Chinese Medical Doctor Association, 2018), 62% of physicians have experienced medical disputes of varying severity, and 66% have encountered conflicts with patients. Chinese scholars have also found that complaints from patients about hospital services—including medical practices, service attitude, administrative management, and logistics—make up more than 90% of total complaints (L. Zheng et al., 2013). If patients' complaints are not handled properly, it can easily result in distrust between doctors and patients, and may even lead to violent acts such as " healthcare-related violence," which seriously disrupt medical order (Mao et al., 2020; Y. W. Wang, 2018; L. Zheng et al., 2013). Research on service recovery in the medical field has a substantial positive impact, exploring how hospitals' recovery measures influence patient satisfaction in various failure scenarios, and thereby enhancing understanding of patients' needs and expectations to prevent conflicts from escalating after service failures.

By the end of 2023, China's total population was 1.41 billion, and the total number of healthcare visits nationwide reached 9.55 billion. There were 1,070,785 medical institutions in

the country (National Health Commission [NHC], 2024). In the context of intensifying performance accountability and evolving quasi-market dynamics, Chinese medical institutions need to improve patient satisfaction and loyalty. From the perspective of the supply and demand relationship for medical resources at the macro level, market competition pressure on Chinese medical institutions is gradually increasing, from 2010 to 2023, and the growth rate of China's medical resource supply has surpassed the growth rate of medical service demand. The number of beds per 1,000 people in China rose from 2.6 to 7.2, with an annual compound growth rate of 8.2%. Meanwhile, the number of medical visits increased from 5.84 billion to 9.55 billion, with an annual compound growth rate of only 3.9%, which is significantly lower than the growth rate of beds per 1,000 people (NHC, 2011, 2024). Public medical institutions accounted for the vast majority of service delivery, handling 7.24 billion visits in 2023 alone (NHC, 2011, 2024). These institutions operate under comprehensive government regulation, including controls over market entry, service pricing, and financial management. Moreover, they are subject to regular performance evaluations, in which patient satisfaction serves as a key indicator (NHC, 2023a).

In recent years, the Chinese government has implemented a series of policy initiatives aimed at enhancing the patient experience nationwide (H. Feng et al., 2023). In 2017, the report of the 19th National Congress of the Communist Party of China highlighted that the main contradiction in Chinese society is between the growing needs of the people for a better life and unbalanced, inadequate development. It proposed building a "Healthy China" in the field of medical and health care (Xi, 2022).

In May 2023, the National Health Commission of China issued the "Notice on Carrying out the Theme Activity of Improving the Medical Experience and Enhancing Patient Experience," which states that the "patient-centered" concept should be implemented throughout the entire medical service process to increase the patient satisfaction and perceived quality of care (NHC & National Administration of Traditional Chinese Medicine [NATCM], 2023a). Meanwhile, the National Administration of Traditional Chinese Medicine jointly issued the "Action Plan for the Comprehensive Improvement of Medical Quality (2023-2025)" (NHC & NATCM, 2023b). In October 2023, the National Health Commission released the "Notice on Printing and Distributing the Special Action Plan for Patient Safety (2023-2025)," aimed at ensuring continuous improvement in medical quality and safety (NHC & NATCM, 2023b).

Table 1.1 Core policies to improve patient experience

Title	Date	Agencies	Key Points on Patient Experience
Notice on Issuing the Special Action Plan for Patient Safety (2023-2025)	2023.10	NHCN NATCM	Patient safety is crucial to the well-being of the general public, representing the baseline of healthcare quality. It also significantly impacts patients' trust and satisfaction with hospitals.
Notice on Issuing Measures for Convenient and Beneficial Primary Healthcare Services	2023.08	NHC	Enhancing the Public's Sense of Access and Satisfaction with Basic Medical and Healthcare Services at Primary Healthcare Institutions.
Notice on Issuing Key Tasks for Deepening the Medical and Healthcare System Reform in the Second Half of 2023	2023.07	NHC NDRC MOF MOHRSS NHSA	Carrying Out the "Enhance Patient Healthcare Experience" Thematic Campaign to Improve Patient Healthcare Perceptions.
Comprehensive Medical Quality Enhancement Action Plan (2023-2025)	2023.05	NHC NATCM	By the end of 2025, comprehensively enhancing medical quality and continuously improving the public's satisfaction with healthcare services.
Thematic Campaign Plan for Improving the Patient Experience and Enhancing the Perception of Healthcare Access (2023-2025)	2023.05	NHC NATCM	By the end of 2025, integrating the "patient-centered" approach throughout all aspects of healthcare services.
National Tertiary Public Hospital Performance Assessment Operations Manual (2023 Edition)	2023.02	NHC	Hospitals should establish satisfaction monitoring indicators and continuously improve them.
Review Criteria for Level 3 Hospitals (2022 Edition)	2022.12	NHC	Develop satisfaction monitoring indicators and continuously enhance them.
State Council General Office's Opinions on Promoting the High-Quality Development of Public Hospitals	2021.06	GOSC	Establishing a new culture for the high-quality development of public hospitals - strengthening patient-centered approaches.
Regulations on Complaints Management in Medical Institutions	2019.03	NHC	Strengthening the management of complaints in medical institutions, standardizing complaint handling procedures, improving healthcare services, safeguarding medical safety, and protecting the legitimate rights and interests of both medical professionals and patients to maintain a normal healthcare order.
State Council General Office's Opinions on Strengthening the Performance Assessment of Level 3 Public Hospitals	2019.01	GOSC	In 2019, a nationwide performance assessment for Level 3 public hospitals was initiated. The performance assessment indicators for Level 3 public hospitals included a system of four aspects, including satisfaction evaluations.
Notice from the National Health and Family Planning Commission Office on	2017.08	NHC	Conducting third-party pilot hospital satisfaction surveys in 93 provincial-level hospitals nationwide.

Title	Date	Agencies	Key Points on Patient Experience
Conducting Pilot Hospital Satisfaction Surveys			

Between 2002 and 2012, the number of reported serious medical adverse events in China grew at an average annual rate of 10%, with 63.7% of surveyed hospitals reporting at least one such incident during this period. Concurrently, incidents of verbal abuse, threats, physical assaults, and collective disturbances targeting healthcare providers increased by approximately 30% per year on average (J. Zhang, 2017). Between 2018 and 2022, Chinese judicial authorities handled a total of 64,851 cases related to medical malpractice liability disputes, with hospitals' average annual litigation loss rate being approximately 80% (Medical Legal Research Center, 2023). Against this backdrop, effectively managing service failures—particularly through timely and empathetic recovery strategies—has become a critical operational and ethical imperative for hospitals.

1.2 Theoretical gaps

Service recovery, as a vital component of enhancing patient experience, has garnered widespread academic recognition for its critical role in service management research. However, recent studies reveal a notable imbalance across sectors. The extant literature demonstrates that service recovery in domains such as service robotics, tourism, and e-commerce has yielded substantial insights, leading to relatively mature theoretical and practical frameworks. In contrast, research on service recovery within the medical industry remains underdeveloped and warrants greater scholarly attention (C. L. Pan & Yuan, 2023; Xue et al., 2023; G. B. You et al., 2023). In China's healthcare sector, existing service recovery research faces notable limitations. Most studies are led by doctors from clinical departments, who draw on their extensive clinical experience to explore service recovery. While these studies offer practical guidance, they primarily focus on individual departments or sections and lack systematic research from a comprehensive hospital operations and management perspective (Ji et al., 2018; B. Jia, 2018; Y. F. Pan, 2016). Hospital operations involve coordinated efforts across multiple links and departments. Analyzing service recovery strategies solely from a local perspective makes it difficult to effectively address complex medical service scenarios. Therefore, systematic research on service recovery strategies in the medical sector holds considerable significance. Theoretically, it can help bridge the current knowledge gap in China’s healthcare service literature and enrich the broader service recovery paradigm. Practically, it can provide evidence-based, institution-wide management solutions to optimize service processes, enhance patient

satisfaction, and strengthen organizational competitiveness—thereby supporting the high-quality development of China's medical system.

1.3 Research questions

In the consumer market, even the best services may encounter dissatisfied consumers, some of whom choose to express their dissatisfaction through complaint channels. In healthcare services, patient complaints represent conflicts of interest between providers and patients. Due to the complexity of medical services, patient complaints are also intricate, covering multiple aspects such as service attitude, technical skills, medical costs, environment, equipment, and waiting times. Each aspect can be further divided into many specific items (J. Wu, 2024). Studies show that complaints related to hospital medical services—including procedures, attitude, management, and logistics—account for over 90% of total complaints (L. Zheng et al., 2013). Traditional patient complaint methods mainly include complaint boxes, hotlines, and reception desks. In the digital age, with advances in information technology, complaint channels have become more diverse. Hospitals now use various online platforms, including official websites, Weibo, WeChat public accounts, and mobile apps, to provide online complaint services. Compared to traditional methods, these digital, non-face-to-face channels are more convenient and help reduce the costs of handling complaints (X. H. Li et al., 2021). Their convenience, low cost, and wide dissemination have made non-face-to-face complaint channels the primary way for patients to express dissatisfaction with medical services.

Complaints from patients and their caregivers are essential indicators of weaknesses in the healthcare system (X. H. Li et al., 2021). When faced with complaints, large hospitals have actively implemented service recovery measures to restore patient trust. However, the healthcare service industry urgently needs a comprehensive theoretical framework for service recovery and a mature system of best practices. Currently, most medical institutions show significant shortcomings when handling complaints: they lack systematic and standardized response strategies, often responding passively and handling complaints hastily only after they arise; moreover, solutions mostly depend on staff members' subjective judgment, leading to arbitrary processes and inconsistent outcomes, which hinder resolving conflicts fundamentally. There is a pressing need in hospital management for a refined complaint management mechanism. This mechanism must accurately identify various service failure scenarios—such as diagnostic errors, communication breakdowns, and complex procedures—and match each with scientifically grounded and actionable recovery strategies to address patient complaints

caused by service failures effectively. Existing research and practice exhibit notable deficiencies in this area, which require in-depth exploration.

This study introduces the service failure and service recovery theoretical model into the medical complaint management scenario, aiming to analyze systematically the relationships between types of service failure, recovery measures, and patients' subsequent satisfaction, loyalty, and word-of-mouth sharing. By developing an analytical framework that combines theory and practice, it aims to help medical institutions optimize their service recovery processes, enhance the effectiveness and relevance of responses, and ultimately improve the quality and level of medical services, achieving dual improvements in patient experience and hospital management efficiency. Based on this, the following hypotheses are proposed.

Q1: How do the different characteristics of service failure affect the effectiveness of service recovery strategies?

Q2: How do the remedial policies of medical institutions affect the effectiveness of service recovery strategies?

Q3: How do the service recovery strategies of hospitals affect patients' perceived justice?

Q4: How does patient perceived justice affect their subsequent behavioral intentions?

1.4 Research objectives

As demand for medical services from all parts of society increases, hospitals must urgently improve their management capabilities to ensure the health and quality of care provided. In medical institutions, the number of patient complaints about services has been rising each year. However, recent years have seen few academic studies on service recovery strategies for different types of service failures in the medical field. Additionally, medical complaint management is a relatively new area, lacking systematic theories and established practices, representing a long-standing gap in the domestic medical service sector.

Service recovery is an important area in service management research. It mainly explores the effectiveness of enterprises' service recovery strategies after service failures, helps enterprises formulate better policies, and has accumulated abundant research results in multiple industries such as aviation and tourism. Given the complexity and impact of service failures in healthcare, a structured theoretical framework is essential to guide the analysis of how different recovery strategies affect patient perceptions and behavior. In this context, the study draws on established models of service failure and recovery, adapting them to the specific dynamics of Chinese public hospitals. This theoretical foundation enables a more rigorous examination of

cause-effect relationships within the healthcare setting. This research aims to examine the complaint handling practices in large-scale tertiary hospitals in Guangzhou, exploring issues related to service recovery for different failure scenarios and patients' subsequent behavioral intentions. The findings are expected to improve complaint handling mechanisms in the medical industry and serve as valuable references.

1.5 Structure of the thesis

Based on the research questions of this study, this thesis is divided into six chapters, each focused on a different main research content as follows:

Chapter 1, Introduction. This chapter discusses the management and theoretical foundations of the study, emphasizing current management challenges in the healthcare service sector and gaps in theoretical research. Based on this, the research questions and objectives are outlined. The study examines how service failure and recovery influence patient behavioral intentions, aiming to address the theoretical gap through empirical analysis.

Chapter 2, Literature Review. This chapter systematically examines the key concepts and theories related to service failure, service recovery, and customer behavioral intentions, including perceptions of fairness and attribution theories. By analyzing both domestic and international research, it explores the meaning of service failure, recovery strategies, and factors influencing patient behavioral intentions. The literature review offers theoretical support for developing the research model. It also highlights gaps in existing studies, particularly the limited research within China's healthcare services.

Chapter 3, Research Model and Hypotheses. This chapter outlines the research model, explaining the logical connections between service failure, recovery strategies, perceived fairness, and customer behavioral intentions. By describing variables and deriving hypotheses, it investigates how service failure characteristics influence recovery strategies, the effectiveness of recovery policies, and the mediating role of perceived fairness. The research hypotheses establish a foundation for the upcoming empirical analysis and emphasize the key factors affecting hospital service management.

Chapter 4, Research Methods. This chapter offers a comprehensive overview of the research methods, including a literature review, expert consultation, questionnaire surveys, and data analysis techniques like principal component analysis and structural equation modeling. It then describes the questionnaire design process and the measurement scales created based on the research model, introduces the empirical research subjects of this study, and explains the

data analysis methods. These methods include descriptive statistics, exploratory factor analysis, and mediation effect tests to ensure the scientific accuracy and reliability of the findings. Finally, a small-sample test is performed to verify the reliability and validity of the measurement model.

Chapter 5, Research Results. This chapter presents the main findings of the empirical research, including the relationship between service failure and recovery strategies, the mediating effect of perceived fairness, and the factors influencing patient behavioral intentions. Data analysis validates some hypotheses and offers directions for improving hospital service management. The research results support data-backed improvements for medical institution services.

Chapter 6, Conclusion and Future Work. This chapter summarizes the results of the empirical research, synthesizes the research conclusions, and discusses the theoretical contributions of this study, providing practical implications for relevant management personnel in medical institutions. It also analyzes the limitations of this study and suggests directions for future research.

Chapter 2: Literature Review

This chapter will systematically sort out and review the relevant literature of the research, mainly covering three core concepts (service failure, service recovery, and patients' subsequent behavioral intentions) and three theoretical frameworks (Social Exchange Theory, Perceived Justice Theory, and Attribution Theory). It aims to summarize existing research results and their applications in the medical industry, identify research gaps, and provide a theoretical foundation for subsequent studies.

2.1 Service failure

Research on service failure is a crucial topic in marketing, with significant practical implications for business operations and customer relationship management. Even top companies can sometimes face service failures. Among different types of failures, medical service failures are particularly serious because they involve risks to life and health, often leading to more severe consequences. Current research mainly focuses on five areas: definition and classification, attribution analysis, empirical studies, remedial measures, and subsequent impacts (with service recovery discussed separately in the next section and not repeated here). This section reviews the meaning of service failure, research directions and achievements, and China's specific studies on service failure from three perspectives.

2.1.1 Concept of service failure

Defining the concept of service failure is essential for studying its impact mechanisms, and the academic community has analyzed it from various perspectives. Parasuraman et al. (1985) first proposed the definition of service failure was introduced, suggesting that it occurs when a company's service does not meet the minimum acceptable level of customer expectations, leading to dissatisfaction due to unmet needs. This definition implicitly included the concept of customer expectations, even though it was not explicitly stated. Later, Grönroos (1997) expanded on this by introducing the idea of customer expectations, arguing that service failure happens when the service level provided by a company does not meet customer expectations. This definition, which connects customer expectations with service failure from the customer's

point of view, has gained wide acceptance among scholars in subsequent research (Harrison-Walker, 2019; Shams & Rather et al., 2020). Michel (2021) further expanded the definition from the service provider's perspective, indicating that service failure occurs when the service provided by staff does not meet the company's standards and requirements. During this refinement, other scholars offered different viewpoints. For example, Van Vaerenbergh et al., (2014) argued from the company's perspective that service failure is perceived by customers when the company's goal of customer satisfaction is not achieved. The development of these definitions shows that the meaning of service failure has gradually shifted from a focus on the company to the customer's perception, laying the groundwork for future classification and attribution studies.

On the basis of clarifying the connotation of service failure, scholars have conducted systematic explorations into its classification from diverse perspectives. These include both the process-outcome dichotomy based on customer perception and the functional-moral orientation classification that integrates industry-specific characteristics, and these classification approaches have provided theoretical tools for analyzing the influence mechanism of service failure (Akarsu et al., 2022; Alnawas et al., 2022; S. Kelley et al., 1993; J. Wei et al., 2024). The severity of service failure and the attribution of service failure are two commonly adopted categorization methods, both of which emphasize understanding service failure from the perspective of customers.

Customers distinguish the severity of service failure based on the magnitude of various tangible and intangible losses they have incurred. In relevant research, many scholars have classified service failure into minor service failure and severe service failure according to its severity, and this classification is typically employed to explore the impact of service failures of varying severity on the effectiveness of service recovery (Alnawas et al., 2022; Shams & Rehman et al., 2020).Other research have demonstrated that the severity of service failure is positively related to customers' willingness to switch to a different brand. In other words, the more severe the service failure, the greater the likelihood that customers will change their preferred brands. However, customers' willingness to switch is also influenced by their level of forgiveness for the service failure. The higher the level of forgiveness, the more it can lessen the intention to switch brands. In other words, effective service recovery strategies are crucial for retaining customers (Riaz & Khan, 2016). Although service failure can cause negative outcomes, customer satisfaction after a service failure is more important than satisfaction before it (Maxham, 2001).

Attribution theory provides an important perspective for understanding the impact mechanisms of service failure, as consumers make evaluative judgments or causal attributions to explain the causes of service failures. Regarding the attribution of service failure, it is generally categorized into three dimensions: controllability, stability, and personalization. Personalization refers to the extent to which people believe that factors within their control influence the outcomes they experience. While personalization is essential in some service failure situations, many researchers have overlooked this type of attribution because consumers often think that most causes stem from the service provider rather than themselves. As a result, most previous studies have focused only on the attribution of controllability and stability (Kuok Wei & Ariffin, 2022). Some scholars also categorize causes based on specific situations and their understanding. For example, in medical-related literature, it is noted that outcome quality, administrative quality, interaction quality, and environmental quality are factors that contribute to service failure (Um & Lau, 2018). The classification of attribution methods reflects the underlying logic of consumers' psychological attribution of service failure. The various types of attribution, based on industry differences, further broaden the theory's applicability.

In addition to classifying service failure from the customer’s perceptual perspective, scholars have proposed other approaches, such as the two–dimensional typology by S. Kelley et al. (1993), which distinguishes between process failure and outcome failure. This classification is an extended application of the conclusion that service quality can be categorized into the two dimensions of process and outcome. Specifically, outcome failure refers to the failure to provide tangible products/services or core/basic services, and it primarily reflects tangible results and customers' primary needs. In contrast, process failure refers to flaws or defects in the delivery of core services and products; such failures reflect the intangible elements of service delivery (Luo & Mattila) , such as service unavailability or slow service, which relate to the nature of service failure. Classification based on the nature of customers' requests/needs (e.g., special needs, customer preferences, customer errors, other disruptive customers) and the nature of employees' actions (e.g., level of attention, unusual actions, cultural norms, stakes involved, and adverse reactions) (Bitner, 1990). From an internal management viewpoint, providing products or services to external customers requires coordination and cooperation among internal departments. Services can be divided into internal and external services based on their target audience, and failures can be classified as internal service failures and external service failures. Controllability refers to the extent to which the focal party perceives the cause as a result of intent or lack thereof (Bitner, 1990). Accordingly, it is categorized into controllable and uncontrollable. This type of attribution involves

consumers' judgments about whether the service provider can cause or prevent the failure (Nikbin et al., 2014; E. Yao et al., 2021). Stability indicates whether the cause is viewed as temporary or permanent (stable). Service failures caused by stable issues are more likely to recur than those caused by unstable ones (Muschetto et al., 2019; Nikbin et al., 2014).

The negative effects of service failure directly threaten a company's survival, making it a key focus of academic research. The main consequences of service failure include customer dissatisfaction, negative word-of-mouth, negative emotions such as anger and disappointment, and customer switching tendency. Among these, customer dissatisfaction and negative word of mouth can ultimately lead to customer switching behavior (Y. H. Peng & Zhao, 2024). As a result, service failures lead to high costs for businesses (Koc et al., 2017). In particular, anger and disappointment are two common and influential negative emotions in service failure situations, regardless of the type of service failure (Luo and Mattila, 2020).

Sánchez-García and Currás-Pérez (2011) note that negative word-of-mouth and complaints are the two most common customer responses to service failure behaviors. For individuals, negative word-of-mouth conveys more valuable information than positive word-of-mouth (Xing et al., 2022). Papathanassis and Knolle (2011) similarly identified negative word-of-mouth and complaints as the two most prevalent behavioral responses to service failure. Existing research indicates that service failure primarily affects businesses through three channels: emotions, word-of-mouth, and behavioral changes, with negative emotions exerting particularly powerful effects. These findings underscore the critical importance of effectively managing service failures.

This section explains the concept, classification, attribution, and impact of service failure, reflecting the evolutionary logic of its theoretical framework. The research path from definition to attribution and then to consequences provides a solid base for future service recovery studies. It also points out the limitations of service recovery research in the medical field.

2.1.2 Research directions and achievements

Due to the widespread occurrence of service failures, researchers have conducted extensive studies on this subject. Most of these studies focus on examining specific situations within particular industries, such as traditional sectors like hotels, restaurants, and airlines (Cheng et al., 2019; K. Kim & Baker, 2020; Kuok Wei & Ariffin, 2022). Recently, research has also increased in emerging areas such as online shopping and intelligent robots (Y. H. Hu et al., 2023; Mathew et al., 2020).

Empirical research indicates that the progression of service failure often influences customer attitudes by gradually escalating the issue. This escalation can lead to a shift in customer perceptions and ultimately increases their likelihood of spreading negative word-of-mouth on social media (Israeli et al., 2017). Different types of service failure—outcome failure and process failure—affect customers' tendency to post negative comments online differently, with outcome failure more likely to trigger negative evaluations (Obeidat et al., 2017). Negative evaluations, in turn, can affect customers' intentions to repurchase (Zeqiri et al., 2023).

Although research on service failure in the healthcare industry dates back to the 1980s, with early studies such as Carmel (1988) investigating patients' reactions to dissatisfaction caused by service failure, a search on Google Scholar reveals a relatively small number of papers discussing service failure in the healthcare industry. One possible reason is that hospitals operate as closed systems, where medical service failures involve high levels of privacy. Both medical staff and patients often hesitate to disclose relevant information, making it difficult for academic research to gather comprehensive cases of medical service failures from hospitals (Chiu et al., 2020). According to existing literature, from the perspective of hospital internal management, the main causes of medical service failures are human factors, with insufficient education and training and poor team communication being the primary reasons for many medical errors (McIntosh et al., 2014; Savič et al., 2007).

From the patient's perspective, combined with patient complaints, common service failure scenarios include service attitude, technical skills, medical expenses, medical environment, medical equipment, and waiting time (J. Wu, 2024). Studies show that the severity of service failure greatly affects patient satisfaction and word-of-mouth, and the perceived controllability of the failure also has some influence. However, the overall impact is not very large (Walton & Hume, 2012). Empirical research across various industries has revealed how service failure influences customer behavior, especially the importance of matching failure types with effective recovery strategies. It is also important to note that although the consequences of service failure in healthcare are serious, theoretical research in this area is relatively limited due to data access issues.

2.1.3 Research on service failure in China

While following the international theoretical framework for research on service failure, studies in China also reflect local system and cultural traits. The concept of service failure first appeared in Chinese literature in 2000, but it was only briefly mentioned without detailed explanation or in-depth research (Walton & Hume, 2012). As service marketing theory developed in China,

Chinese scholars gained a deeper understanding of service failure and reached a consensus with international scholars that service failure happens when a service does not meet customer expectations (Y. Song et al., 2006). Since then, Chinese researchers have conducted extensive studies on service failure, including attribution analysis, empirical research, recovery strategies, and the effects of these factors. They mainly focused on the concept of service failure in industries like hotels, tourism, aviation, and apparel trade. Recently, with rapid technological advancements, research on online service failures and robot service failures has increased. Although service failure is not a new idea for Chinese scholars, research on service failure in China's medical industry remains limited. The two most influential studies in this area were conducted by R. Huang (2016) and Chiu et al. (2020).

R. Huang (2016) defined medical service failure as issues that occur within the core service or its system, preventing the service from being completed as expected or causing deviations from prescribed procedures. It can be categorized into eight specific types.

(1) Over-treatment: Medical procedures that go beyond the patient's actual medical needs during treatment, including unnecessary examinations, excessive treatments, over-prescription of medication, and unwarranted surgical procedures.

(2) Failure to achieve expected results: After diagnosis and treatment, the patient's condition does not improve, and the treatment effect is not evident; in more severe cases, the condition worsens, resulting in treatment failure.

(3) Misdiagnosis: When healthcare providers incorrectly diagnose a condition, leading to a medical service failure.

(4) Service insufficiency: Cases where medical institutions do not complete the required diagnostic and treatment procedures for patients.

(5) Service delay: When there are delays or hold-ups in providing medical services, it leads to longer wait times for patients than usual.

(6) Inconsistent information: Incomplete or inaccurate information provided to patients by medical institutions or medical personnel.

(7) Billing issues: Excessive drug prices, high diagnostic fees, and inconsistent billing practices in healthcare.

(8) Non-compliant behavior: Service failure resulting from medical personnel violating or not fully complying with relevant regulations during the provision of medical services.

These eight factors represent the different causes of medical service failure. Based on research into these factors, the following conclusions can be made: Currently, in China, the main types of medical service failures include issues within the medical service system,

inappropriate behavior by medical staff, and patient perception problems. Among these, over-treatment and not achieving expected outcomes are the most significant contributors to medical service failure. Therefore, regulating the conduct of medical personnel and improving their technical skills should be the main focus for enhancing the effective operation of the medical service system.

Chiu et al. (2020) categorized medical service failure into four types: human-oriented errors include external or internal factors that influence the medical team's professional judgment, or lead to poor communication or collaboration, resulting in incorrect decisions. These are categorized into insufficient decision-making support, educational communication errors, and improper guidance. Human-practice-oriented errors involve mistakes in executing techniques or procedures by medical staff due to poor conditions or lack of proficiency. These are divided into poor mental state, technical errors, and lack of self-awareness. Non-human-practice-oriented errors occur in specific clinical environments or situations, often caused by unique factors unrelated to the overall system. They only affect a few cases and are classified into errors caused by patients or caregivers, adverse environmental conditions, and poor medical supplies. Non-human-oriented errors arise from systemic issues affecting medical procedures, such as work systems, information system design, or management system operation. They are divided into imperfect operating procedures, information system defects, and flawed management systems. Their research on QCC data from Taiwan revealed that human errors are the main cause of most medical service failures, especially in human decision-making and overall understanding. Practical improvements targeting non-human errors can significantly reduce human mistakes or actual errors.

Research on service failure in China mainly centers on patient complaints. Patient complaints play a positive role in enhancing hospital management levels, and the strength of patients' willingness to complain depends on the trade-off between the expected costs and benefits of complaining (X. H. Li et al., 2021). Studies on patient complaints primarily focus on the frequency and trends of medical complaints, the key characteristics of complainants and the objects of complaints, the proportion of hospital departments receiving complaints, the outcomes of complaint resolution, and the analysis of complaint points (B. H. Li et al., 2022; Y. J. Zhang et al., 2023). Y. J. Zhang et al. (2023) conducted a quantitative analysis of complaint data collected from the government service hotline in Shandong Province, China, between 2019 and 2021. They reported that a total of 1,724 patients filed complaints during this period, corresponding to a medical complaint incidence rate of 0.02%. Male patients accounted for 60.90% of complainants, compared to 39.10% for female patients, with an average of 1.89

complaints per patient. A relatively high proportion of patients submitted multiple complaints, and the departments most frequently cited were outpatient services, surgery, logistics, and administrative units. In contrast, B. H. Li et al. (2022) adopted a qualitative approach to explore the emotional experiences underlying patient complaints, using NVivo software to analyze narratives from the same regional context. Their study identified recurring themes such as frustration, perceived injustice, and unmet expectations, offering deeper insights into the psychological motivations behind complaint behavior rather than statistical patterns. Current research on service failure in China highlights the unique characteristics of Chinese medical services. However, it mainly focuses on analyzing complaint behavior, with limited exploration of the underlying causes.

Table 2.1 Service failure perspectives compared

Scholar / Year	Research Perspective	Definition of Service Failure	Main Classification Dimensions	Research Contribution
Parasuraman et al. (1985)	Service quality perspective from the enterprise	The service provided by the enterprise fails to meet the minimum level acceptable to customers, resulting in dissatisfaction	Not explicitly classified	Introduced the basic concept of service failure, with implicit consideration of customer expectations
Grönroos (1997)	Customer expectation perspective	Service level fails to meet customer expectations	Classified by degree of match with customer expectations	Clarified the relationship between customer expectations and service failure
Michel (2001)	Service provider perspective	Service fails to meet the standards and requirements set by the enterprise	Classified by the gap from service standards	Emphasized internal quality standards
Van Vaerenbergh et al. (2014)	Enterprise satisfaction goal perspective	The enterprise fails to achieve the goal of making customers satisfied	Classified by whether the goal is achieved or not	Approached service failure research from the perspective of organizational goals
S. Kelley et al. (1993)	Customer perception perspective	—	Process failure vs. outcome failure	Most widely used classification method, distinguishing tangible outcomes from the delivery process

Scholar / Year	Research Perspective	Definition of Service Failure	Main Classification Dimensions	Research Contribution
Bitner (1990)	Service nature perspective	—	Classified by nature of service, customer needs, and employee actions	Provided a more detailed categorization of the causes of service failure
W. T. Zhang & Yan (2016)	Internal vs. external customer perspective	—	Internal service failure vs. external service failure	Incorporated internal services into service failure research
Y. H. Peng & Zhao (2024)	Cause-and-effect perspective	—	Function-dominant vs. ethics-dominant	Explored failure types by integrating functional commitment and moral responsibility

In summary, Chinese scholars have made initial progress in developing localized theories on service failure; however, research in the medical field remains at the stage of describing phenomena. Moving forward, it will be important to integrate the development characteristics of China's medical industry to explore more policy-informed theoretical research models. In Chapter 3, this study will adopt two well-established theoretical classification frameworks—namely, the severity of service failure and the attribution of service failure, which have accumulated abundant research outcomes—to conduct a more specific classification of service failure in the healthcare domain and construct a theoretical research model.

2.2 Service recovery

The growth of the service industry often comes with frequent service failures. As research on service failure deepens, service recovery has become an important area within service management theory. As the main strategy for handling service failures, the effectiveness of service recovery measures directly influences customer relationship repair and the preservation of corporate reputation. As the service economy becomes more complex, research has shifted from passive responses to proactive prevention. In this field, the service recovery paradox, factors affecting service recovery, strategies, and their effectiveness have long been key focus areas for scholars. This section will systematically discuss the development, practical application, and theoretical foundation of service recovery in the context of Chinese medical services.

2.2.1 Concept of service recovery

Grönroos (1988) formally introduced the concept of service recovery. The service recovery (or "customer complaint handling") he referred to involves compensatory actions or responsive measures taken by service providers after a service failure to prevent customer complaints. Therefore, he also calls it customer complaint handling. He defines service recovery as the efforts a company makes to meet or exceed customer expectations when customers are dissatisfied due to defects in the products or services provided. Hart et al. (1990) noted that it is almost impossible for service providers to offer error-free services at all times, which makes research on service recovery essential. They broadened the purpose of service recovery from merely avoiding complaints to meeting customer expectations, linking it to the definition of service failure and thus encompassing the full scope of remedying service failures.

Tax and Brown (1998) provided a more detailed interpretation of the definition of service recovery, highlighting that its goal is to reduce and lessen customer dissatisfaction caused by service failure. They see service recovery as a management process that starts with recognizing service failure, then analyzing the underlying causes of these errors, followed by assessing service failure through quantitative analysis, and finally implementing suitable management actions to resolve these issues. Some scholars have introduced the concept of preventive service recovery, also known as proactive service recovery, which involves proactive measures that companies develop in advance to prevent service quality issues and respond quickly when problems arise (He, 2024).

In summary, the development of the concept of service recovery reflects two major trends in its conceptual definition: one is the shift from singular post-event compensation to complete-cycle management, and the other is the shift from an enterprise-oriented perspective to a customer-perception-oriented perspective. The continuous deepening of the theory has led to the development of differentiated service recovery measures.

2.2.2 Research directions and achievements

Service recovery measures, factors influencing their effectiveness, and the impact of service recovery on customer satisfaction are the primary research areas in the field of service recovery.

(1) Service Recovery Measures

Based on various theoretical perspectives, scholars have developed a multidimensional classification system for recovery measures. According to social exchange theory and equity theory, service recovery can be categorized into: economic compensation (including monetary,

goods, and time-related resources), response speed, apology, proactivity (referring to the initiator of the recovery), and understanding (Bae et al., 2021; Smith et al., 1999; C. Wei et al., 2020). Some scholars have combined apology, proactivity, and understanding into the concept of psychological recovery, thus identifying three types of recovery measures: economic compensation, recovery speed, and psychological compensation (J. F. Peng & Jing, 2006).

Gelbrich and Roschk (2011) Summarized three types of recovery measures that companies use when dealing with complaining customers based on previous literature: The first category is compensation, including economic compensation (cash, discounts, coupons, replacement of defective products, or re-provision of services) and psychological compensation (mainly apologies). The second category is good service staff behavior, which involves employees showing sympathy and comfort to customers, being friendly and attentive, and demonstrating a responsible attitude. The third category includes effective organizational processes, such as timely and efficient responses to customer needs and proper handling of customer complaints.

Roschk and Gelbrich (2014) drew on resource exchange theory to view service recovery as a process of re-providing resources to compensate for customers' previous losses, emphasizing that matching the resources lost by customers in a service failure with those provided in recovery can maximize recovery effectiveness. Specifically, their research classified service recovery measures into four categories based on the specificity and uniqueness of resources: economic compensation for monetary losses, product replacement for defective products, re-provision of services for defective services, and psychological compensation, such as apologies and comfort, for indifferent employee attitudes. They found that immediate recovery and economic recovery can effectively improve customers' evaluations of service recovery with low-intensity negative emotions, while delayed recovery and psychological recovery help customers with high-intensity negative emotions give higher evaluations.

Relevant researchers have found that immediate recovery and economic recovery can effectively improve customer evaluations of service recovery, particularly for those with low-intensity negative emotions. In contrast, delayed recovery and psychological recovery can help customers with high-intensity negative emotions give higher evaluations. K. Kim and Baker (2020) divided employee service recovery into role-based recovery and extra-role recovery based on whether it exceeds the basic job responsibilities. Extra role recovery is not required by the organization. Employees voluntarily dedicate extra time and effort to recovery activities. The idea is similar to customer-focused organizational citizenship behavior and can generate positive reactions from customers when implemented effectively. In summary, the existing classification system has dual features, combining resource compensation

(economic/psychological) with process improvement (response/institutional). The introduction of extra-role recovery has gone beyond traditional organizational boundaries. boundaries and expanded the scope of research on employee proactivity.

Table 2.2 Summary of recovery methods

Division Dimensions	Categorize	Seminal Research
Social Exchange Theory and Equity Theory	Economic Compensation Recovery Speed Apologies Initiative Understanding Follow-up	Bae et al. (2021) C. Wei et al. (2020) Smith et al. (1999)
Specific response measures	Compensation: including financial and psychological compensation. Positive service behaviors: including employees' friendly attitudes toward customers. Effective organizational processes: including timely and efficient responses to and handling of customer complaints.	Gelbrich & Roschk (2011)
Resource Exchange Theory	Economic compensation: corresponding to financial losses. Product replacement: corresponding to defective products. Re-provision of service: corresponding to defective service. Psychological compensation: such as apology and consolation corresponding to indifferent employee attitude	Roschk & Gelbrich (2014)
Company's Employee Role Specifications	In-role remedies: prompt issue resolution and polite customer treatment. Extra-role remedies: remedial actions beyond basic job responsibilities and organizational mandates.	van der Heijden et al. (2013) K. Kim & Baker (2020)

(2) Factors Influencing the Effectiveness of Service Recovery

Among the factors affecting the effectiveness of service recovery, customer-perceived fairness (Mathew et al., 2020; Nuansi & Ngamcharoenmongkol, 2021; Z. X. Wang & Lu, 2018) and customer attribution of service failure (R. Cai & Qu, 2017; Lee & Cranage, 2018; Swanson & Hsu, 2011) have been extensively studied. Additionally, the severity of the service failure, the type of failure (Mattila, 2001; Mattila et al., 2009; Obeidat et al., 2017), employees' enthusiasm and ability to serve (Y. Huang et al., 2020), and customer involvement in the service recovery process (Dong et al., 2015; N. P. Jin et al., 2015)are also key factors discussed in service recovery research. W. Song and Ji (2013) conducted an empirical analysis and in-depth study using data from 46 companies in the service industry, identifying seven key factors that influence service recovery. These include the formality of service industry regulations, the

degree of decentralization of frontline employees, customer participation, the feasibility of recovery measures, the timeliness of service recovery, the level of employee training, and the extent of recovery resource investment.

Regarding the operating mechanism of service recovery, Boshoff (1997) believed that service recovery should prioritize the product first, then the means, followed by the sequence and time dimensions. This perspective broadened the research scope to include the operating strategies of service recovery measures, moving beyond limiting the measurement to a single dimension of recovery. Later, he conducted an empirical study in 1999 to validate the service recovery satisfaction scale and introduced a measurable method for its assessment. In his research, he also identified 13 indicators for evaluating customer satisfaction after service recovery, including time, compensation, apology, fair repair, empathy, taking responsibility, keeping promises, feedback, empowerment, accessibility, tangibles, employee attitude, and explanation (Boshoff, 1999).

In research on service recovery timing, most studies conclude that "the faster the service recovery, the better the outcome," and that increasing the speed of service recovery positively impacts customer satisfaction (Boshoff, 1999). However, not all studies fully support this conclusion (Fan & Niu, 2016). K. S. Min et al. (2020) found that when the timing of an apology matches customers' expectations for future interactions, customer satisfaction increases. They highlighted the importance of matching recovery speed with customer-expected timing, rather than assuming that faster is always better. They introduced the idea of "relative delayed recovery," which differs from the traditional view of always providing "immediate recovery." They argued that the success of service recovery depends not only on the timing but also varies based on personality traits. For example, during service failure, men tend to prefer timely recovery, while women are more satisfied with delayed recovery. Customers with proactive personalities tend to favor delayed recovery, whereas those passive personalities prefer timely recovery.

(3) The Impact of Service Recovery on Customers

The positive effect of service recovery on customer satisfaction and loyalty has been confirmed across various industries. In the hotel industry, Cheng et al. (2019) focused on the Malaysian hotel industry and used justice theory as the theoretical foundation, revealing how service recovery impacts customer satisfaction and loyalty. The study found that the three dimensions of service recovery—distributive justice (the fairness of compensation), procedural justice (the efficiency of complaint handling), and interactional justice (the communication attitude)—all have a significant positive effect on customer satisfaction, which in turn

influences loyalty. It also confirmed that fair service recovery measures can help rebuild customer trust and strengthen customer relationships.

In the online shopping field, Jung and Seock (2017) employed a scenario-based experimental method to examine how three types of recovery measures—apology, compensation, and combined recovery—affect customer-perceived justice, satisfaction, and word-of-mouth. They discovered that the unique value of an apology is evident in a single apology or an "apology + compensation" approach, which can significantly improve customers' perceptions of distributive and interactional justice, with no notable difference from a combined recovery approach. This indicates that in online settings, emotional recovery, such as an apology, might partially replace material compensation. The study also highlighted the independence of procedural justice, which remained unchanged across different recovery types, but had the strongest influence on customer satisfaction. This underscores the importance of process transparency and response speed in online shopping environments. At the same time, the study's analysis of the recovery effect transmission path - that is, perceived justice promotes positive word-of-mouth through satisfaction - further verified the classic theory of Tax and Brown (1998) "perceived fairness - emotional repair - behavioral transformation". The study found that, in online shopping, customers are more sensitive to interactional fairness because of low switching costs and high transparency of information. This emphasizes the unique nature of service recovery efforts in different contexts.

In the banking industry, service recovery greatly enhances customer satisfaction, which in turn significantly boosts customer trust, word-of-mouth, and repurchase intentions (Mathew et al., 2020; Nadiri, 2016). By surveying customers who had experienced electronic service failure, Mathew et al. (2020) found that the quality of service recovery is crucial to customer satisfaction. The study revealed that four factors of perceived service recovery quality - perceived information quality (such as the accuracy, relevance, and credibility of information), digital commitment (such as customers' familiarity with and loyalty to digital services), employee performance (such as the professionalism and empathy of service personnel), and organizational service orientation (such as the company's responsiveness to customer needs) - significantly influence customer satisfaction with electronic service recovery. Among these, perceived information quality is the most critical factor, emphasizing the importance of transparent and timely information communication during service recovery to reduce customer dissatisfaction.

Nadiri (2016) further examined how justice theory applies to service recovery in the Dubai banking industry. By surveying retail bank customers who experienced service failures, the

study found that all three justice dimensions—distributive, procedural, and interactional—positively influence service recovery satisfaction. Among these, interactional justice (such as employees' politeness, empathy, and communication quality) has the greatest impact. The study also revealed that satisfaction with service recovery has a positive effect on customer trust, which in turn boosts customers' repurchase intentions and word-of-mouth. Additionally, trust is not only a direct outcome of service recovery but also a mediator that links recovery satisfaction to long-term customer relationships. In the medical field, Nguyen et al. (2021) noted that service recovery greatly influences customer satisfaction, and the seriousness of the service failure impacts how satisfied customers are with the recovery process.

At the same time, service recovery satisfaction also affects patients' trust in hospitals. In the aviation industry, Etemad-Sajadi and Bohrer (2019) found that the quality-of-service recovery, such as the fairness of compensation, and process quality, such as processing speed and employee empathy, have different effects on customer behavior. Output quality has the largest direct effect on satisfaction, significantly surpassing the impact of process quality. Both output and process quality of service recovery directly influence customer loyalty and indirectly impact customer satisfaction. The study results indicate that in the aviation industry, substantial compensation is more effective than process improvements in reducing customer dissatisfaction during service recovery.

Following the introduction of the concept of service recovery, scholars identified the "Service Recovery Paradox" phenomenon in subsequent research, which describes the situation where customer satisfaction after service recovery surpasses the satisfaction level achieved during error-free service (Edström et al., 2022). The service recovery paradox was initially proposed by McCollough et al. (2000). Many scholars have studied whether the service recovery paradox exists, but they have reached different conclusions, with only some studies supporting its existence. de Matos et al. (2007) believed that the service recovery paradox exists in terms of customer satisfaction, but not in the areas of repurchase intention, word-of-mouth, and corporate image. Michel and Meuter (2008) used 11,000 interview data from the banking industry to verify the service recovery paradox. The survey results showed that the service recovery paradox does exist, but it is a rare event. Its occurrence depends on the nature of the service failure, the qualities of the service recovery, and the shared perceptions between boundary spanners.

2.2.3 Research on service recovery in China

The concept of service recovery was first introduced to the Chinese academic community by Qiu and Mou (1998) in their Chinese-language publication. Since then, service recovery has been widely studied and applied in China. The essence of service recovery is an immediate response to service failure, which restores patient satisfaction and loyalty through swift on-site actions. This paper also introduces the dual nature of service recovery: on one hand, its inevitability—due to the variability and inseparability of services—makes it impossible to prevent errors entirely; on the other hand, its strategy-oriented nature requires systematic improvements through mechanisms such as actively tracking errors, empowering front-line employees, and closed-loop experiential learning. Additionally, this study clarifies the "golden time" principle of service recovery, which stresses the importance of immediacy and speed. It emphasizes that recovery actions are not only crucial for risk management but also serve as a key opportunity to strengthen customer brand loyalty.

In the medical field, the earliest research by Chinese scholars can be found in X. P. Jia (2003) on hospital service contact management. She pointed out that about 75% of communication conflicts are caused by non-technical service failures. The main causes of doctor-patient communication problems are two core contradictions: patients' unreasonable expectations and sudden service failures. The service recovery strategies focus on three key aspects: first, emotional repair, with a focus on apologies; second, professional communication, which combines verbal comfort with body language; and third, a quick response to restore patient trust.

Research directions in medical service recovery include applying recovery strategies in clinical departments and examining how recovery affects patient satisfaction. Most studies focus on exploring recovery strategies within individual clinical units. Ren (2019) studied service recovery strategies in emergency nursing and found that by implementing preventive service recovery, enhancing patient observation management, establishing a three-tier service recovery system, taking the initiative to respond, and improving nurses' professional skills, the quality of nursing care and patient satisfaction can be improved. The study discussed service recovery strategies within the context of hemodialysis work. It proposed relevant countermeasures and service recovery steps to address common service failure factors in hemodialysis, such as limitations of medical technology, unsatisfactory hospital service quality, patient-related issues, and objective factors like operational issues.

Hospitals aim to improve medical staff's awareness of operational errors to quickly identify and correct mistakes, which helps reduce patients' negative feelings and build trust with patients and their families. Additionally, when serious outcomes occur that are not due to staff mistakes, hospitals should establish a fair and sufficient post-event service recovery system. This approach should focus on enhancing medical care and offering psychological support rather than providing financial compensation. In the context of high-volume, dispute-prone outpatient services, research on service recovery in nursing has gained increasing attention. Improving patient experience through effective management has become a major focus. In his empirical study, B. Jia (2018) compared two groups of outpatients under routine management and nursing service recovery management and found that the recovery group showed significantly higher nursing satisfaction, better nursing quality scores, and lower rates of nursing complaints and disputes compared to the control group. The study implemented a comprehensive service recovery strategy, which included enhancing the recovery awareness and skills of nursing staff, establishing an on-site rapid response system, providing psychological counseling and appropriate compensation, creating feedback channels and nursing monitoring systems, and further optimizing the service recovery process. The study also highlighted that the outpatient department serves as the hospital's first impression.

Service recovery not only effectively alleviates patient dissatisfaction and prevents the escalation of negative emotions but also significantly enhances the overall quality of nursing care and patient satisfaction in hospitals, builds patient trust, and reduces patient loss and complaints. Y. F. Pan (2016) found that providing nursing service recovery through postoperative visits can effectively correct operating room nursing service errors and improve patient satisfaction with nursing services.

From the perspective of hospital operations management, research has mainly focused on developing service recovery systems and specific recovery measures. However, few studies examine how the established service recovery system influences patient behavioral intentions. Su et al. (2016) systematically reviewed the relevant literature and summarized the multiple causes of medical service errors. They proposed comprehensive service recovery strategies that cover the entire process, from before to after the visit, providing a structured approach to improve China's medical service recovery system. The study emphasized that service failures are not solely due to hospital management, insufficient professional skills of medical staff, and patient expectation gaps, but are also closely related to social structural factors, including information asymmetry and institutional shortcomings. Regarding specific recovery measures, hospitals should implement systematic interventions in three main stages. Before the visit,

hospitals should enhance information disclosure, optimize processes, and improve the appointment registration system. During the visit, hospitals should improve service details, such as clear signage, guidance services, empathetic communication, and doctor-patient interaction. After diagnosis and treatment, hospitals should establish smooth complaint mechanisms, provide timely feedback, and follow-up procedures to enhance patients' perception of humanism in the hospital and maintain the relationship. Additionally, the study also highlighted the need for medical staff to improve service awareness, strengthen legal and humanistic training, and standardize recording processes to establish a responsive and traceable recovery system.

There have also been relevant studies focusing on service recovery in China's public hospitals (J. D. Feng, 2017). K. Feng (2012) systematically explored the construction of the service recovery system. The study highlighted that China's public hospitals often face challenges with uneven resource distribution and inconsistent standardization of service recovery processes. It is important to address these issues through institutional design, such as clarifying responsibility shares and improving feedback channels, to enable quick responses and resource coordination during recovery and boost recovery efficiency. The study also stressed the practicality of service recovery at the operational level by proposing a "early warning trigger mechanism" to monitor potential errors in real-time. It recommended using digital tools to reduce response times. Additionally, it promoted the idea of "100% closed-loop feedback", which means tracking all recovery actions until the problem is fully resolved. The study offers a comprehensive approach for service recovery in China's public hospitals, moving from theory to practice and enriching localized research efforts.

Additionally, some studies have explored how service recovery efforts influence patient behavioral intentions in healthcare environments. For example, J. W. Li et al. (2009) employed empirical analysis to investigate the correlation between the severity of service failure, the attribution of service failure, and patient satisfaction. Service recovery should address not only distributive justice but also procedural and interactional justice. Patient satisfaction influences their loyalty behaviors through trust and emotional commitment. A detailed review of this part of the research will be provided in the following text.

At present, most research on service recovery measures in the healthcare field has focused on highly specific concrete measures, while there is a lack of systematic analysis of general measures commonly addressed in service recovery research and insufficient comprehensive evaluation of service recovery effectiveness. In Chapter 3, this study will incorporate three of the most common general recovery strategies—apology and explanation, rapid response, and

compensation—into the research model for discussion, and assess the implementation effectiveness of service recovery from a multidimensional perspective.

2.3 Customer behavioral intentions

In service recovery research, understanding customers' behavioral intentions is essential for explaining how individuals turn their thoughts, evaluations, and emotions into future actions toward service providers. Behavioral intention acts as a key predictor of customers' subsequent actions, which include positive behaviors like repeat business, positive word-of-mouth, and long-term loyalty, as well as negative behaviors such as switching providers and increasing complaints. This concept is especially important in the context of service failure and recovery: customers' future decisions are influenced not only by the outcome of the recovery but also, more importantly, by the overall experience during the recovery process and their perception of fairness. To better understand this idea systematically, it is first necessary to clarify the theoretical foundation of customers' behavioral intentions and their core components.

2.3.1 Concept of customer behavioral intentions

The idea of behavioral intention comes from the theory of attitudes (Engel et al., 1995). Attitude mainly consists of three parts: cognitive, affective, and conative. The cognitive part involves a person's knowledge and beliefs about the attitude object, while the affective part shows how the person feels about the attitude object. The conative part is about the person's intention to act or behave toward the attitude object (L. Yan et al., 2021). The theory of reasoned action states that actual human behavior is determined by behavioral intention, which is also influenced by subjective norms and attitudes toward the behavior (S. N. Zhang et al., 2021). Service recovery acts as an intervention mechanism that impacts customer attitudes and subjective norms, thereby indirectly shaping customer behavioral intentions. Effective service recovery strategies can improve customer satisfaction and repurchase intentions, ultimately influencing customer behavioral intentions (Etemad-Sajadi & Bohrer, 2019; Mathew et al., 2020; L. Yan et al., 2021).

Research on customer behavioral intentions in service recovery focuses on three areas: customer satisfaction, word-of-mouth, and repurchase intentions (loyalty).

Customer satisfaction is usually defined as the emotional response that occurs when customers compare their expectations of a product or service with what they actually perceive, expressing happiness or unhappiness (Kotler & Keller). Spreng et al. (1996) noted that when

customers' perceptions of service match their expectations, satisfaction occurs; when perceptions surpass expectations, high satisfaction may be triggered; and when perceptions fall significantly below expectations, dissatisfaction usually results. Satisfaction can be assessed through dimensions such as feelings of joy and overall contentment (Hapsari et al., 2017; D. Jin et al., 2020; Kusumawati & Rahayu, 2020). In the context of service failure, service recovery becomes a crucial factor impacting customer satisfaction. Service Recovery Satisfaction (SRS) refers to the overall evaluation of the responses and solutions provided by the company during the recovery process (Azzahro et al., 2020). It is also regarded as a cognitive assessment of the entire recovery process and its outcomes by customers (Culiberg et al., 2023). Service recovery improves customer satisfaction through positive recovery efforts, thereby affecting customer behavioral intentions (L. Yan et al., 2021; Mathew et al., 2020).

Word-of-mouth (WOM) has long been recognized as one of the most important factors affecting customers' purchasing choices (Abdul Latif et al., 2019). Word-of-mouth influences our behavior by increasing awareness and either modifying or confirming our existing views. Positive word-of-mouth not only boosts consumers' interest in a brand (Kumar et al., 2016) but also encourages repeat purchases (Iyengar et al., 2015). The power of word-of-mouth lies in shaping market potential through both the creators and recipients of WOM, as well as through multiple channels that can convey both positive and negative information. Factors that drive customer word-of-mouth include customer satisfaction, positive or negative emotions, emotional commitment, calculative commitment, and the connection between self and brand. These factors are influenced by background variables such as gender, age, income, and country (Keiningham et al., 2018). Satisfied customers tend to generate positive word-of-mouth and are more likely to stay loyal (Matzler et al., 2019).

Customer loyalty is defined as a firm's intention and behavioral commitment of customers to continue making repeat purchases or choosing a particular service provider in the future. Customer loyalty can be measured by indicators such as experience quality, perceived value, and customer satisfaction (Cheng et al., 2019). Loyalty consists of two dimensions: behavioral loyalty, which is the actual behavior of customers in continuously purchasing a particular brand or service, and attitudinal loyalty, which is the intention of customers to recommend the brand to others (Liat et al., 2014; Yee & Mansori, 2016). Some studies have proposed the concept of the "loyalty wheel," emphasizing strategies to maintain customer loyalty through building trust, reducing customer churn, understanding the reasons for churn, and systematically preventing negative experiences (Laili et al., 2022). When service failure occurs, customers' current loyalty and the severity of the failure often influence how companies choose and implement service

recovery strategies. If recovery measures effectively meet customer expectations, they can increase loyalty. Conversely, poor handling may lead to customer churn and even brand alienation (Hussein et al., 2018; Roy, 2018). Therefore, service recovery is not only vital for repairing customer relationships but also essential for maintaining and strengthening customer loyalty.

In the healthcare sector, customer behavioral intention is the same as patient behavioral intention, which refers to patients' tendency to continue choosing a specific hospital and to recommend it after receiving medical treatment. This is especially shown in their willingness to revisit, their intention to actively recommend, and their tendency to spread word of mouth. It is an important indicator for predicting the stability of the doctor-patient relationship. For medical organizations, patient behavioral intention not only helps retain existing patients but also attracts new ones through positive word-of-mouth effects. This not only builds a positive reputation for medical institutions but also leads to benefits both economically and socially (W. J. Zhou et al., 2018).

2.3.2 Research directions and achievements

Among satisfaction, word-of-mouth, and loyalty, the literature on customer satisfaction and word-of-mouth is the most extensive, while the literature on loyalty is comparatively limited.

Research on customer satisfaction mainly concentrates on pinpointing the factors that influence satisfaction. Tax and Brown (1998) argued that the trustworthiness and reliability of corporate behavior influence customers' evaluation of service quality and satisfaction, thereby strengthening customer relationships and fostering commitment. Service quality and brand image also positively impact customer satisfaction. Additionally, there is often a positive correlation between customer satisfaction and customer loyalty (Dam & Dam, 2021). Factors influencing customer satisfaction vary slightly across industries due to their distinct characteristics and operational environments. For example, in the catering industry, price and the variety of dishes significantly affect customer satisfaction (H. Choi et al., 2021). In online banking services, the usability of electronic services, web design, and privacy protection greatly influence customer satisfaction (Al-Hawary & Al-Smeran, 2017). In online shopping, factors such as the convenience of e-commerce services, transparency of product information, variety of options, and competitive prices all play important roles in shaping customer satisfaction (Olasanmi, 2019). In the case of service failure, Matikiti and Mpinganjira et al. (2019) found in their study on South Africa's aviation industry that after a service failure, customers would develop a set of expectations about how the organization should compensate them. These

expectations, whether they are met or not, would influence their recovery satisfaction positively or negatively.

According to equity theory, customers' perceived fairness in service recovery can greatly influence their satisfaction with the process (Azzahro et al., 2020; Ozkan-Tektas & Basgoze, 2017). In healthcare, customers are called patients. While there is extensive research on patient satisfaction, there are comparatively fewer studies on patient service recovery satisfaction (SRS). Swain and Kar (2018) identified six main aspects of patients' perceived hospital service quality, namely technical quality, procedural quality, infrastructural quality, interactive quality, personnel quality, and social support quality. Based on this conceptual framework, they proposed a direct link between service quality, patient satisfaction, and behavioral intention. Fatima et al. (2018) conducted an empirical study on private hospitals in Pakistan to explore the mechanism by which medical service quality affects patient satisfaction and loyalty. This study identified service quality dimensions, including physical environment, customer-friendly environment, communication, privacy and security, and responsiveness, and confirmed that these factors significantly improve patient satisfaction. Gupta et al. (2022) found in their research on public and private hospitals that patient satisfaction with service recovery is positively correlated with distributive fairness, regardless of whether the hospitals are government or private.

Research on word-of-mouth (WOM) has mainly examined the factors that influence customer WOM and how WOM affects their purchasing decisions. The elements impacting WOM are diverse. Product quality, price, customer satisfaction, and perceived value all play roles in WOM. Corporate social responsibility can also shape brand image and customer WOM by mediating customer trust in the brand (Khan & Fatma, 2023). With advances in Internet technology, online WOM has become a key information source for customers in many industries, influencing their travel decisions (Litvin et al., 2017; Maru & Sai Vijay, 2024). Social media is crucial in creating credible WOM, which influences brand image and customer purchase intentions (Romadhoni et al., 2023; Siddiqui et al., 2021).

Loyalty is directly linked to customer purchase behavior (Dick & Basu, 1994; M. Y. Wang & Su, 2023), and academic research has mainly concentrated on improving customer loyalty. A significant body of literature indicates that product quality, service quality, and brand image all positively influence loyalty (Naini et al., 2022; Dam & Dam, 2021). Some studies also suggest that corporate social responsibility and the fairness of pricing can affect customer loyalty (Islam et al., 2021). Additional research shows that customers develop service satisfaction based on perceived interactional fairness, outcome fairness, and procedural fairness in the services

provided by companies, which in turn impacts loyalty (Islam et al., 2021). W. Zhou et al. (2017) and Olesen and Bathula (2022) found that multiple factors, including service quality, satisfaction, value, trust, commitment, and brand image, influence patient loyalty. Improving service quality can lead to increased customer satisfaction and a higher perceived value. Greater satisfaction, in turn, further influences trust and commitment, indirectly boosting loyalty. However, whether quality and value have a direct impact on loyalty remains a matter of controversy. Some studies support their positive effect, while others argue that satisfaction or trust serves as a mediator. Furthermore, when service failure occurs, effective service recovery is a crucial factor impacting customer satisfaction and loyalty (Adzhigalieva et al., 2022; Phan et al., 2021).

2.3.3 Research on customer behavioral intention in China

In recent years, research on customer behavioral intention in the context of medical services in China has become more in-depth, especially regarding how service quality, satisfaction, and trust influence patient behavioral intentions. W. J. Zhou et al. (2018) found that the dimensions of perceived service quality—including trust, effectiveness, humanization, and cost-effectiveness—all influence patient behavioral intention. Trust and effectiveness impact behavioral intention through the mediating roles of patient satisfaction and trust. Patients are more inclined to continue visiting the hospital when they feel their rights are respected and the medical outcomes are clear. The humanization of service affects behavioral intention by boosting customer satisfaction. Although cost-effectiveness does not significantly improve satisfaction or trust, it directly influences patient loyalty, suggesting that reasonable fees can reduce patient churn. The study also emphasizes that satisfaction can directly or indirectly affect patient behavioral intention through trust. Only when a trust relationship is established based on satisfaction are patients more likely to keep choosing the medical service provider. Zeng et al. (2018) conducted an empirical analysis of how perceived medical service quality affects patient satisfaction and behavioral intention, emphasizing that service quality is a key factor in enhancing patient satisfaction and loyalty. Perceived medical service quality not only directly and positively affects satisfaction and behavioral intention but also indirectly influences behavioral intention through the mediating role of satisfaction. This means that improving service quality can enhance current patient satisfaction and increase their willingness to revisit in the future through higher satisfaction. The reliability, empathy, and responsiveness of service quality significantly boost patient satisfaction, thereby influencing their loyalty and likelihood to recommend. Patients' perceptions of the medical environment, trust in doctors' skills, and

transparency of hospital information all significantly impact their subsequent willingness to visit and endorse the hospital. The hospital's physical conditions and service processes also affect patient loyalty, and high trust in doctors' professional abilities notably encourages patients to revisit and positively spread the hospital's reputation. The study also indicates that patients' gender and type of medical visit can influence their behavioral intentions. For instance, male patients and inpatients are more likely to revisit and recommend the hospital. These findings suggest that, within the context of medical services in China, service quality, trust mechanisms, and patient satisfaction collectively shape patient behavioral intentions, providing an empirical foundation for optimizing medical management strategies.

Currently, research mainly focuses on service quality and satisfaction in understanding customer behavioral intention. In comparison, studies on customer behavioral intention after service recovery are limited and primarily found in non-medical industries, highlighting the need for further research in the medical field.

Research on customer behavioral intentions after service recovery currently mainly focuses on the tourism and online shopping sectors. Studies in the tourism industry have indicated that the alignment between types of service failure and recovery strategies significantly influences customer behavioral intentions. For process-based service failures, addressing psychological recovery first, followed by material compensation, proves more effective in increasing customers' support and engagement with the company. Conversely, for outcome-based service failures, the opposite sequence tends to be more successful. Xu et al. (2022) pointed out that different types of mandatory customer participation have varying effects on online service recovery satisfaction. Cognitive participation is more effective than physical participation in improving customers' perception of co-creation, which boosts recovery satisfaction, while emotional participation shows no significant impact. In the e-commerce industry, if companies fail to implement timely and effective recovery measures to address customers' negative emotions, the resulting negative experiences can spread more quickly, widely, and accurately than in traditional industries.

The quality of information, communication, procedures, and outcomes in service recovery significantly affects customer satisfaction and trust, which in turn shape their attitudinal and behavioral loyalty (Chou, 2018). Furthermore, service recovery is essential for achieving customer "secondary satisfaction" and positive behavioral intentions. Research indicates that in online shopping, customers who encounter process errors expect more psychological recovery, while those facing outcome errors expect more tangible recovery. Tangible recovery results in higher secondary satisfaction and loyalty. Secondary satisfaction, in turn, positively influences

customer loyalty (Jian & Ke, 2017). Additionally, customer satisfaction with service recovery is affected by their attribution style. When customers believe that the problem is within the company's control, recovery satisfaction tends to decrease. Conversely, increased recovery satisfaction significantly boosts customers' trust, commitment, and repurchase intentions, along with positive word-of-mouth (Y. Y. Hu et al., 2016). These findings from non-medical industries provide valuable insights into the relationship between service recovery and customer behavioral intentions, supporting further research in the medical field.

In the medical field, although research on service recovery and patient behavioral intention started relatively late, some empirical findings have emerged. Zhai et al., (2022) analyzed the impact of hospital service recovery on patient satisfaction, combining expectation theory and equity theory, and reached the following conclusions: (1) There is a strong positive correlation between hospital service recovery and perceived fairness; (2) There is a strong positive correlation between perceived fairness and patient satisfaction; (3) Recovery expectations, severity of the error, and type of patient relationship significantly influence patient satisfaction. W. W. Guo et al. (2024) demonstrated that developing a service recovery model can improve patients' overall satisfaction with the hospital. This model quickly identifies service failures, categorizes them based on the type of patient dissatisfaction, and then applies recovery measures (such as psychological recovery or a combination of psychological and material recovery) to ensure quick feedback. Additionally, by enhancing communication, providing professional training for medical staff, and promoting medical knowledge to patients beforehand, the model effectively improves patients' medical experience and results in a higher overall satisfaction. Q. Liu et al. (2020) demonstrated that various service recovery methods, such as quickly identifying service failures, addressing and resolving patients' issues, and fixing service processes, can effectively handle service failures and greatly boost the satisfaction of dissatisfied patients. Z. Yu et al. (2020) highlighted the positive effects of service recovery measures at the outpatient pharmacy on patients' emotions and behavioral intentions. Various service recovery measures shortened patients' wait times to pick up their medication, reduced their dissatisfaction, and boosted their intentions to keep visiting the hospital, recommend it to friends and family, choose it as their main medical facility, and share positive feedback, ultimately leading to higher patient satisfaction.

In outpatient nursing services, implementing a nursing service failure recovery system has been shown to boost patient satisfaction during visits. Empirical studies demonstrate that establishing a recovery early warning mechanism, standardizing the failure recovery process, enhancing quality management systems, applying four-level recovery measures, and

strengthening the recovery awareness and skills of nursing staff can significantly reduce missed diagnoses and errors, improve the efficiency and accuracy of consultations, and lower the rates of nurse-patient disputes. Additionally, these measures help increase the success rate of dispute resolution and improve the quality of outpatient nursing care. These findings suggest that adopting a nursing service failure recovery system not only improves the efficiency and quality of outpatient nursing but also motivates staff, thereby effectively increasing patients' overall satisfaction (G. H. Wu, 2020). Postoperative follow-up, as a vital opportunity to recover and enhance operating room nursing services, has been shown to reduce patients' negative emotions and boost satisfaction. When facing issues in postoperative nursing, follow-up provides an opportunity for nurses to comfort patients and address concerns promptly. Through sincere apologies, clear explanations, and corrective actions, it meets the needs of patients who are vulnerable physically and emotionally after surgery. It offers a space for patients to vent and seek understanding, helping rebuild their trust in nursing services and significantly increasing satisfaction (Z. M. Luo et al., 2015). These studies emphasize the importance of fairness, timeliness, and effective communication in service recovery, which enhance patient satisfaction and trust, providing strong support for developing a patient-centered approach to service recovery mechanism.

Research on hospital management in China has limited literature on patient loyalty and word-of-mouth. There is only one paper addressing patient loyalty after service recovery. In healthcare, although service failures are unavoidable, the speed of service recovery and perceived fairness are crucial factors shaping patient satisfaction and loyalty. A study by J. W. Li et al. (2009) found that patient satisfaction does not directly determine loyalty. Trust and emotional commitment act as mediating variables in the relationship between satisfaction and loyalty. This study emphasizes that procedural fairness and interactional fairness during service recovery have a greater impact on patient satisfaction than outcome fairness. Patients prioritize the attitudes, communication, and handling methods of nursing staff over material compensation alone. The faster the recovery and the more sincere the attitude, the more likely it is to foster patients' trust and emotional attachment, which can effectively lead to loyal behaviors, including the willingness to revisit and recommend hospital services. Furthermore, the study showed that loyalty greatly boosts patients' willingness to revisit and spread positive word-of-mouth. Patients with high loyalty are more likely to recommend the hospital, strengthening its social reputation and market presence. Therefore, creating a service recovery system that focuses on fairness and emotional connection is a practical way for hospitals to enhance customer relationships and foster greater loyalty.

In summary, research on customer behavioral intent in China's medical service sector has made notable progress, especially in areas such as service quality, patient satisfaction, trust mechanisms, and service recovery strategies, leading to extensive empirical evidence. The findings indicate that behavioral intent is often shaped by multiple factors, with trust and perceived fairness being particularly vital during service recovery. Although the link between service recovery and customer behavioral intent in the current medical context remains an emerging research area, existing studies have already outlined important pathways and key variables. Moving forward, it is essential to deepen understanding of how patient satisfaction, loyalty, and positive hospital word-of-mouth are formed, to provide stronger theoretical insights and practical guidance for enhancing medical service quality and improving doctor-patient relationships.

The research model proposed in Chapter 3 will conduct a more comprehensive assessment of the impact of service recovery on patients' subsequent behavioral intentions from three dimensions—satisfaction, loyalty, and word-of-mouth—thus providing reliable support for hospitals to optimize their management practices.

2.4 Social exchange theory

2.4.1 Social exchange theory origin and development

Social exchange theory emerged in the 1960s and dates back to Adam Smith, who noted in his 1776 classic work *The Wealth of Nations* that exchange exists in all nations and societies. People engage in exchanges to gain benefits, which include both material and psychological rewards (Smith, 2011). Modern social exchange theory is grounded in the principles of economic transactions and incorporates certain ideas from utilitarian economics into various social exchange models. Prominent scholars in this field include Homans, Blau, and others.

Homans is considered the founder of social exchange theory. Homans (1958) drew on concepts from behavioral psychology and economics to construct his behavioral exchange theory. Homans believed that the principles of social exchange behavior align with those of economics and are universally fundamental for maintaining interpersonal interactions and social stability. Individuals can logically pursue maximum benefits. Homans' theory primarily consists of six propositions about human social behavior: the success proposition, the stimulus proposition, the value proposition, the deprivation and aggression proposition, and the rationality proposition. He incorporated psychological factors into social exchange, which

revised the purely economic rational actor model and emphasized human subjectivity. However, Homans viewed all behavior as exchange, overemphasizing Skinner's behaviorism and overlooking the key differences between human and animal behavior. He used the principle of equality to explain social exchange phenomena without considering inequality. His support for psychological reductionism diminished the independent status of sociology. His emphasis on methodological individualism meant his research focused on individuals and couldn't fully explain larger social structures mechanisms.

American sociologist Peter M. Blau expanded on Homans' research Blau, P. M (2008). First, he shifted the focus from individual exchanges to the dyadic relationships between exchange partners. Second, he studied exchange activities that do not meet the principle of equity. Blau also identified the elements and key principles of social exchange. He differentiated between micro and macro social structures, arguing that social exchange stems from attraction, with economic motives acting as the conditions for social attraction. Social exchange is similar to economic exchange but is limited by social and cultural norms.

Blau proposed six fundamental propositions of social exchange: the principle of rationality, the principle of reciprocity, the principle of equity, the principle of marginal deterrence, and the principle of inequality. These principles are similar in content to Homans' exchange propositions. Although Blau's theory is based on Homans' exchange theory, he avoided some of the shortcomings of Homans' approach. However, his theory relies on a crucial premise that human behavior is guided by exchange. This process is taken as given and cannot be fully proven or explained. If one is willing to accept this important premise, they will follow Blau's theory; otherwise, they will reject it.

2.4.2 Social exchange theory and service recovery

Social exchange theory has become a widely used framework in marketing because of its strong theoretical foundation applicability. Z. P. Yu et al. (2022) investigated the differential effects of participation density and festive atmosphere on customers' online participation intentions, drawing on social exchange theory. They noted that the underlying mechanisms of how these two factors influence online participation intentions differ. W. F. Huang and Liu (2023) developed an application model for literature note-sharing applications based on Homans' "behavioral exchange theory," and proposed corresponding design strategies to evaluate the extent to which reading apps meet readers' needs on multiple dimensions. Y. H. Hu et al. (2023) examined the role of social relationship networks in consumer participation in social commerce from the perspective of social exchange. The results showed that among various indicators of

social relationship networks, only network centrality directly affects consumers' purchase intentions. The mediating role of transaction value expectations is more significant in how network centrality influences consumers' purchasing decisions intentions.

In contrast, the mediating effect of relationship value expectations is more significant in how network size influences consumers' purchases intentions. Y. Li and Li (2023) utilized survey data from omnichannel consumers in 2019 and, based on social exchange theory, analyzed the impact of omnichannel integration on customer patronage and its mechanisms from the retailer's perspective, employing structural equation modeling. They also explored the moderating role of cross-channel purchase experience.

In research on service recovery strategies after service failure, social exchange theory is frequently used as an analytical framework to examine the factors that influence the effectiveness of service recovery. Lv et al. (2021) explored the unique path of AI empathy recovery based on social exchange theory, uncovering the intrinsic rewards that AI technology brings to customers. By integrating the SOR model with social exchange theory, this study identified trust and perceived innovation as the psychological mechanisms linking the external stimulus of AI empathy responses to the behavioral outcome of continued usage intention. It examined the recovery effect of AI-generated empathy responses and confirmed their positive impact on customer loyalty. L. Choi et al. (2014) conducted an empirical investigation into the antecedents of customer organizational citizenship behaviors (COCBs) in the context of service recovery, grounded in social exchange theory. The study found that when companies demonstrate care and fair treatment, customers are more likely to engage in higher levels of COCBs, voluntarily helping the company resolve service failures. Y. Cai and Li (2015) addressed the lack of research on consumer perceived performance in service recovery, which led to a lack of theoretical guidance for service recovery work in automotive 4S stores. They proposed eight research hypotheses, combining the economic and social losses from service failures with factors that influence service recovery, to analyze the content and factors affecting consumer perceived performance during the service recovery process. The results showed that in the 4S store service recovery process, apologies, recovery initiatives, and recovery speed significantly influence the perceived performance of social resource exchange. Conversely, recovery speed and the level of compensation significantly impact the perceived performance of economic resource exchange. Xu et al. (2022) also applied the principles of social exchange and reciprocity in their study on the impact of service recovery strategy order on customer participation intentions. In process-based service failure scenarios, the recovery strategy order of "psychological recovery first, then material recovery" had a greater impact on customer

intentions to participate in service recovery and perceived corporate support compared to the order of "material recovery first, then psychological recovery." In outcome-based service failure scenarios, the recovery strategy order of "material recovery first, then psychological recovery" had a greater impact on customer intentions to participate in service recovery and perceived corporate support compared to the order of "psychological recovery first, then material recovery."

2.5 Perceived equity theory

2.5.1 Perceived equity theory origin and development

Perceived equity theory developed from the equity theory within social exchange theory and was first introduced by Adams. This theory states that individuals compare the investments they make in social exchanges, such as time, effort, and money, with the returns they receive, including salaries, rewards, and emotional benefits. They also make horizontal comparisons with others to assess whether they are being treated fairly. When individuals perceive unfairness, they may take actions to restore balance, such as reducing their input, expressing dissatisfaction, or seeking compensation (Adams, 1965). Initially, Adams' research focused solely on distributive justice, highlighting the significance of the outcomes without considering the process of resource allocation.

In subsequent theoretical research, Leventhal (1976) introduced the concept of procedural justice, representing the fairness of the allocation process and being as important as distributive justice. He emphasized that in resource allocation, "how it is distributed" is just as critical as "what is distributed." He argued that every organization has a set of procedures and rules to guide resource distribution, and the final outcome is just the last step in the entire process. When organizations allocate resources or mediate conflicts, they should adhere to principles such as consistency, impartiality, error correction, and representation. Initially, perceived equity theory only addressed distributive justice without considering the decision-making process involved. Therefore, in 1976, he first proposed the concept of procedural justice, which pertains to an individual's perception of the fairness of the procedures within the social system that governs the allocation. It mainly focuses on people's cognitive perceptions of events prior to resource distribution and their judgments regarding the fairness of these events. This sense of fairness not only influences how individuals evaluate and accept outcomes but also affects their trust in the organization (Leventhal, 1976).

Bies and Moag (1986) further pointed out that the process itself is not enough to explain people's perception of fairness. Therefore, interactional justice, which represents the relationship between organizational leaders and employees, was separated from procedural fairness. Interactional justice emphasizes whether interpersonal behavior in service or organizational interactions shows elements like respect, honesty, and concern for others. This has created the classic three-dimensional structure in the theory of perceived fairness. According to the 2016 publication "Management Science and Technology Terminology" by the China National Committee for Terminology in Science and Technology, this view was accepted. The theory of perceived fairness is defined as the process by which customers evaluate their inputs and outputs when forming service recovery assessments, including procedural fairness, distributive fairness, and interactional fairness （National Health Commission[NHC], 2019).

Greenberg (1993) further refined interactional justice into two sub-dimensions. The first is interpersonal justice, which refers to whether an individual is treated with respect and dignity by others during interactions. The second is informational justice, which concerns whether an individual receives sufficient, accurate, timely, and reasonable explanations and information. This has led to the development of a four-dimensional structure of perceived fairness, which has been increasingly applied to service recovery (Mccoll-Kennedy & Sparks, 2003) to better explain the mechanisms behind customer acceptance and the evaluation of corporate remedial actions. Specifically, the meanings of each dimension are as follows:

Distributive Fairness: According to research by Mccoll-Kennedy and Sparks, (2003), organizational members assess whether outcomes are fair by comparing the ratio of the rewards (Outcome) they receive to their contributions (Input) with those of other members within the organization. Cook and Deutsch (1986) argue that distributive fairness should emphasize all elements related to individual well-being, such as chances for advancement and promotions, and it serves as a key source of satisfaction for members within an organization.

Procedural Fairness: Leventhal (1976) emphasized that its core is the sense of identification with systems, standards, and procedures. Especially in disputes or errors, whether customers believe that the company's process is transparent, the rules are clear, and the treatment is fair and consistent, is an important criterion for judging the success of remediation.

Interactional Justice: Bies and Moag (1986) proposed that interactional justice refers to the perception of fairness in the attitude of the other party during the problem-solving process. In the service recovery process, customers are more likely to assess the staff's attitude, tone, and politeness. Therefore, a positive service attitude is essential for companies to train frontline employees to compensate for failures.

Interpersonal Justice and Informational Justice: Greenberg (1993) proposed that interpersonal justice refers to the fairness that organizational members perceive in their interactions with their superiors. Informational justice pertains to the fairness perceived in the decision-making process, based on the information and explanations provided by the organization when making decisions. With the growth of digital services and online customer support, the significance of informational justice has become more evident. Customers want to understand more about "why the error occurred," "how to be compensated," and "whether it is sincere." Clear and ample information can effectively reduce uncertainty and improve trust.

2.5.2 Relationship with service recovery

Perceived fairness theory originally emerged from research on organizational behavior and human resources within businesses and was later adopted into marketing by scholars. It has since been extensively used in studies of consumer behavior after service failures. Perceived fairness is widely recognized as a key factor influencing customer satisfaction, trust, loyalty, and behavioral intentions, such as complaining, repurchasing, and word-of-mouth communication, in service recovery research (Tax & Brown, 1998). The success of service recovery efforts depends largely on customers' overall evaluation of a company, and perceived fairness is a crucial measure of recovery effectiveness recovery.

Cook and Deutsch (1986) first applied equity theory to the study of consumer behavior outside organizations. They argued that consumers' complaints not only originate from service failures but also from perceived fairness gaps that occur when consumers compare the services they receive with those of others. If the perceived fairness is low, consumers are more likely to complain. Concerning perceived distributive fairness, if customers believe that the compensation matches their losses, they are more likely to accept the remedial measures. However, when the compensation is inadequate, it is difficult to reduce customer dissatisfaction even if the procedures and interactions are reasonable (Roggeveen et al., 2012). In terms of perceived interactional fairness, Maxham and Netemeyer (2002) noted that, even in situations with limited material compensation, companies can effectively improve customer satisfaction and overall perception of the company through interactive behaviors such as listening, expressing empathy, and apologizing. Blodgett et al. (1997) found that all three dimensions—distributive fairness, procedural fairness, and interactional fairness—have an impact on patients' repurchase intentions and word-of-mouth communication, with interactional fairness having the most significant effect. R. Cai and Qu (2017) through their research on the U.S. restaurant industry, discovered that distributive fairness and procedural fairness have a more

noticeable impact on consumers' indirect reactions (such as repurchase intentions and word-of-mouth communication), while interactional fairness has a more pronounced effect on consumers' direct reactions (such as immediate emotional feedback). In recent years, Chinese scholars have conducted extensive research on the impact of perceived fairness on customer satisfaction, loyalty, and word-of-mouth in the context of online shopping failures (Cui & Chen, 2019). X. Zhang et al. (2016) demonstrated through empirical research that perceived fairness has a positive influence on consumer repurchase intentions, and that perceived usefulness moderates the relationship between procedural fairness and emotional loyalty in a positive manner.

Remedial actions following a service failure can greatly shape consumers' perceptions of fairness. Q. Yao and Song (2018) found that after a service failure, remedial actions such as communication and rapid response have a positive impact on consumer-perceived interactional fairness. Apologies and explanations, however, do not significantly influence perceived fairness. Quick response and communication positively affect consumers' perception of procedural fairness, while compensation and quick response positively influence perceived distributive fairness. Interactional fairness and distributive fairness both have a positive impact on consumer remediation satisfaction, whereas procedural fairness does not significantly affect consumer perceptions satisfaction. Jung and Seock (2017) emonstrated that in the context of online shopping, different types of service recovery influence consumers' perceptions of distributive and interactional fairness but do not affect their view of procedural fairness. Among various service recovery options, consumers prefer apologies the most.

Many scholars have used perceived fairness as a mediating variable to examine the effectiveness of service recovery actions. Mathew et al. (2020) studied electronic service failures in the banking industry and found that perceived fairness moderates customer satisfaction with service recovery. Nuansi and Ngamcharoenmongkol (2021) used perceived fairness as a mediating variable to analyze the impact of proactive corporate management on customer satisfaction in the context of customer complaints. Z. X. Wang and Lu (2018) discovered a significant positive relationship between service recovery and perceived fairness, as well as between perceived fairness and customer satisfaction. Perceived fairness fully mediates the relationship between service recovery and customer satisfaction. Ali et al. (2023) explicitly proposed "Perceived Recovery Justice" (PRJ) as one of the important factors influencing customer remediation satisfaction and repurchase intentions. They empirically confirmed its positive effect on remediation satisfaction. The study also further validated that remediation satisfaction mediates the relationship between perceived recovery justice and

customer repurchase intentions, demonstrating how perceived fairness boosts customer loyalty by increasing customer satisfaction in service recovery situations.

In the healthcare industry, perceived fairness has been extensively used in patient satisfaction research and is a crucial factor affecting patient satisfaction. W. C. Li and Li (2007) argued that although patients come to seek treatment for their illnesses, curing diseases is not the entirety of medical service work. The perceived fairness during the medical treatment process also significantly influences patient satisfaction. Based on the 2019 China Social Survey data and using perceived fairness as a mediating variable for empirical analysis, a study on how medical security levels affect public satisfaction with livelihood found that the perception of social fairness mediates the relationship between medical security levels and public satisfaction. In cases of service failure, service recovery has a notable positive effect on perceived fairness, which subsequently impacts patient satisfaction. Zhai et al. (2022) argued that although patients come to seek treatment for their illnesses, curing diseases is not the entirety of medical service work. The concept of perceived fairness has evolved from distributive fairness (Adams, 1965) to a four-dimensional framework encompassing distributive, procedural, interpersonal, and informational fairness (Greenberg, 1993). In service recovery, this framework influences customer satisfaction, trust, loyalty, and behavioral intentions in various ways degrees.

2.6 Attribution theory

2.6.1 Attribution theory origin and development

Social psychologist Fritz Heider (1958) first introduced attribution theory in his book *The Psychology of Interpersonal Relations*. Heider (1958) argued that, to achieve a consistent understanding of the environment and control it, people must attribute the behavior of others and use these attributions to predict their actions. Event attributions are divided into two main types: internal causes and external causes. Internal causes include emotions, attitudes, personality, and abilities, while external causes involve external pressures, weather conditions, and situational factors. He pointed out that during attribution, people often rely on two principles: First is the Principle of Covariation, which means that if a specific cause is consistently linked to a particular outcome across many different situations, and the outcome does not occur when the cause is absent, then the outcome can be attributed to that cause. The second is the Principle of Exclusion, which states that if one aspect of internal or external causes

is enough to explain the event, the other aspect can be excluded as a contributing factor. Since Heider introduced attribution theory, it has not only been widely applied in psychology but has also gradually expanded into research areas such as management, economics, and sociology.

H. H. Kelley (1967) expanded and developed attribution theory by introducing the three-dimensional model of attribution. He proposed that events can be attributed along three dimensions: the actor, the stimulus, and the environmental context. Each dimension of attribution follows the principle of covariation, which includes consistency, consensus, and distinctiveness. Consistency refers to the same individual's consistent response to the same stimulus across different times and situations. Consensus refers to the similar responses of different people to the same stimulus. Distinctiveness refers to the different reactions of an observed individual to the same type of stimulus. In subsequent research, H. H. Kelley further refined attribution theory by introducing the principles of discounting, augmentation, and compensation.

Since Heider and H. H. Kelley, other scholars have significantly expanded attribution theory and promoted its use in various fields. For example, Seligman (1975) introduced the concept of "learned helplessness" based on a series of animal experiments, emphasizing that long-term attribution to uncontrollable external causes leads individuals to give up effort. On this basis, Abramson et al. (1978) applied the learned helplessness theory to human behavior research, incorporating the concepts and principles of attribution to provide a new perspective on individuals' psychological reactions to failure and enrich the application of attribution theory. Bandura (1977) first introduced the concept of self-efficacy theory, arguing that individuals' sense of self-efficacy plays a decisive role in their behavioral motivation in achievement situations. Cognitive psychologists later conducted further research and development, eventually forming the attribution theory of self-efficacy. Later, Weiner (1985) combined attribution theory with motivation theory, elaborating on attribution theory in detail through three dimensions and six factors. The three dimensions include internal and external attribution, stable and unstable attribution, and controllable and uncontrollable attribution. The six factors are ability, effort, task difficulty, luck, physical condition, and external environment. Weiner's attribution theory primarily presents three main points: personality differences and success or failure experiences influence a person's attribution; people's attributions to past achievements affect their expectations, emotions, and effort levels for future achievements; and individuals' expectations, emotions, and effort significantly impact their achievement behavior.

2.6.2 Relationship with service failure and service recovery

Before attribution theory, research concentrated on self-attribution related to success and failure, as well as personal motivation. Over time, theoretical research gradually evolved and expanded into the fields of interpersonal attribution and social motivation, specifically attribution to others, along with interdisciplinary cross-field research trends. Carson (2019) explained people's attribution of work outcomes and interpersonal relationships at work by distinguishing between external relationship attribution and external non-relationship attribution. Ginder et al. (2019) applied attribution theory to corporate social responsibility (CSR) research, noting that consumers' attributions of CSR events influence their evaluation of and support for the brand image.

Many scholars have examined the issue of assigning responsibility in service failures from the consumer's perspective. Coombs (2007) argued that attribution of responsibility is the first step for consumers to control a crisis, and factors such as corporate brand reputation and consumer perceived self-efficacy can influence customers' attribution of service failures. Laufer et al. (2009) showed that consumers' initial perceptions of a brand image would moderate their attribution styles when facing a service crisis; the better the brand image, the more likely consumers are to attribute the failure to external causes, thereby reducing adverse emotional reactions. C. Chen (2018) found that customers with high self-efficacy tended to blame the company for service failures more frequently as their service participation increased. In contrast, customers with low self-efficacy were less likely to attribute service failures to the company under high-participation conditions than under low-participation conditions, showing that attribution is influenced not only by external events but also by the individual characteristics.

Different consumer attributions of service failure can influence their expectations for service recovery and their satisfaction with the service. Weiner (2000) pointed out that when customers attribute failure to controllable, internal factors of the service provider (such as employee mistakes), they are more likely to experience emotions like anger and disappointment. Anger, in turn, increases customers' sensitivity to insufficient remedies (Romani et al., 2012). Matikiti and Roberts-Lombard et al. (2019) conducted an empirical analysis in the aviation industry and found that the attribution dimensions of service failure, as perceived by customers, will affect their subsequent satisfaction with service recovery. Iglesias (2009) analyzed the impact of service failure attribution on consumer satisfaction. The empirical results showed that attributing failure to the service provider causes a consistent decrease in customers' perceived quality of all services, even those unrelated to the failure, which in turn impacts customer

satisfaction. Simultaneously, attribution also has a direct effect on satisfaction, beyond just influencing perception. Both attitude-based and attribute-based processes are influenced by attribution. Research on shared services has found that the severity of service failure affects the link between customer attribution of the failure and their willingness to forgive the company, highlighting the important role of attribution in emotional regulation mechanisms. Chang et al. (2015) showed that corporate response strategies and the severity of service failure influence customer attribution, which in turn is negatively correlated with organizational reputation and positively correlated with negative word-of-mouth.

At the same time, different cultural backgrounds also significantly influence people's attribution styles, thereby shaping their perception of and satisfaction with service failures. Mattila and Patterson (2004) noted that the differing sensitivity of East Asian and American consumers to situational constraints influences their attribution of service errors. The causal explanation of service errors reduces the likelihood of American consumers falling into the fundamental attribution error; however, for East Asian consumers, the impact of the explanation on the attribution process is minimal. Tam et al. (2016) noted that the differing sensitivity of East Asian and American consumers to situational constraints influences their attribution of service errors. The causal explanation of service errors decreases the likelihood of American consumers making the fundamental attribution error; however, for East Asian consumers, the effect of the explanation on the attribution process is minimal.

Compared to other service industries, attribution research in the healthcare sector remains in its early stages, with relatively few existing research conclusions (Walton & Hume, 2012). Compared to other service industries, attribution research in the healthcare sector remains in its early stages, with relatively few existing research conclusions. Y. W. Wang (2018) proposed an attribution model for medical disputes based on practices in China's healthcare sector. This model classifies patients' disruptive behaviors into three domains: psychological (internal driving mechanisms), institutional (external driving mechanisms), and resource-based (reactive mechanisms), revealing multiple attribution pathways in doctor-patient interactions conflicts. M. M. Liu et al. (2021) applied attribution theory to explore how to build effective trust and communication mechanisms in shared decision-making between doctors and patients, emphasizing that establishing effective attribution coordination mechanisms can help resolve conflicts and promote service recovery.

As a vital theoretical framework for understanding reactions to service failures, attribution theory remains underused in healthcare service recovery research. Current studies mainly focus on macro-level aspects, such as patient satisfaction and service quality assessment, but lack a

systematic examination of the attribution mechanisms behind patient complaints. Given the unique features of healthcare services—high risk, strong dependency, information asymmetry, and emotional stress—the psychological processes involved in patients' attribution need more attention. This paper introduces attribution theory into the context of healthcare service failures, aiming to clarify the links between different attribution styles and remedial strategies, thereby providing theoretical support for improving complaint-handling mechanisms and designing effective solutions strategies.

2.7 Summary

This chapter systematically reviews the three research areas of service failure, service recovery, and patient subsequent behavioral intentions, as well as the three theoretical frameworks of social exchange theory, perceived equity theory, and attribution theory, thereby establishing the theoretical foundation for the model proposed in this report.

With the rapid growth of the socio-economy, people's demand for and expectations of medical services are continuously rising (Wen et al., 2017). However, in recent years, the situation of medical disputes and complaints has remained serious (J. Zhang, 2017). Between 2018 and 2022, over five years, Chinese courts handled a total of 64,851 medical malpractice liability dispute cases, with hospitals' defeat rates consistently around 80% each year (Medical-Legal-Research-Center, 2023). Medical services are a type of high-contact, complex service work, where the provision and use of services happen together and are heavily influenced by human and situational factors. Therefore, it's difficult to deliver perfect medical services consistently. Service failures can happen at various contact points, leading to patient dissatisfaction. In response, hospitals must quickly take corrective actions to reduce patient and family dissatisfaction and prevent further errors (M. M. Liu et al., 2021; Zhai et al., 2022).

Given the inevitability of service failures, implementing service recovery is essential for businesses to better understand their customers, improve satisfaction and loyalty, and protect their reputation (Cheng et al., 2019; Mathew et al., 2020; Nguyen et al., 2021). When examining the mechanisms behind these three factors, perceived equity theory and attribution theory have been commonly used and repeatedly confirmed by previous research (Nuansi & Ngamcharoenmongkol, 2021; Suri et al., 2019; Yang et al., 2022). Studies show that perceived equity explains up to 85% of the effect on customer satisfaction after service recovery, suggesting that the impact of service recovery on customers' future behaviors is mainly driven by their perceptions of fairness (Tax & Brown, 1998).

The main measures of service recovery include tangible compensation, explanatory apologies, and timely responses. Previous research has confirmed the positive impact of service recovery on customer satisfaction, recommendations, and loyalty. Factors such as patients' attribution of service failure also influence the effectiveness of service recovery (Matikiti & Mpinganjira et al., 2019; M. Song et al., 2023).

Research on service recovery has been extensively studied across major service sectors, including aviation, hospitality, catering, banking, and online shopping (Cheng et al., 2019; Etemad-Sajadi & Bohrer, 2019; Jung & Seock, 2017; Mathew et al., 2020). However, a notable gap exists in systematic research on service recovery within China's medical industry, both in theory and practice. Most scholars examining service recovery in China's healthcare sector are hospital doctors and managers, and their analyses and recommendations are primarily based on their clinical experience. Additionally, most research focuses on exploring service recovery strategies within individual clinical departments. There is limited research from both theoretical and empirical viewpoints, and few studies systematically investigate how hospitals can implement service recovery from an overall operations perspective (Ji et al., 2018; B. Jia, 2018; Y. F. Pan, 2016). Driven by China's current government efforts to enhance patients' medical experiences and the hospitals' need for sustainable development, service recovery research—an important aspect of satisfaction studies—will become a key focus area in China's medical industry. This paper utilizes the analytical frameworks of perceived equity theory and attribution theory to examine how various service recovery measures influence patients' satisfaction, loyalty, and willingness to recommend under different service failure scenarios. It aims to identify optimal service recovery strategies from an overall hospital operations standpoint to address this research gap.

In light of the key concepts, definitions, and gaps identified in the literature, it becomes essential to develop a research model that integrates these theoretical insights into a cohesive analytical framework. The next chapter introduces this model, proposing a set of hypotheses based on the constructs reviewed here—particularly focusing on the relationships between service failure characteristics, recovery strategies, perceived justice, and patients' behavioral intentions. This model aims to bridge theory and empirical analysis in the specific context of Chinese public hospitals, addressing both conceptual limitations and practical challenges outlined in this chapter.

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Chapter 3: Research Model and Hypotheses

This chapter introduces the research model and hypotheses, emphasizing how hospital service recovery measures affect patients' perceived fairness and their subsequent behavioral intentions under different service failure scenarios. The model outlines how various service failure scenarios—such as severity of failure, type of failure, and patient attribution—and recovery measures—like apology, quick response, and compensation—shape patients' future behaviors, including satisfaction, loyalty, and recommendation, by influencing their expectations and perceptions of fairness. The hypotheses focus on three main points: the influence of perceived fairness on behavioral intentions, how service recovery impacts perceived fairness, and the interaction between service failure and recovery on perceived fairness.

3.1 Model design

The general scenario for service recovery is as follows: when a service failure occurs during an enterprise's delivery of products or services to customers, the enterprise then takes measures to conduct recovery, and customers' subjective evaluations of this process will ultimately affect their satisfaction and subsequent behavioral intentions.

Based on the analysis in Chapter 2, In service recovery research, perceived justice is widely acknowledged as a key factor affecting customer recovery satisfaction. However, existing studies mainly focus on single aspects of perceived justice or consider it just as a result of service recovery strategies, lacking a detailed analysis of how it is formed. To fill this gap, this study incorporates social exchange theory to explore the interactive relationship between service failure scenarios and recovery measures, proposing a more comprehensive hospital service recovery model. In this model, perceived justice is not only a result of service recovery but is also jointly influenced by both service failure scenarios and recovery measures. The upcoming sections will describe the key variables in detail, including the multiple dimensions of service failure scenarios, the development of service recovery systems, and the theoretical framework of multidimensional perceived justice. These variables will form the basis for later analysis, helping to deepen understanding of how service recovery impacts patients' behavioral intentions.

3.1.1 Method

Smith et al. (1999) developed a service recovery satisfaction model based on social exchange theory and conducted empirical analyses using data from the restaurant and hotel industries to investigate the impact of perceived fairness on customer satisfaction with the recovery process. Their research confirmed that the three dimensions of perceived fairness (distributive fairness, procedural fairness, and interactional fairness) and expectation disconfirmation directly influence customer recovery satisfaction.

Academic research on service recovery in the healthcare industry remains relatively scarce within the Chinese academic community. J. W. Li et al. (2009) analyzed from the perspective of patients' perception of error severity and error attribution, using structural equation modeling to examine the impact of hospital service failure and service recovery on patient satisfaction and loyalty. Zhai et al. (2022) incorporated equity theory and expectation theory into their model, establishing a structural equation model that includes multiple variables such as service recovery measures, perceived fairness, patient relationship types, and patient satisfaction. They quantitatively examined the logical relationships between hospital service recovery, perceived fairness, and patient relationship types, exploring the factors that influence how hospital service recovery affects patient satisfaction. According to social exchange theory, perceived fairness results from the interaction between the service failure situation and the service recovery strategy. These two studies only consider the dimensions of service recovery as factors in forming perceived fairness, lacking analysis of the service failure itself situation.

This study will mainly draw on the research model proposed by Smith (Smith et al., 1999). On this basis, it will incorporate the attribution of service failure and expand the analysis of its impact on customer satisfaction, so as to comprehensively examine the influence of different service failure scenarios in the healthcare industry on customer loyalty and recommendation intention. The research aims to help hospitals identify optimal service recovery strategies and improve patients' satisfaction, loyalty, and recommendation intention.

3.1.2 Model

The review of previous research findings in Chapter 2 indicates that perceived fairness is a crucial factor influencing customer recovery satisfaction. Customers may form their sense of fairness based on the exchange of losses and compensation during the service failure recovery process. By integrating equity theory with the research hypotheses proposed in Section 3.1, this study develops a hospital service recovery model (Figure 3.1). The combination of the service

failure situation and the hospital's service recovery system jointly affects the recovery strategies the hospital adopts. These strategies then influence patient satisfaction through the mediating role of perceived fairness.

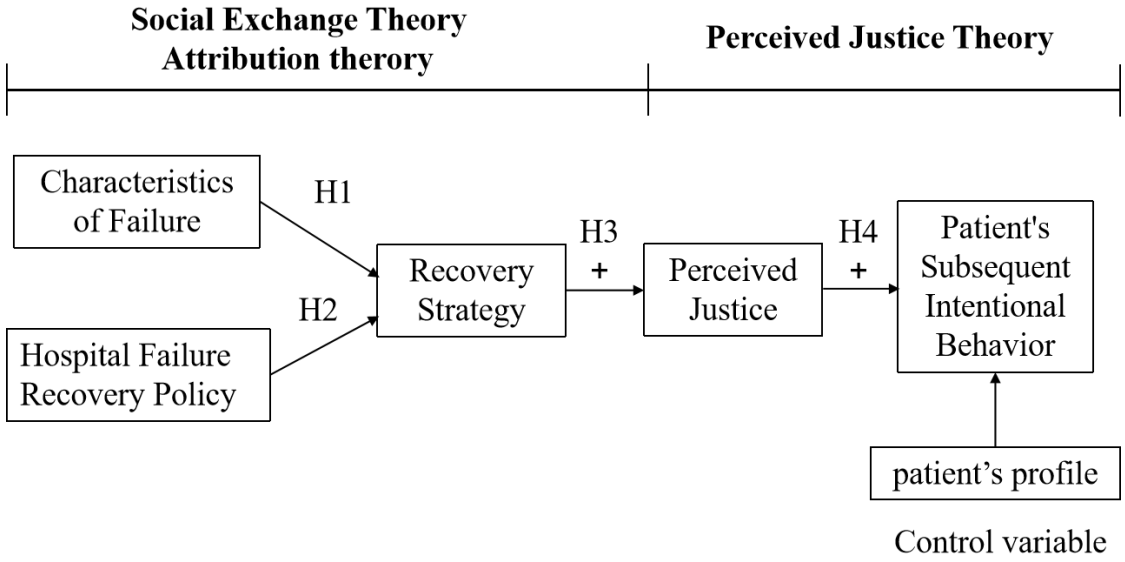

Figure 3.1 Hospital service recovery model

3.1.3 Variable description

3.1.3.1 Service failure situations

In conjunction with the discussion on the classification of service failure in relevant research presented in Section 2.1.1, this study selects two well-established dimensions with abundant research findings to categorize service failure scenarios: severity of service failure, and attribution of control over service failure.

(1) Severity of service failure: It reflects the patient's assessment of how much was lost during the service failure. If the patient perceives the loss as significant, it is categorized as a severe service failure. If the perceived loss is minor, it is categorized as a non-severe service failure.

(2) Attribution of control over service failure: It is the patient's judgment of the hospital's ability to manage service failure. This report looks at two situations where patients see the service failure as either controllable or uncontrollable by the hospital.

3.1.3.2 Insights into service recovery systems

A service recovery system consists of rules and guidelines set by hospitals to handle service failures and ensure patient satisfaction. When failures or dissatisfaction happen, hospitals and their medical staff must respond proactively and promptly within the system. The goal of these

measures is to minimize the negative impact on perceptions of service quality, satisfaction, and overall experience caused by medical service failures, while also working to restore and improve patient satisfaction and loyalty as much as possible.

3.1.3.3 Dimensions of service recovery

Building on the service recovery measures outlined in Chapter 2 and referencing the standard service recovery strategies used in medical practice by the authors, this study adopts the classification provided by J. F. Peng and Jing (2006). In the area of economic compensation, tangible compensation is selected as the focus; for symbolic compensation, apology and explain, response speed are chosen as the key subjects of investigation. The main components of the service recovery dimensions in large tertiary general hospitals are summarized as follows:

(1) Tangible compensation: This primarily refers to the monetary payment made by the hospital to patients who submit off-site complaints under its compensation policies.

(2) Apology and explain: After a patient complaint, hospital staff—typically a designated person—directly apologize to the patient through face-to-face, telephone, email, or messaging interactions. The apology aims to seek the patient's understanding, provide an explanation for the issue that occurred, and may also involve friendly interaction and communication with the patient.

(3) Response speed: This refers to the hospital's response time to patient complaints and its flexibility in addressing the issue. It includes quickly acknowledging the patient's complaint, understanding the circumstances surrounding the incident, clarifying the context and causes of the event, identifying the issues raised in the complaint, and proposing multiple solutions while actively communicating with the patient.

3.1.3.4 Dimensions of perceived fairness

This research applies the four dimensions of perceived fairness proposed by Greenberg (1993): distributive fairness, procedural fairness, interactional fairness, and informational fairness, as mediating variables to examine the impact of service recovery on patients' subsequent behavioral intentions. The definitions of each perceived fairness dimension in this work are as follows:

(1) Distributive Fairness: Distributive fairness mainly concerns the perceived fairness of how benefits and costs are shared between the two parties in an exchange. Specifically, it relates to the patient's view of whether the hospital's methods of compensation for service failures are fair. This dimension evaluates if the patient perceives the hospital's approach to addressing service failures as just.

(2) Interactional Fairness: Interactional fairness refers to how fair one party's attitude appears to the other during conflict resolution. In service recovery research, this dimension mainly focuses on the attitude of service personnel when addressing errors, especially how patients perceive the fairness of the hospital's response.

(3) Procedural Fairness: Procedural fairness pertains to the flexibility of policies and procedures in handling complaints, the wait time for a response from the hospital, and how efficiently the hospital resolves issues. It also includes the patient's perception of the flexibility, response time, and effectiveness of the hospital in resolving problems.

(4) Informational Fairness: When the hospital provides service recovery, it refers to the patient's perception of the fairness of the systems and regulations that form the basis of the hospital's service recovery plan, as well as the explanations given.

3.2 Hypotheses

3.2.1 Impact of service failure on service recovery (H1)

Service failure is the precursor to service recovery. The implementation and assessment of how well service recovery measures work are all done within the context of specific service failures (Khamitov et al., 2019). This section will further explore how the circumstances surrounding a service failure—such as the type of failure, its severity, and its attribution—affect the process of service recovery.

Service failure - service recovery can be seen as an exchange process: customers face a failed service and suffer economic or psychological losses; companies respond by offering compensation to regain customer trust and take steps to reduce the customers' losses. The economic and psychological losses customers experience during a service failure determine the type of compensation needed in this interactive process to balance their losses and gains, creating a sense of fairness. This approach aligns with the core framework of social exchange theory (Y. Zhang et al., 2021). Therefore, this study aims to include a discussion of different service failure scenarios to broaden the analysis model of how service recovery impacts perceived fairness, making it more practically useful.

(1) Impact of Service Failure Severity on Service Recovery

Customers' perceived fairness of service recovery measures varies with the severity of the service failure. For the same recovery strategy, the more severe the failure, the lower the perceived level of compensation and fairness from the customers' perspective.

Based on prospect theory and the psychological accounting effect, severe service failures can heighten customers' perceived losses. Even with adequate recovery strategies, customers may still feel dissatisfied, which can influence the effectiveness of service recovery (de Mesquita et al., 2023; Raza et al., 2023). Zeithaml et al. (1993) proposed, from the perspective of tolerance domains, that severe service failures can narrow customers' tolerance domains, leading to more substantial dissatisfaction. Therefore, the severity of a service failure is a key factor that influences the success of recovery strategies. There is a negative relationship between the severity of a failure and customer satisfaction with the recovery. The more serious the failure, the greater the customer's loss and the higher their expectations for resolution. It becomes harder for companies to meet these expectations through recovery efforts, making customers less likely to be highly satisfied with the service recovery (Cho et al., 2017). When the level of service failure is high, economic compensation is essential to meet customer expectations. Offering excessive cash compensation can lessen negative word-of-mouth from customers in severe failure situations (Noone, 2012; Zou & Migacz, 2020). Existing research generally agrees that as the failure level increases, the size and type of tangible compensation become more significant. High-value tangible compensation can effectively reflect the company's effort to restore customer trust. When the failure level is low, customers' attention to and willingness to engage in tangible compensation from the company's recovery efforts also decrease accordingly (La & Choi, 2019; N. Kim & Ulgado, 2012).

(2) Impact of Service Failure Type on Service Recovery

Service failure is the main cause of customer dissatisfaction and switching behavior. Although scholars have classified service failure types from different perspectives with varying results, there is a consensus on the outcome-process classification (Roschk & Gelbrich, 2014). Outcome failure, a core service failure, refers to the service provider's inability to deliver the basic service content, leading customers to perceive a real issue with service quality. Process failure, on the other hand, involves defects and deficiencies in the service delivery process, such as employee, manager, or customer behavior, and is often related to insufficient employee skills, poor communication, negative attitude, and failure to meet customer needs (Smith et al., 1999; Um & Lau, 2018). Accordingly, within the context of service recovery, it can be divided into two dimensions based on the type of service failure: psychological recovery and material recovery. Psychological recovery pertains to the emotional aspect of social transactions and includes actions like apology and rapid response, as discussed in this research. Material recovery relates to the economic side of social transactions, primarily involving tangible compensation (X. F. Tang et al., 2013).

After experiencing a service failure, consumers often expect compensation proportional to their losses. That is, customers who face process failures seek quick psychological recovery, while those dealing with outcome failures look for prompt material compensation. The most effective recovery occurs when strategies match the specific type of service failure (X. F. Tang et al., 2013). The kind of failure—whether outcome or process—influences how customers perceive recovery effectiveness. Additionally, following an outcome failure, providing compensation and acting swiftly can enhance customers' perceptions of fairness. When a process failure happens, offering an apology and a quick response have a greater impact on perceived fairness (M. Song et al., 2023).

(3) Impact of Service Failure Attribution on Service Recovery

Attribution theory proposes that people constantly try to find the causes of events. After experiencing a service failure, consumers will unconsciously look for reasons behind the failure and determine who or what should be held responsible (Leo & Huh, 2020). The process and results of attribution affect consumers' reactions to service failure, including their word-of-mouth, complaints, demands for compensation, and their views on the effectiveness of service recovery.

In the process of attributing responsibility, the most common distinctions are among three factors: locus of control, controllability, and stability (L. Peng & Chen, 2024). Locus of control refers to consumers' perception of whether the problem is caused by internal factors (i.e., the consumer themselves) or external factors (such as the service provider). Controllability relates to consumers' perception of how much control the service provider has over the failure, meaning whether the provider could have prevented the failure from happening. Finally, stability pertains to whether customers see the service failure as a one-time event or a persistent issue. Regarding stability, an unstable attribution creates uncertainty about future outcomes, while a stable attribution leads consumers to expect consistent results in the future (Weiner, 2000). Since this work primarily focuses on patients who have lodged complaints to examine service recovery strategies, in this context, complaining patients usually perceive that the hospital is mainly responsible for internal and external attribution of responsibility. Additionally, because medical services are highly professional and technical, patients often find it difficult to determine whether the service failure they experienced will happen again in the future. Therefore, this work mainly discusses the attribution of controllability in service failure, specifically whether patients believe that the hospital could have prevented the failure.

After a service failure occurs, consumers' attribution process can either lessen or increase their dissatisfaction with the failure, thereby influencing the effectiveness of subsequent service

recovery (Malombe & Choudhury, 2020; Siu et al., 2014). When customers attribute the cause of the service failure to controllable factors of the company, they will assign more responsibility for the failure to the company (J. S. Tang et al., 2017). Specifically, customers' perceptions of the controllability of the failure during the attribution process will impact their satisfaction with the service recovery; the less controllable the failure is, the stronger the link between perceived fairness and satisfaction with service recovery (Nikbin et al., 2014).

Customers' attributions of service failure will affect their specific compensation demands. When consumers believe that the service failure is within the service provider's control, they will have higher expectations for service recovery using the same measures. The higher these expectations are, the harder it is for companies to meet them through recovery efforts. As a result, it becomes more difficult for customers to be satisfied with the recovery, and more substantial measures (such as tangible compensation) are often required. Conversely, when consumers attribute the service failure to other entities, their recovery expectations tend to be lower, and recovery actions with less intensity (such as apologies and quick responses) can still be effective (Reviewed, 1980).

Based on previous research, this study aims to empirically examine whether the circumstances of service failure in the medical field also influence the effectiveness of service recovery. Specifically, the impact of service recovery strategies on perceived fairness varies depending on the severity of service failure, the type of service failure, and the attribution of service failure. Therefore, we propose:

H1: Different characteristics of service failure affect the effectiveness of service recovery strategies.

3.2.2 Impact of hospital service recovery policies on service recovery (H2)

Service recovery policies are a set of rules and guiding principles established by hospitals to address service failures, aiming to repair patient dissatisfaction through appropriate recovery measures and prevent similar issues from happening again. Service recovery measures, on the other hand, are the specific actions taken based on these policies, including apologies, compensation, and service improvements. The State Council of China, (2018) has issued the "Regulations on the Prevention and Handling of Medical Disputes," and the NHC (2019) has released the "Administrative Measures for Complaints in Medical Institutions." Both documents outline specific requirements for medical institutions in managing and preventing medical disputes. The hospital grading review for tertiary hospitals in China also clearly

requires hospitals to establish systems for doctor-patient communication, complaint management, and complaint resolution (NHC, 2022).

Service recovery policies with clear principles, standards, and procedures give hospitals a straightforward action guide when addressing service failures. For example, when a medical error occurs, the accountability mechanism and compensation standards outlined in the policy will directly influence how recovery measures are developed and implemented. Additionally, the patient-centered principle emphasized in the policy encourages hospitals to focus more on the needs and feelings of patients when designing recovery measures.

The strictness and enforcement level of service recovery policies greatly influence how effective recovery measures are. The supervision, evaluation, and feedback mechanisms outlined in these policies help ensure that recovery efforts are properly carried out. Additionally, the training and education requirements specified in the policies can raise awareness and emphasize the importance of recovery measures among service staff, thereby boosting their effectiveness. For example, some hospitals regularly conduct service recovery training sessions to improve the service awareness and response skills of their medical teams, enabling them to better and faster meet patient needs through recovery actions.

Service recovery policies focus not only on addressing current service failures but also on the ongoing improvement of future services. Analyzing service failures and developing preventive measures in policies provide hospitals with directions and incentives for service enhancement. By regularly summarizing experiences and lessons and refining recovery policies, hospitals can gradually optimize their recovery efforts and enhance service quality. Additionally, collecting and analyzing patient feedback in the policies can help hospitals identify potential problems early, enabling them to implement preemptive recovery measures to prevent issues from escalating.

Therefore, we propose:

H2: Remedial policies of medical institutions affect the effectiveness of service recovery strategies.

3.2.3 Impact of service recovery on perceived fairness (H3)

From a social exchange perspective, the content of social exchange can be described along two dimensions: the economic dimension and the symbolic dimension. The economic dimension mainly involves the investment of financial resources, such as money, materials, and time. The symbolic dimension primarily pertains to the investment of spiritual and social resources, including emotions, social status, and respect (C. M. Guo & Fan, 2010). From this standpoint,

service failures in the exchange process between a company and a customer can result in both economic and symbolic losses, leading to dissatisfaction. Service recovery aims to compensate for these losses and restore customer satisfaction. Therefore, as a process of social re-exchange, service recovery should encompass both economic and symbolic forms of compensation. This research utilizes the theory of perceived fairness to examine how service recovery influences patients' subsequent behavioral intentions. Based on the classification, J. F. Peng and Jing (2006) tangible compensation is selected as the representative of economic compensation, while apology and response speed are chosen as representatives of symbolic compensation.

Perceived fairness has become a key factor in assessing service recovery satisfaction. If customers feel that the company has accurately provided the services they need, that the company's service procedures are fair, and that service staff respect and treat customers honestly, they will perceive that the company's service performance meets or exceeds their expectations, thus boosting recovery satisfaction (Nuansi & Ngamcharoenmongkol, 2021).

(1) Tangible Compensation (Distributive Fairness)

Tangible compensation refers to the physical form of compensation that customers receive after a service failure, such as cash, replacement goods and services, discounts, and coupons (Gelbrich & Roschk, 2011). S. Kelley et al. (1993) argued that the fairness of the recovery outcome means that the market value of the compensation implemented after a service failure can match the value of the service failure. For example, when a company compensates customers for their losses with vouchers, cash, or discounts, and this compensation matches their losses, customers may then provide a positive evaluation of the company. That is to say, tangible compensation can influence perceptions of distributive fairness. Since distributive fairness concerns the fair distribution of costs and benefits in creating a just exchange relationship, it has the strongest connection to the dimension of distributive fairness among the three perceived dimensions fairness.

Proposed, through qualitative analysis and evaluation of service failure-service recovery scenarios, that compensation is the recovery measure most highly correlated with customers' perceptions of distributive fairness. Q. Yao and Song (2018) found that after an online shopping service failure, the company's compensation would affect customers' distributive fairness, which in turn had a positive impact on consumer recovery satisfaction, and it was the most influential among multiple service recovery measures. Q. Y. Zheng and Fan (2007), based on their research on service recovery measures in the online service industry, indicated that all dimensions of service recovery would have a positive impact on the dimensions of perceived fairness, with the tangible compensation dimension affecting the perception of distributive

fairness. J. Yan et al. (2013) believed that different recovery strategies would have different impacts on the dimensions of perceived fairness, and appropriate compensation would affect outcome fairness.

(2) Apology (Interactional Fairness)

An apology falls under the category of psychological compensation. During the service recovery process, companies can earn customer forgiveness through genuine interactions. When service personnel express an apology, it shows their concern and care for the negative feelings customers might have due to service failure—that is, empathy with the customer. This display of empathy can also further evoke the customer's emotional empathy toward the employee (C. Wei et al., 2020). Recent studies indicate that in high-contact and highly variable service industries, such as hotels, restaurants, and tourism, efforts to use AI robots for service recovery and apologies have not produced the expected results (Y. Hu et al., 2021; Jiang et al., 2023). Unlike the outcomes of service compensation and the procedural aspects of compensation, an apology demonstrates the humanized interaction between parties in the service recovery process, going beyond mere procedural requirements. Therefore, when scholars examine the influence of apologies on customer satisfaction, they often include it as part of the customer's perception of interactional fairness (C. Wei et al., 2020).

From the perspective of equity theory, numerous studies have suggested that timely and sincere apologies can provide consumers with psychological and social resources to compensate for interpersonal interactional fairness (Y. You et al., 2020). Q. Y. Zheng and Fan (2007) Based on their research on service recovery measures in the online service industry, they indicated that all dimensions of service recovery positively affect the dimensions of perceived fairness, with the apology dimension specifically influencing interactional fairness. In the case of customer complaints, perceived fairness in interactions includes polite treatment by the service provider, attentive listening, reasonable explanations, and acknowledgment of mistakes. Through the act of apologizing, customers can sense the company's sincerity and thus perceive interactional fairness; therefore, apologies are often associated with interactional fairness (Goodwin & Ross, 1992).

Drawing on Greenberg, (1993) classification scheme, this study further refines interactional fairness into two dimensions: interpersonal fairness and informational fairness. Interpersonal fairness is defined as the degree of fairness that patients perceive in their interactions with hospital staff. In contrast, informational fairness is defined as the degree of fairness patients feel from the information and explanations provided by the hospital.

(3) Response Speed (Procedural Fairness)

After a service failure occurs, most companies typically need to quickly identify the problem and communicate the recovery plan to customers to reduce their waiting time. In service recovery, the speed of response is often linked to customers' perceptions of procedural fairness, which then impacts their satisfaction, loyalty, and likelihood of recommending the company.

Empirically demonstrated the significant impact of response speed on procedural fairness through research in the restaurant and hotel industries. Wirtz and Mattila (2004) categorized response speed as part of the procedural fairness dimension and verified its positive impact on consumer satisfaction, repurchase intention, and word-of-mouth. Q. Yao and Song (2018) found that a quick response and effective communication following a service failure had a positive impact on consumers' perceived procedural fairness. Q. Y. Zheng and Fan (2007) argued that the dimension of prompt recovery has a positive and significant impact on customers' perceived procedural fairness. Xian and Lv (2018) empirical research results indicated that, among the three compensation measures—apology, compensation, and response speed — response speed had the most significant impact on procedural fairness and the greatest degree of influence.

Currently, there is a relative scarcity of research specifically examining the link between response speed and procedural fairness in service recovery within the medical industry. However, strong theoretical and empirical findings exist in other sectors.

Based on previous research, service recovery has been shown to influence patients' perceptions of fairness. Specifically, tangible compensation primarily affects their views of distributive fairness, apologies impact their perceptions of interactional fairness, and response speed influences their perceptions of procedural fairness. Therefore, we propose:

H3: The service recovery strategies of hospitals affect patients' subsequent behavioral intentions.

3.2.4 The impact of perceived fairness on customer behavioral intentions (H4)

Based on the analysis of the theory of perceived fairness in Section 2.4, current academic research on perceived fairness mainly focuses on two key models: the three-dimensional model—distributive fairness, procedural fairness, and interactional fairness (Bies & Moag, 1986)—and the four-dimensional model—which adds informational fairness to the previous three (Greenberg, 1993). This paper adopts the four-dimensional model of perceived fairness into the research framework, examining how distributive fairness, procedural fairness, interactional fairness, and informational fairness influence patients' subsequent behavioral intentions.

The discussion of subsequent behavioral intentions in this research includes three parts: satisfaction, loyalty, and the likelihood of recommendation. The impact of perceived fairness on subsequent customer behavior has been confirmed in numerous studies. When customers' experiences conflict with their standards of fairness, a sense of unfairness is triggered, leading to dissatisfaction. This expectation involves principles of distributive, procedural, and interactional fairness. If customers perceive a low level of fairness, they will become dissatisfied and may even complain, which in turn affects their satisfaction, loyalty, and likelihood of recommending the company. All three dimensions—distributive fairness, procedural fairness, and interactional fairness—can influence patients' repurchase intentions and word-of-mouth (Baudier et al., 2023; Mathew et al., 2020; Yang et al., 2022). For example, R. Cai and Qu (2017), through their research on the U.S. restaurant industry, found that distributive and procedural fairness have a greater influence on consumers' indirect reactions, such as repurchase intentions and word-of-mouth, while interactional fairness more significantly affects consumers' direct reactions, like immediate emotional feedback. Recently, Chinese researchers have focused more on how perceived fairness impacts customer satisfaction, loyalty, and word-of-mouth in the context of online shopping failures. Cui and Chen, (2019) verified the positive impact of procedural fairness and distributive fairness on consumer satisfaction. X. Zhang et al. (2016) empirically demonstrated that all three dimensions of perceived fairness have a positive influence on consumers repurchase intentions, and perceived usefulness positively moderates the relationship between procedural fairness and emotional loyalty.

In the healthcare sector, the theory of perceived fairness is also commonly applied in research on patient satisfaction and subsequent behaviors intentions. Ting and Yu (2010) found, through a survey of complaining patients in Taiwan, that perceptions of distributive fairness and procedural fairness can affect patients' loyalty to hospitals. Zhai et al. (2022) empirically demonstrated a significant positive relationship between perceived fairness and patient satisfaction. Given the extensive validation of how perceived fairness influences customer behavioral intentions in other fields, and similar findings in the healthcare industry, we propose:

H4: Perceived fairness affects the implementation effectiveness of service recovery strategies in medical institutions.

3.2.5 Hypothesis summary

This section summarizes the above hypotheses in Table 3.1:

Table 3.1 Summary of research hypotheses

	Research Hypotheses
H1	Service failure characteristics affect service recovery strategies.
H2	Hospital service recovery policies affect service recovery strategies.
H3	Service recovery strategies are positively correlated with patients' perceived fairness.
H4	Perceived fairness is positively correlated with patients' subsequent behavioral intentions.

Table 3.2 below summarizes the main constructs of the research model and their respective measurement indicators. These were derived from the literature discussed in Chapter 2 and the conceptual rationale developed in this chapter.

Table 3.2 Measurement indicators of the variables

Variables	Measurement Indicators
Service Failure Scenarios	Severity Attribution of Service Failure
Hospital Recovery Policies	Awareness of Recovery Policies
Service Recovery Strategies	Apology Compensation Response Speed
Perceived Justice	Interactional Justice Information Justice Outcome Justice Procedural Justice
Patients' Subsequent Intentional Behavior	Patient Satisfaction Loyalty Word of Mouth

The characteristics of service failure will be discussed from two perspectives: severity and attribution. Severity refers to patients' assessment of the extent of losses experienced during the failure—specifically, the larger the losses patients suffer, the more severe the failure. Attribution relates to patients' judgment of the hospital's ability to control the failure. When patients believe the failure was caused by factors the service provider could have managed, they will assign more responsibility to the provider.

In this research, recovery policies mainly focus on patients' awareness of the recovery policies of medical institutions. Most hospitals in China have established relevant procedures and regulations for managing patient complaints and doctor-patient disputes. However, no literature discussing the impact of medical institutions' recovery policies on the effectiveness of service recovery has been found so far. Therefore, this study uniquely introduces the variable of "recovery policies" into empirical research, aiming to explore whether the level of patients' awareness of medical institutions' recovery policies has a statistically significant effect on recovery effectiveness.

Service recovery is analyzed from three perspectives: apology, compensation, and response speed. Tangible compensation mainly refers to the monetary reimbursement hospitals provide

to patients who file off-site complaints in accordance with their compensation policies. An apology involves hospital staff, typically designated personnel, directly apologizing to patients through face-to-face conversations, phone calls, emails, or message interactions, with the goal of gaining patients' understanding and explaining the issues that occurred. Response speed relates to how quickly hospitals respond to patients' complaints and how flexible they are in resolving problems, including confirming complaints promptly, understanding the details of the incident, and proposing solutions while actively communicating with patients.

Perceived justice includes interactional justice, informational justice, distributive justice, and procedural justice. Distributive justice mainly concerns the fairness of how benefits and costs are shared between the two parties in an exchange, especially regarding patients' perceptions of the fairness of the compensation methods hospitals use to address service failures. Interactional justice primarily assesses patients' perceptions of the attitudes of hospitals and staff during the handling of complaints. Procedural justice evaluates patients' perceptions of the fairness, flexibility, and rationality of policies and procedures in the complaint process, as well as the effectiveness of hospitals in resolving issues. Informational justice refers to how patients perceive the fairness of the information, systems, regulations, and explanations provided by hospitals as the foundation for implementing service recovery efforts.

The effectiveness of service recovery is assessed through patients' subsequent intentional behavior across three dimensions: patient satisfaction, loyalty, and word-of-mouth. Satisfaction is the positive or negative subjective evaluation formed by patients after receiving medical services, based on comparing their actual experience with their expectations. Loyalty refers to patients' behavioral tendency to repeatedly choose the same medical institution after treatment; word-of-mouth involves patients actively sharing their experiences with medical services with others via verbal communication or social media. This study primarily focuses on patients' tendency to spread positive evaluations.

On the basis that the research model has been confirmed, the research methods and tools to be employed for model validation, as well as the measurement methods for each variable and the ways to obtain relevant data, will be the focus of the subsequent research. This content will be elaborated in the next chapter.

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Chapter 4: Research Methods

This chapter primarily outlines the research methods and processes used in this study. A comprehensive approach has been adopted, combining multiple research methods, including literature reviews, expert consultations, questionnaire surveys, and structural equation modeling. Additionally, this chapter provides detailed information on the research sample, questionnaire design, data collection, and data analysis.

Commonly used research methods in the service recovery field include questionnaire surveys, scenario testing, literature reviews, and quantitative analysis. Mathew et al. (2020) and Cheng et al. (2019) utilized literature reviews, questionnaire surveys, and quantitative analysis. Matikiti and Roberts-Lombard et al. (2019) employed scenario testing in their study.

On the basis of referring to the measurement indicators of each variable in previous relevant studies, this study confirmed the measurement indicators adopted herein. For example, the measurement indicators of service failure were referenced from the research of Basso and Pizzutti (2016) and Tsarenko and Tojib (2012); the measurement indicators of attribution of service failure were referenced from the research of Lee and Cranage (2018)and Nikbin et al. (2015) ; the measurement indicators of patient satisfaction were referenced from the research of Chen and Kim (2019) and Siu et al. (2013); and the measurement indicators of patient loyalty and WOM were referenced from the research of Migacz et al. (2018) and B. Choi and Choi (2014). This study developed a measurement questionnaire framework encompassing the dimensions of service failure, service recovery, perceived fairness, and patient behavioral intentions. After finalizing, formal questionnaire surveys will be administered to collect data. The empirical research sample includes outpatients, inpatients, or their family members from two major tertiary general hospitals in Guangzhou (Southern Medical University Nanfang Hospital and Guangzhou First People's Hospital). Subsequently, data analysis will employ regression analysis and structural equation modeling (SEM) to explore the relationships among variables. This research will use IBM SPSS 29.0 and SmartPLS 4.0 to perform descriptive statistics, reliability tests, validity assessments, and hypothesis testing.

4.1 Overview of research methods

This research uses various methods, including literature review, expert consultation, questionnaire survey, and structural equation modeling. The main research methods are as follows:

4.1.1 Literature review method

The literature review method involves analyzing studies on a specific topic to clarify the nature and status of the research object and derive one's viewpoints. This approach helps researchers develop an overall understanding of the research subject, supporting a historical and dynamic perspective. Additionally, it allows for the study of objects that are no longer accessible. A literature review, also known as a "synthesis and critique of literature," involves systematically organizing, analyzing, and evaluating the relevant literature that has been thoroughly collected. It offers a comprehensive and systematic overview and critique of the research progress and achievements in a specific subject or field over a certain period. Reviews can be categorized into two types: comprehensive and thematic. A comprehensive review covers an entire discipline or profession, while a thematic review concentrates on a specific research question or research method. A literature review's characteristics include detailed analysis of past and current research to determine the present state, trends, unresolved issues, and future directions in the field. It sets the stage for ongoing research and involves presenting one's viewpoints, opinions, and suggestions based on relevant theories, research conditions, and practical needs.

Literature screening in this study was conducted in accordance with the 2020 updated version of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021). By searching foreign databases like Science Direct, Web of Science, and PubMed, as well as Chinese full-text journal databases such as CNKI, VIP, and Wanfang, relevant domestic and international journal articles from various industries related to stakeholder participation, dynamic capabilities, operational (routine) capabilities, innovation, project performance outcomes, and relationship outcomes were collected. Additional searches were performed using search engines like Google Scholar, and the theoretical research findings were organized and summarized using literature management software. Furthermore, government websites such as the General Office of the State Council and the National Health Commission were consulted to gather relevant industry policy information and documents.

4.1.2 Expert consultation

Expert consultation involves seeking advice from relevant experts on the research topic, using their professional knowledge and experience to offer guidance and suggestions for the study.

Along with the literature review, this study used expert consultation to gather opinions from specialists on how service recovery measures influence patients' future behavioral intentions, such as satisfaction, loyalty, and word-of-mouth. During the questionnaire development, relevant measurement indicators were selected from the scales used in previous related studies. After translation and adjustments, these indicators formed the basis of this study's measurement tools. In October 2024, six experienced experts in patient satisfaction management at medical institutions were invited to perform a Q-sorting (manual factor analysis) on each measurement item. These items were then sorted into different research variables. Items that lacked discriminant validity, did not match the variable definitions, or were culturally inappropriate were revised. The goal was to refine the questionnaire's content and structure, ensuring each item was clear and that the measurement tools were consistent, practical, and easy to understand.

4.1.3 Questionnaire survey method

Questionnaire is a commonly used tool for collecting research data in the field of social surveys. Typically presented in the form of questions, it captures information about respondents' basic details, behavioral performance, subjective attitudes, and values, thereby explaining the research issues and verifying the pre-proposed research hypotheses. As a method within the scope of positivist research, the questionnaire survey focuses on acquiring objective academic insights through the collection and analysis of quantitative data (Zikmund, 2020).

With advancements in technology and the government's focus on public welfare, how patients submit complaints about medical services has shifted from traditional on-site methods to including complaints made through government hotlines (such as 12345). This shift reflects the development and diversification of medical service complaint mechanisms, aiming to better address patient dissatisfaction and increase patient satisfaction.

On-site complaints usually happen within the hospital, where outpatients or inpatients directly share their dissatisfaction with hospital management or relevant departments and seek solutions. This approach allows for quick gathering of information and fast responses to patient needs, helping to resolve issues immediately and strengthen doctor-patient relationships. However, because of limited resources or poor management, on-site complaints might not be effectively addressed, which can lead to low patient satisfaction.

External channels, such as government hotlines, offer patients a more convenient official way to file complaints. This approach is not only suitable for patients who are unwilling or unable to communicate directly with the hospital but also encourages hospitals to take existing issues seriously and address them with the involvement of government departments. Complaint handling through government hotlines generally has greater authority and fairness, effectively reducing doctor-patient conflicts and improving patient satisfaction.

Our survey questionnaire will be distributed through two channels: on-site medical visits and government hotlines, utilizing both offline and online methods to thoroughly understand patients' complaints about medical services and their effectiveness. This will help evaluate the strengths and weaknesses of different complaint channels, providing a scientific basis for medical institutions to enhance services and promote harmonious doctor-patient relationships.

For the offline survey, investigators will visit the hospital carrying tablets and randomly approach patients or their family members who have had negative experiences. They will invite these individuals to complete the questionnaire. Willing respondents will answer the questions on the tablet provided by the investigator. After finishing the questionnaire, respondents will receive a small gift, such as a pen or a file folder, as a token of appreciation.

The online survey will target individuals who have filed complaints through the government "12345" hotline. Respondents will be invited to complete the questionnaire via SMS, using the phone numbers they provided during their complaints. Before sending the SMS, investigators will first call the patients to invite them to complete the questionnaire, answer any questions they may have, and record the names of those willing to participate. Afterwards, SMS invitations will be sent to those who agreed to participate in the questionnaire to boost the response rate. Once they complete the questionnaire, online respondents will automatically receive a small cash reward (a 5-yuan red envelope) distributed by the survey system.

4.1.3.1 Survey data collection at hospitals

(1) Target Population

The primary subjects of this study are patients who have filed complaints and have received a resolution from the hospital. Based on patients' actual perceptions of medical services, the study has identified variables related to service failure, service recovery, perceived fairness, and customer behavioral intentions. The sample was chosen from outpatients, inpatients, and their family members who had relevant experiences at two large public hospitals in Guangzhou, using a combination of random sampling and convenience sampling.

Sample Hospitals: Two major tertiary general hospitals in Guangzhou are Nanfang Hospital of Southern Medical University and Guangzhou First People's Hospital.

Survey Respondents: Outpatient respondents are patients or their family members who visit the outpatient department of the sample medical institutions. Inpatient respondents are patients or their family members who are registering for discharge at the discharge office of the sample hospital. Both groups must have experienced a complaint and received a resolution from the hospital. Nanfang Hospital of Southern Medical University and Guangzhou First People's Hospital are both large comprehensive medical institutions that serve a broad patient population from 31 provinces across China. With a daily outpatient volume of over 10,000 visits and an average of about 500 patients discharged daily, these hospitals ensure a sufficient sample size and broad patient coverage, which guarantees the representativeness of the survey results, the reliability of the survey data, and the validity of the statistics.

(2) Data Collection Methods

Patients who have experienced service failure are randomly screened through on-site interviews, and their consent is obtained to participate in the questionnaire survey. The background of the survey is explained to the participants. A confidentiality agreement is provided to ensure privacy. Participants are informed about the approximate time needed to complete the questionnaire. The process for completing the questionnaire is explained to them. Assistance is given to help the target population complete each item on the iPad. After finishing the questionnaire, participants receive a small gift as a token of appreciation.

(3) Collection Procedure

Patients who have experienced service failure are screened through random on-site interviews, and their consent to participate in the questionnaire survey is obtained.

The background of the questionnaire survey is explained to the participants.

A confidentiality commitment is provided to the participants.

The participants are informed of the approximate time required to complete the questionnaire.

The method of completing the questionnaire is explained to the participants.

Assist the target population in completing the questionnaire item by item on the iPad.

After the questionnaire is completed, a small gift is given to the participants as a token of appreciation.

4.1.3.2 Survey data collection through government hotline “12345”

(1) Target population

Randomly select an appropriate sample size from patients who have filed medical complaints against Nanfang Hospital of Southern Medical University and Guangzhou First People's Hospital through the government “12345” hotline.

(2) Collection period

The data collection period is scheduled from January 20, 2025, to May 31, 2025. Over time, participants might have difficulty recalling specific issues accurately. To help prevent this, a brief reminder SMS will be sent alongside the online questionnaire to remind individuals of their previous complaints.

(3) Collection method

The collection method involves using a link to the “SurveyStar” survey platform. “SurveyStar” is a professional online survey platform that offers multiple functions such as online questionnaires, exams, 360-degree evaluations, forms, assessments, and voting" for data collection, analysis, and management.

Create an online questionnaire using the “SurveyStar” platform.

Send the online questionnaire link and reminder SMS to each complainant based on the mobile phone numbers provided by the "12345" hotline.

Provide a small incentive to participants who complete the questionnaire, in the form of a thank-you bonus.

4.1.4 Principal component analysis

'Principal component analysis' is a multivariate statistical method used to examine correlations among multiple variables. During the pilot testing stage of the questionnaire, which involved a small sample size, this study employed the principal component analysis approach, using SPSS software to assess the reliability and validity of each item (Pallant, 2020). The representativeness of the items and whether they met the requirements for factor analysis were judged based on the factor loading matrix. By comparing the actual calculated values with the test standards, items that did not meet the requirements were deleted or modified, while those that met the requirements were retained. This process enhanced the quality of the questionnaire, ensuring each item effectively measured the intended content of the study and laying a solid foundation for the subsequent formal questionnaire survey.

4.1.5 Structural equation modeling

Structural equation modeling is a widely used method in social sciences and a common tool for multivariate data analysis. It is frequently applied to confirmatory factor analysis, higher-order factor analysis, path analysis, and causal analysis, among other uses. After testing confirmed the reliability and validity, this study used structural equation modeling based on PLS (Partial Least Squares regression) for model validation (Memon et al., 2021). The factors involved in the model were identified from literature reviews and relevant theories. Finally, the model was adjusted based on the fit results. The specific details are as follows:

The measurement model was evaluated through confirmatory factor analysis to validate the proposed theoretical framework. Due to the model's complexity, the assessment was split into two parts: first-order variable reliability and validity analysis, followed by higher-order variable reliability and validity analysis. Model fit was determined using composite reliability (CR), factor loadings (FL), average variance extracted (AVE), the absence of cross-loadings, and the Fornell-Larcker criterion. The structural model was analyzed with Smart PLS 4.0 software, focusing on squared factor loadings (R2) and standardized path coefficients.

4.2 Questionnaire design

A questionnaire is a measurement tool, essentially a set of items that reflect the levels of latent variables, aimed at revealing the levels of theoretical variables that are difficult to measure directly. The first step in developing a practical and scientific measurement tool is to define the scope of the variables (constructs), which requires a thorough review of the literature. Through a comprehensive literature review and input from scholars, items can be scientifically selected to meet the construct attributes. Consequently, the resulting items can ensure a certain level of reliability and validity.

4.2.1 Questionnaire design process

This study includes five second-order variables: service failure scenarios, hospital remedial policies, service recovery strategies, perceived fairness, and patient behavioral intentions. These five second-order variables consist of a total of 14 first-order variables. All were adapted from established scales used in previous research.

Table 4.1 Research variables

Second-order Variables	First-order Variables
1. Service Failure Characteristics	1.1 Severity 1.2 Attribution of Service Failure
2. Hospital Remedial Policies	2.1 Awareness of Remedial Policies
3. Service Recovery Strategies	3.1 Apology 3.2 Compensation 3.3 Response Speed
4. Perceived Fairness	4.1 Interactional Fairness 4.2 Information Fairness 4.3 Outcome Fairness 4.4 Procedural Fairness
5. Patients' Subsequent Intentional Behavior	5.1 Patient Satisfaction 5.2 Loyalty 5.3 Word of Mouth

In this study, the development process of the questionnaire for variable measurement includes four main stages: (1) Questionnaire creation, (2) Questionnaire assessment, (3) Pilot testing with a small sample, and (4) Final refinement and validation of the questionnaire, as well as hypothesis testing.

Table 4.2 Process of questionnaire development

Measurement Questionnaire Development Process: Specific Research Content	Measurement Questionnaire Development Process: Specific Research Content
Step 1: Questionnaire Generation	--Literature Analysis + Interviews + Adjustment and Translation of Measurement Items --Q-Sorting Method (Manual Factor Analysis):
Step 2: Questionnaire Evaluation	Six experts individually discuss and analyze each item for clarity, conciseness, and consistency with the research objectives. --Pre-test: Six experts individually evaluate the clarity, content importance, accuracy and consistency of measurement items, applicability (translation), and ease of understanding.
Step 3: Small Sample Testing	n=121 —Reliability and Validity Analysis —Exploratory Factor Analysis
Step4: Final Purification, Validation, and Hypothesis Testing	n= 555 —Item Purification and Confirmatory Factor Analysis —Convergent and Discriminant Validity Analysis —Hypothesis Testing

(1) Step 1 (Questionnaire Generation)

Based on the model and variables of this study, for variables examined in previous relevant research, such as Chen and Kim (2019), Lee and Cranage (2018) and Migacz et al. (2018), some suitable measurement indicators were compiled from the measurement scales used in those earlier studies. Specifically, 3 to 6 measurement indicators were collected for each variable. After translation and adjustment, the preliminary measurement indicators for this study were developed. For example, adjustments were made to align the service provider entities in the

reference literature's measurement indicators with the context of this study: "company" was changed to "hospital," "employees" to "doctors" or "nurses," and "customers" to "patients."

For variables lacking prior relevant research or suitable measurement indicators in existing studies (such as "awareness of service recovery policies" and "informational justice"), two experts with extensive experience in handling patient complaints and conducting patient satisfaction surveys were invited for discussions. Based on the experts' opinions, 3 to 5 measurement indicators were developed for each of these variables.

(2) Step 2 (Questionnaire Evaluation)

① Q-Sorting Method: Six experts with extensive experience in patient satisfaction management at medical institutions were invited to conduct a Q-sorting exercise for each measurement indicator. They categorized them into different research variables to evaluate the clarity, comprehensiveness, and consistency of each variable with the research purpose. For example, regarding the initial measurement item “Despite the complaint, the hospital respond proactively and you are satisfied with the hospital's handling of the situation,” one expert suggested during the Q-sorting that this item could measure both “procedural justice” and “distributive justice” (or “outcome justice”). He recommended removing the phrase “at the hospital respond proactively” from the item to improve its clarity and accuracy. This suggestion was accepted, and the item was revised to “Despite the complaint, you are satisfied with the hospital's handling of the situation.”

② Pilot Testing: The research objectives, content, and model of this study were presented to six experts to ensure they had a preliminary understanding of the research. For measurement indicators that the experts found unclear or inaccurate, their suggestions were sought to improve the wording. This process ultimately guaranteed that all measurement indicators were clear, accurate, and properly matched with the corresponding research variables, thereby helping to develop the research questionnaire. For example, one expert argued that expressions like “failure severity” and “failure attribution” were too academic to include in the questionnaire, and respondents might not understand them correctly. The expert recommended replacing these with the description “nature of the complaint issue” in the questionnaire and placing the measurement items for both “failure severity” and “failure attribution” under this description to improve respondents' understanding. This suggestion was eventually adopted.

(3) Step 3 (Small Sample Testing of the Questionnaire)

The small sample test was conducted initially mainly to preliminarily examine and optimize the questionnaire before the formal large-scale survey. The test focused on three main aspects:

First, a reliability analysis assessed the internal consistency of the questionnaire, ensuring each measurement item reliably reflected the target construct. Second, validity testing was performed, including exploratory factor analysis to verify the structural validity of the questionnaire, making sure each item accurately measured the intended dimensions. Any issues identified in the small sample test, such as language expression or logical order, were revised to improve the quality of the full questionnaire and to ensure the reliability and validity of the research data.

In the small-sample test phase, a total of 121 valid samples were collected from two channels: online and offline surveys. Tests for questionnaire reliability and validity were conducted. A low response rate was identified as an issue during this phase. Specifically, in the online survey, approximately 70% of patients did not check the SMS after receiving it, around 20% abandoned the survey without completing it after checking, and only about 10% submitted valid questionnaires. In the offline survey, since it only targeted patients who had filed complaints and had them addressed by the hospital, there were few patients meeting these conditions during the survey, resulting in a low rate of valid questionnaires returned.

To address this issue, the questionnaire response plan was specifically optimized for the formal survey, mainly by implementing the following measures: First, a telephone interview link was added before distributing the online questionnaires to invite patients to participate, address their questions, and record the list of willing respondents. Based on the telephone interview results, SMS messages were sent to willing patients to improve the questionnaire response rate. Second, an incentive system was established: small cash rewards (5-yuan red envelopes) were automatically sent by the survey system upon questionnaire completion. Third, small gifts (such as toothpaste, towels, etc.) were given to offline respondents to boost their participation. Regarding reliability and validity, the results of the small-sample test indicated that the questionnaire had good reliability and validity and was suitable for use in the formal survey.

(4) Step 4 (Final Purification and Validation of the Questionnaire and Hypothesis Testing)

The main goal of the final purification and validation of the questionnaire is to ensure the measurement tool's reliability and validity, so the research data accurately reflect the theoretical constructs. This stage involves item refinement (removing items with low reliability and validity), confirmatory factor analysis (CFA) (testing the convergent and discriminant validity of the scales), to improve the questionnaire's structure, and to confirm its theoretical soundness. This process eliminates inappropriate measurement items, ensuring the scientific accuracy of subsequent data analysis. Hypothesis testing is a critical part of the research, aiming to determine whether the causal relationships in the theoretical model are supported. Based on the

analysis, the study will either support or reject the initial hypotheses, providing empirical evidence to validate the research model and related management practices.

4.2.2 Measurement scales

Using the questionnaire design methodology proposed in Section 4.2.1, we developed a questionnaire containing a series of items related to service failure, service recovery, and patients' subsequent behavioral intentions. The questionnaire was then distributed to previous complainants, asking them to respond to these items. The goal was to understand patients' perceptions of service failure, the effectiveness of service recovery, and how these factors influence their future behavioral intentions. The survey collected data on these key issues to support the research goals and findings. The initial set of measurement items was derived from relevant past research literature and was ultimately translated into a Chinese questionnaire for distribution.

The questionnaire will use a 7-point Likert scale for measurement, with scores from 1 to 7 representing different levels of attitude intensity. A score of 1 indicates "strongly disagree," showing that the respondent completely disagrees with the statement; a score of 7 indicates "strongly agree," reflecting the respondent's strong agreement. The intermediate scores (2-6) represent varying degrees of inclination, such as "disagree," "slightly disagree," "neutral," "slightly agree," and "agree." The 7-point scale provides better discrimination and more accurately captures differences in respondents' attitudes, reducing the potential information loss associated with a 5-point scale. It has been widely used in previous studies, improving the sensitivity of the data and the reliability of statistical analysis, thus ensuring the scientific rigor and validity of the research results. The Measurement Scales Table is provided in Annex A and the questionnaire is provided in Annex B.

4.3 Participating hospitals

In this research, we selected two large tertiary public hospitals as the focus of our empirical research. "Tertiary" refers to the level of the medical institution, while "public" relates to the ownership of the institution. Compared to other types of hospitals, tertiary public hospitals provide a more comprehensive range of medical specialties and serve a larger number of patients, reflecting a higher level of medical services in China (Ministry of Health of the People's Republic of China, 1989). In 2023, the total number of outpatient visits to hospitals in China was 4.26 billion (excluding primary-level medical and health institutions). In terms of

ownership, government-run public medical facilities accounted for 3.56 billion visits, or 83.57% of the total hospital visits.

In comparison, private medical institutions accounted for 0.7 billion visits, or 16.43% of the total hospital visits. In terms of hospital levels, tertiary hospitals accounted for 2.63 billion visits (61.74% of the total hospital visits) (NHC, 2024). Selecting tertiary public hospitals as the focus of empirical research ensures that the sample size meets the requirements for analysis and offers better representativeness. Moreover, because tertiary public hospitals have higher operational and management standards mandated by the Chinese government, these hospitals feature more advanced systems for patient satisfaction and complaint management, creating favorable conditions for in-depth empirical exploration in this study.

The hospitals selected for this study are two major hospitals in Guangdong Province: Nanfang Hospital of Southern Medical University and the First People's Hospital of Guangzhou. Both are located in Guangzhou, Guangdong Province, and are recognized as two of China's top 100 large comprehensive tertiary hospitals, providing medical services, education, research, and preventive care. These hospitals have strong medical disciplines and extensive experience in patient satisfaction and complaint management.

4.3.1 Nanfang Hospital of Southern Medical University

Nanfang Hospital of Southern Medical University was founded in 1941 during World War II as a military hospital. After more than eighty years of development, it has grown into a national academic medical center focused on clinical practice, education, and research. Recently, Nanfang Hospital has consistently ranked among the top 15-20 in China's authoritative hospital rankings for comprehensive hospitals. The hospital provides services across 111 medical specialties, with over 10, including infectious diseases, plastic surgery, hematology, pathology, obstetrics and gynecology, and orthopedics, which have achieved top ten status nationally or received nominations. As the primary teaching hospital and the first affiliated hospital of Southern Medical University, Nanfang Hospital continues to deliver professional, comprehensive care to patients worldwide, while training clinical and research talents who serve China's medical field with excellence.

Nanfang Hospital of Southern Medical University has received significant financial support for its major scientific research projects, including China's "Twelfth Five-Year Plan" and the joint fund from the National Natural Science Foundation of China and Guangdong Province. It has also earned multiple awards, including eight second prizes for scientific and technological progress in China and one first prize for medical science and technology.

Nanfang Hospital of Southern Medical University was successfully recognized as a top-tier comprehensive hospital in the first national review and evaluation in 2014 and has been listed among "China's Top 100 Hospitals" for several decades. In recent years, the hospital has earned titles such as "National People's Trustworthy Demonstration Hospital," "Advanced Unit in Hospital Culture Construction in China," "China Hospital Association Science and Technology Innovation Award," and "First Prize in National Medical Record Quality Review." It has consistently been rated as an AAA-level medical service provider and an advanced unit in medical management by the Guangzhou Medical Insurance Administration.

The hospital spans 203,000 square meters and has a building area of 458,000 square meters. It features 3,601 beds and medical equipment valued at nearly 2 billion yuan. Over the past three years, the average annual outpatient and emergency visits have exceeded 3 million, while the average annual discharged patients have surpassed 100,000. Additionally, the hospital's online medical services have recorded nearly 100,000 consultations.

The hospital has partnered with a third-party organization to conduct patient satisfaction surveys. In 2022, they collected 5,225 outpatient samples and 5,025 inpatient samples, resulting in overall satisfaction scores of 87.21% and 94.71%, respectively. The China Health Management Center has established a standard for satisfaction surveys at 90 points, and the hospital's outpatient satisfaction score falls below this benchmark. Also in 2022, the hospital received a total of 1,463 patient suggestions and complaints. The main areas of frequent complaints included whether medical staff showed respect, the explanations and listening skills of medical staff, waiting times, and the convenience of appointment registration. Service failures often lead to low patient satisfaction ratings and medical complaints during visits. Therefore, to continually improve patient satisfaction and loyalty while reducing complaints, the hospital must effectively implement service recovery measures to address service failures.

4.3.2 First People's Hospital of Guangzhou

The First People's Hospital of Guangzhou was established in 1899 and is among the first group of top-tier hospitals in Guangdong Province. In the 2022 National Performance Assessment of Tertiary Public Hospitals, it earned a Class A rating and has been recognized as one of the "Top 100 Hospitals in China" and "Top 100 Provincial Hospitals" for several consecutive years. It ranks among the top three in the "Top 100 Provincial Single Hospitals in China." The hospital provides a comprehensive range of medical specialties, including 73 specialized disciplines (56 clinical and 17 medical technical). Among these, Gastroenterology, Geriatrics, and Urology are national key clinical specialties, with Gastroenterology also designated as a key medical

discipline in Guangdong Province. The hospital also features 21 provincial key clinical specialties, such as General Surgery, Orthopedics, Anesthesiology, Hematology, Neurosurgery, Urology, Respiratory Medicine, Neurology, Endocrinology, Pediatrics, Burn Surgery, Nephrology, Medical Imaging, Oncology, Clinical Nursing, Clinical Laboratory, and Emergency Medicine. Additionally, the Clinical Molecular Medicine and Molecular Diagnostics Laboratory are important medical science laboratories in Guangdong Province. The hospital maintains one national disinfection supply training base, 24 national standardized training bases for resident physicians, and two pilot bases for specialized physician training.

The hospital currently has three campuses: the main campus, Nansha Hospital, and the Hedian Branch, with a total of 2,970 beds. The total staff number is 4,231, including 3,607 health professionals and 1,031 with senior titles. In 2023, the hospital cared for a total of 2.626 million patients and discharged 106,000.

4.4 Data analysis methods

The data collected through the questionnaire were first analyzed using SPSS 29.0 for standard method bias testing and descriptive analysis. Subsequently, reliability and validity assessments of the questionnaire scales were conducted, along with an analysis of the moderation effect. Factor analysis, structural equation modeling, and mediation effect testing were then performed using Smart PLS 4.0 to validate the research hypotheses in this report. Finally, the research data were analyzed and interpreted.

To improve the efficiency of distributing and collecting questionnaires, the researchers developed an online survey on a web-based platform. Trained investigators visited participants in person, engaged with them, and helped them complete the questionnaire.

4.4.1 Descriptive statistical analysis

This primarily involves statistical descriptive analysis of the basic information of healthcare managers, medical staff, and patients in the survey questionnaire, as well as scoring the potential behaviors of stakeholders.

4.4.2 Exploratory factor analysis

Factor analysis is a statistical technique that simplifies complex relationships among variables into a few underlying factors, aiming to replicate the connections between the original variables

and these factors. It examines how multiple observable indicators that are directly measurable and correlated are influenced by a small number of hidden independent factors and seeks to categorize variables when possible.

In this study, factor analysis was performed using a questionnaire survey and the scoring of individual questions to condense multiple needs into several main categories, making it easier to extract key information. The minimum recommended ratio of sample size to the number of variables for factor analysis is 5:1, and the sample size should be at least 100.

4.4.3 Reliability and validity analysis

Reliability refers to the internal consistency of measurement results. In this study, Cronbach's alpha coefficient was used to assess the questionnaire's reliability. For survey items that measure the same construct, a coefficient above 0.9 signifies high reliability, from 0.7 to 0.9 indicates good reliability, and below 0.7 denotes low reliability.

Validity analysis includes content validity and construct validity. During the questionnaire development, content validity was confirmed through careful wording and questioning by subject matter experts, who ensured the questionnaire accurately reflected the researchers' intended content. Construct validity was evaluated using exploratory factor analysis, which examines how each item loads onto common factors and whether these items can be grouped into main categories. An item that loads less than 0.5 on all factors or loads greater than 0.5 on two or more factors suggests content ambiguity and questions the validity of the construct.

4.4.4 Moderation effect analysis

The moderation effect determines whether the influence of X on Y is affected by the moderator variable M, meaning whether M influences the relationship between the independent variable X and the dependent variable Y. To examine this, you should first verify if there is a significant link between X and Y. If such a link exists, an interaction term between X and M should be created and added to the regression model. Then, the significance of this interaction term's relationship with Y is tested. If it is significant, it indicates a moderation effect.

It is important to note that before constructing the interaction term, both the independent variable X and variable M should be centered by subtracting the mean of each from its respective values. This process results in a new data sample with a mean of 0, helping to prevent multicollinearity issues.

4.4.5 Structural equation modeling

Structural equation modeling is a widely used method in social sciences and a common tool for multivariate data analysis. It is frequently applied in confirmatory factor analysis, higher-order factor analysis, path analysis, and causal analysis, among other uses. After confirming the reliability and validity through testing in this study, the structural equation model was validated using PLS (Partial Least Squares Regression)-based structural equation modeling. The relevant factors in the model were identified from literature reviews and related theories. Finally, the model was adjusted based on the fit results. The specific details are as follows:

(1) Measurement Model Assessment: Confirmatory factor analysis was employed to validate the theoretical model proposed in this study. Due to the complexity of the model, the measurement model assessment was divided into analyses of first-order variable reliability and validity, as well as higher-order variable reliability and validity. The model fit results were evaluated using composite reliability (CR), factor loadings (FL), average variance extracted (AVE), the absence of cross-loadings, and the Fornell-Larcker criterion.

(2) Structural Model Assessment: The structural model was tested using Smart PLS 4.0 software. The model was assessed based on the squared factor loadings (R2) and standardized path coefficients.

4.5 Pilot testing

Pilot testing is a vital stage in questionnaire research, mainly used to preliminarily evaluate the reliability and validity of the questionnaire with a small set of data, helping to establish a foundation for the full-scale survey (Wildemuth, 2017). First, it can uncover potential problems in the questionnaire design, such as unclear item wording, logical contradictions, or unreasonable response options, thereby improving the questionnaire's structure. Second, through reliability analysis and exploratory factor analysis (EFA), the internal consistency and structural validity of the scale can be confirmed, enabling the identification and removal of low-quality items. Additionally, pilot testing can assess the practicality of the survey process, including the time needed to complete the survey and any difficulties respondents might face in understanding it, along with other operational considerations. This process can lower the risks associated with large-scale surveys and improve the scientific accuracy of the data and research efficiency, ultimately ensuring the quality of the main study and the credibility of its findings.

4.5.1 Small sample collection and data organization

Between January 20 and February 27, 2025, a total of 122 questionnaires were collected, including 94 from online survey channels and 28 from offline survey channels. One online questionnaire was invalid because the main questions were not answered. The remaining 121 questionnaires were valid, with an effective rate of 99.18%. All questionnaires in the pilot survey came from Nanfang Hospital of Southern Medical University.

According to the results of the small sample descriptive statistical analysis in Table 4.3, the patients themselves are the primary source of complaints, both online and offline, with the highest frequency and proportion. In the online channel, there were 54 cases (58.06%), while in the offline channel, there were 10 cases (35.71%), totaling 64 cases, which accounted for 52.89% of the overall cases. The second most common were the patients' parents, with 10 cases online (10.75%) and 4 cases offline (14.29%), totaling 14 cases (11.57%). Additionally, other individuals, such as the patients' children and friends, were also involved. For example, the patients' children accounted for 12 cases online (12.90%) and 6 cases offline (21.43%), totaling 18 cases (14.88%).

Table 4.3 Characteristics of the pilot sample

Survey Item	Options	Online		Offline		Total	
		Frequency	Frequency (%)	Frequency	Frequency (%)	Frequency	Frequency (%)
Identity of the Complainant	Patient themselves	54	58.06	10	35.71	64	52.89
	Patient's parents	10	10.75	4	14.29	14	11.57
	Patient's children	12	12.90	6	21.43	18	14.88
	Patient's friends	9	9.68	5	17.86	14	11.57
	Other	2	2.15	0	0.00	2	1.65
	Other {Spouse}	1	1.08	2	7.14	3	2.48
	Other {Siblings}	1	1.08	0	0.00	1	0.83
	Other {Sister}	0	0.00	1	3.57	1	0.83
	Other {Spouse}	3	3.23	0	0.00	3	2.48
	Other {Husband}	1	1.08	0	0.00	1	0.83
Method of Complaint	Other	1	1.08	0	0.00	1	0.83
	Other {Guangzhou Municipal Health	1	1.08	0	0.00	1	0.83

Survey Item	Options	Online		Offline		Total	
		Frequency	Frequency (%)	Frequency	Frequency (%)	Frequency	Frequency (%)
	Commission}						
	Other {National Hospital Network}	1	1.08	0	0.00	1	0.83
	On-site complaint	29	31.18	9	32.14	38	31.40
	Complaint phone number published by the hospital	19	20.43	4	14.29	23	19.01
	Hospital's official public account	14	15.05	6	21.43	20	16.53
	Government hotline “12345”	28	30.11	9	32.14	37	30.58
Gender	Male	37	39.78	13	46.43	50	41.32
	Female	56	60.22	15	53.57	71	58.68
	Government hotline “12345”	55	59.14	14	50.00	69	57.02
patients' subsequent intentional behavior	Below bachelor's degree	19	20.43	5	17.86	24	19.83
	Doctoral degree	4	4.30	2	7.14	6	4.96
	Master's degree	15	16.13	7	25.00	22	18.18

Regarding the methods of complaint, the government hotline "12345" was the most common way to lodge complaints, with 28 cases online (30.11%) and 9 cases offline (32.14%), totaling 37 cases (30.58%). The second most common method was on-site complaints, with 29 cases online (31.18%) and 9 cases offline (32.14%), totaling 38 cases (31.40%). Complaints made through the complaint channels published by the hospital accounted for 19 cases online (20.43%) and 4 cases offline (14.29%), totaling 23 cases (19.01%). Complaints made through the hospital's official public account accounted for 14 cases online (15.05%) and 6 cases offline (21.43%), totaling 20 cases (16.53%). Additionally, a few complaints were made through other channels, including the Guangzhou Municipal Health Commission and the National Hospital Network. From a gender perspective, the number of female complainants was significantly higher than that of males. In the online channel, there were 56 female cases (60.22%) and 37

male cases (39.78%). In the offline channel, there were 15 female cases (53.57%) and 13 male cases (46.43%), totaling 28 female cases (58.33%) and 20 male cases (41.67%).

Regarding education level, individuals with a bachelor's degree were the main source of complaints, with 55 cases online (59.14%) and 14 cases offline (50.00%), totaling 69 cases (57.02%). Those with a bachelor's degree or lower made up 19 cases online (20.43%) and 5 cases offline (17.86%), totaling 24 cases (19.83%). Individuals with a master's degree and a doctoral degree accounted for smaller proportions, with 22 cases (18.18%) and 6 cases (4.96%), respectively.

4.5.2 Reliability and validity testing of the questionnaire

The steps for testing reliability and validity involve using SPSS software to perform principal component analysis on the data and examining the KMO value of the sample to determine its suitability for factor analysis. The KMO value ranges from 0 to 1. When the sum of squared simple correlation coefficients among all variables is much greater than the sum of squared partial correlation coefficients, the KMO value approaches 1, indicating stronger correlations among the variables and that the original variables are more appropriate for factor analysis. Conversely, when the sum of squared simple correlation coefficients is close to 0, the KMO value approaches 0, indicating weaker correlations and that the variables are less suitable for factor analysis. Therefore, if the KMO value exceeds 0. 9, it suggests the sample is highly suitable for factor analysis; a KMO of 0. 0.8 indicates it is quite suitable; and a KMO of 0. 0.7 suggests the sample' s suitability is average.

Reliability refers to the consistency, stability, and dependability of test results. The higher the value, the more reliable the measurement. Reliability is assessed using composite reliability (CR) and Cronbach' s α. Cronbach' s α is the average of split- half reliability coefficients across all possible item divisions of the scale and is the most common reliability measure. It typically ranges from 0 to 1. If it is below 0. 0.6, internal consistency reliability is generally considered inadequate. A value between 0. 0.7 and 0. 0.8 indicates acceptable reliability, while 0.8 to 0.8. 0.9 suggests excellent reliability. Composite reliability measures the reliability of a new composite variable made up of multiple variables. A composite reliability above 0.7 meets the standard for acceptability.

Validity refers to the accuracy and usefulness of test results. The average variance extracted (AVE) for each latent variable, along with the factor loadings of each measurement variable, assesses the scale' s validity. The AVE reflects the discriminant validity of each latent variable. An AVE greater than 0.50. 50 indicates good discriminant validity. Factor loadings, which

demonstrate convergent validity, should exceed 0.50 for each measurement variable to be considered valid.

The analysis results for each indicator are shown in Table 4.4.

Table 4.4 Correlation matrix of survey items and factors in the pilot survey

Survey Items	FL	AVE	CR	KMO	Cronbach's Alpha
1.1 The nature of the complaint issue - The problem you complained about is very serious.	0.828	0.684	0.938	0.899	0.927
1.2 The problem you complained about has caused you great inconvenience.	0.856				
1.3 The problem you complained about has caused you a lot of stress.	0.760				
1.4 It is very unfair that you have encountered this situation.	0.803				
2.1 The situation you complained about was intentionally caused by the hospital.	-0.684	0.477	0.646	0.500	0.678
2.2 The situation you complained about was intentionally caused by the doctor.	-0.697				
2.3 The cause of the situation was controllable by the hospital.	0.838				
2.4 The cause of the situation was preventable by the hospital.	0.863				
2.5 The hospital could have done something to avoid the situation.	0.836				
3.1Your understanding of hospital complaint handling policies—you are very clear about the complaint management and medical dispute resolution systems required by the government for hospitals.	0.869	0.827	0.960	0.850	0.962
3.2 You are very familiar with the hospital's complaint and dispute handling procedures.	0.914				
3.3 You are very familiar with the time limit requirements for complaint and dispute handling as stipulated by the hospital.	0.947				
3.4 You are very familiar with the outcomes of complaint and dispute handling as stipulated by the hospital.	0.892				
3.5 You are very familiar with the hospital's regulations that different complaint and dispute scenarios have different handling solutions.	0.923				
4.1 Hospital response to complaints—The hospital responds quickly after you make a complaint.	0.828	0.658	0.982	0.956	0.992
4.2 The hospital begins handling the complaint immediately after you lodge it.	0.817				
4.3 The hospital promptly investigates the complaint after you make it.	0.872				
4.4 The hospital resolves your complaint quickly after you lodge it.	0.891				
4.5 The hospital is very patient when handling your situation.	0.905				

Survey Items	FL	AVE	CR	KMO	Cronbach's Alpha
4.6 The hospital shows a lot of empathy when handling your situation.	0.908				
4.7 The hospital takes your situation very seriously.	0.894				
4.8 The staff handling the situation are very respectful to you.	0.879				
4.9 The relevant personnel are very proactive and diligent during the resolution process.	0.897				
4.10 The process of handling complaints by the hospital—The hospital handles your complaint in a fair and reasonable manner.	0.784				
4.11 The hospital applies rules and regulations fairly and reasonably in dealing with your complaint.	0.838				
4.12 The hospital shows sufficient flexibility in handling this situation.	0.831				
4.13 After the situation arises, you believe that the hospital initiates the handling procedure in a very timely manner.	0.873				
4.14 The process by which the hospital handles the situation is rational.	0.850				
4.15 The hospital's explanation for the cause of the complaint is in line with your understanding.	0.802				
4.16 The hospital provides you with the necessary relevant information.	0.825				
4.17 The hospital proactively explains various aspects of the situation handling process to you.	0.787				
4.18 The hospital has fully communicated with you regarding the final resolution plan.	0.771				
4.19 The hospital has provided an explanation for your situation	0.817				
4.20 The result of the hospital's handling of your complaint—The hospital has provided an appropriate explanation for your experience this time.	0.728				
4.21 The hospital acknowledges its responsibility.	0.843				
4.22 The hospital's apology is very sincere.	0.730				
5.1 You are satisfied with the hospital's expression of regret.	0.725				
5.2 The hospital has provided you with a very reasonable compensation plan.	0.725				
5.3 The hospital has provided a very reasonable compensation plan based on the type of your loss.	0.745	0.540	0.825	0.871	0.993
5.4 The hospital has provided a very reasonable compensation plan based on the extent of your loss.	0.745				
5.5 The hospital has provided a very reasonable compensation plan based on the demands you have raised.	0.661				

Survey Items	FL	AVE	CR	KMO	Cronbach's Alpha
5.6 Considering the time and effort the hospital has spent in handling this situation, you believe that the final outcome is fair.	0.715				
5.7 Overall, the hospital's final response is sufficient to resolve your situation.	0.697				
5.8 Your situation has been handled fairly.	0.766				
5.9 Although the situation you complained about occurred, you are satisfied with the hospital's handling result.	0.760				
5.10 Your satisfaction—Overall, you are very satisfied with the hospital's experience in resolving the complaint this time.	0.747				
5.11 Overall, you are satisfied with the process by which the hospital handled this complaint.	0.719				
6.1 Overall, the hospital has provided you with a satisfactory solution.	0.637				
6.2 Overall, you are very satisfied with the doctors at this hospital.	0.608				
6.3 Overall, you are very satisfied with the nurses at this hospital.	0.586				
6.4 Overall, you are very satisfied with the other staff at this hospital.	0.656				
6.5 Overall, you are very satisfied with the doctor-patient relationship at this hospital.	0.671				
6.6 Overall, you are satisfied with the quality of service at this hospital.	0.811				
6.7 Your choice of hospital for future visits—This hospital is your first choice for the next visit.	0.831	0.594	0.949	0.937	0.982
6.8 You will continue to choose this hospital in the future.	0.890				
6.9 Even with other options available, you would still choose this hospital next time.	0.864				
6.10 From now on, you are more inclined to choose this hospital.	0.839				
6.11 You are willing to recommend this hospital to others.	0.836				
6.12 If asked for your evaluation, you would give this hospital a positive review.	0.864				
6.13 You would encourage your relatives and friends to choose this hospital.	0.827				

4.6 Large survey data sample collection

4.6.1 Data collection methods and procedures

This study used a questionnaire survey to gather research data, focusing on patients and their families who had filed complaints due to service failures during their medical visits and whose cases had been resolved by healthcare institutions. The first round of data collection was

conducted from February to March 2025 as a pilot test with a small sample size, resulting in 121 valid questionnaires. Then, exploratory factor analysis (EFA) was performed to conduct initial statistical analysis on the reliability and validity of the measurement scales.

The second round of data collection occurred from April to May 2025, during which the official electronic questionnaire was distributed. A total of 555 valid questionnaires were collected, including 272 through the online channel and 283 through the offline channel.

4.6.2 Sample collection and organization

From January 20, 2025, to April 29, 2025, a total of 1,528 questionnaires were distributed, and 556 were returned, resulting in a response rate of 36.39%. Of these, 555 were valid, producing an effective rate of 99.18%. Specifically, 991 questionnaires were distributed through the online survey method, with 273 returned, all from Nanfang Hospital of Southern Medical University, resulting in a response rate of 27.55%. One online questionnaire was considered invalid due to missing values, leaving 272 valid responses. Meanwhile, 537 questionnaires were distributed via the offline survey method, with 283 returned. Of these, 166 were from Nanfang Hospital of Southern Medical University and 117 from the First People's Hospital of Guangzhou, achieving a response rate of 52.70%, with all responses deemed valid.

As shown in Table 4.5, regarding the identity of the complainants, the patients themselves made up the majority of complaints both online and offline, with the highest frequency and proportion. In the online channel, there were 163 cases (59.92%), and in the offline channel, there were 174 cases (61.48%), totaling 337 cases, which represent 60.72% of all cases. The second most common group was the patients' parents, with 37 cases online (13.60%) and 4 cases offline (14.29%), totaling 42 cases (14.84%). Additionally, other individuals, such as the patients' children and friends, were also involved. For example, the patients' children accounted for 35 cases online (12.86%) and 38 cases offline (13.42%), totaling 73 cases (13.15%).

Table 4.5 Profile of respondents in the formal survey

Survey Item	Options	Online		Offline		Total	
		Frequency	Frequency (%)	Frequency	Frequency (%)	Frequency	Frequency (%)
Complaint Identity	Patient themselves	163	59.92	174	61.48	337	60.72
	Patient's parents	37	13.60	42	14.84	79	14.23
	Patient's children	35	12.86	38	13.42	73	13.15
	Patient's friends	16	5.88	18	6.36	34	6.12

Survey Item	Options	Online		Offline		Total	
		Frequency	Frequency (%)	Frequency	Frequency (%)	Frequency	Frequency (%)
Options	Patient's spouse	12	4.41	8	2.82	20	3.60
	Other	9	3.30	3	1.06	12	2.16
	On-site complaint	68	25.00	73	25.79	141	25.40
	Hospital's published complaint hotline	54	19.85	86	30.38	140	25.22
	Government Hotline “12345”	96	35.29	50	17.66	146	26.3
	Hospital Official Account	42	15.44	63	22.26	105	18.91
	Other	12	4.41	11	3.88	23	4.14
Gender	Male	122	44.85	153	54.06	275	49.54
	Female	150	55.14	130	45.93	280	50.45
Highest Education Level	Below Bachelor's Degree	141	49.47	93	34.44	234	42.16
	Bachelor's Degree	110	38.59	133	49.26	243	43.78
	Master's Degree	26	9.12	38	14.07	64	11.53
	Ph.D.	8	2.80	6	2.22	14	2.52
Type of Visit	Outpatient	187	68.75	195	68.90	382	68.82
	Inpatient	85	31.25	88	31.09	173	31.17
Age	18-30 years old	108	39.70	97	34.27	205	36.93
	31-40 years old	114	41.91	122	43.10	236	42.52
	41-50 years old	36	13.23	49	17.31	85	15.31
	51-60 years old	12	4.41	9	3.18	21	3.78
	61-70 years old	2	0.73	6	2.12	8	1.44

Regarding the complaint methods, the government hotline "12345" was the most common way to file complaints, with 96 cases online (35.29%) and 50 cases offline (17.66%), totaling 146 cases (26.30%). The second most common method was on-site complaints, with 68 cases online (25.00%) and 73 cases offline (25.79%), totaling 141 cases (25.40%). Complaints through the channels published by the hospital accounted for 54 cases online (19.85%) and 86 cases offline (30.38%), totaling 140 cases (25.22%). Complaints through the hospital's official

public account made up 42 cases online (15.44%) and 63 cases offline (22.26%), totaling 105 cases (18.91%). Additionally, a few complaints were filed through other channels, including the Guangzhou Municipal Health Commission and the National Hospital Network.

From a gender perspective, the number of female complainants was higher than that of males: in the online channel, there were 150 female cases (55.14%) and 122 male cases (44.85%); in the offline channel, there were 130 female cases (45.93%) and 153 male cases (54.06%), totaling 280 female cases (50.45%) and 275 male cases (49.54%).

Regarding education level, individuals with a bachelor's degree were the main source of complaints, with 110 cases online (38.59%) and 133 cases offline (49.26%), totaling 243 cases (42.52%). Those holding a bachelor's degree or less accounted for 141 cases online (49.47%) and 93 cases offline (34.44%), totaling 234 cases (42.16%). Individuals with a master's degree and a doctoral degree made up smaller shares, with 64 cases (11.53%) and 14 cases (2.52%), respectively.

Regarding the type of medical visit, outpatient patients made up a larger proportion, with 187 cases online (68.75%) and 195 cases offline (68.90%), totaling 382 cases (68.82%). Inpatient patients accounted for 85 cases online (31.25%) and 88 cases offline (31.09%), totaling 173 cases (31.17%).

Regarding age, the 31-40 age group accounted for a larger share, with 114 cases online (41.91%) and 122 cases offline (43.10%), totaling 236 cases (68.82%). The second most common group was 18-30, with 108 cases online (39.70%) and 97 cases offline (34.27%), totaling 205 cases (36.93%). The age groups of 41-50, 51-60, and over 60 represented smaller proportions, with 85 cases (15.31%), 21 cases (3.78%), and 8 cases (1.44%), respectively.

Regarding the identity of the complainants, the patients themselves were the primary source of complaints, both online and offline, with the highest number and percentage. Online, there were 163 cases (59.92%), and offline, there were 174 cases (61.48%), totaling 337 cases, which represent 60.72% of all cases. The second most common complainants were the patients' parents, with 37 cases online (13.60%) and 4 cases offline (14.29%), totaling 42 cases (14.84%). Additionally, other individuals such as the patients' children and friends were involved. For instance, patients' children accounted for 35 online cases (12.86%) and 38 offline cases (13.42%), totaling 73 cases (13.15%).

In Chapter 4, we have completed the confirmation of measurement indicators, questionnaire design, and descriptive analysis of empirical data. The next chapter will conduct an empirical analysis of the research model based on the empirical data and verify the research hypotheses, which constitutes the core content of this study.

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Chapter 5: Research Findings

This chapter is divided into three main parts: The first part conducts reliability, validity, and discriminant validity analyses for the first-order variables in the research measurement model. The second part analyzes the reliability, validity, and discriminant validity of the second-order variables in the research measurement model. The third part first provides a descriptive analysis of the variables, then summarizes the theoretical structural model of the path relationships between variables and the hypothesis testing results and finally examines the mediating effect relationships between second-order variables. In the fourth part, the research outcomes are systematically summarized and analyzed. The study found that, first, no items needed to be deleted, as the questionnaire design met the reliability and validity requirements for both first-order and second-order variables. Second, all four hypotheses proposed in the study were confirmed.

The results of the reliability and validity analysis for the first-order variables are as follows:

(1) Reliability: The Cronbach 's α values for all first-order variables exceeded the standard of 0.8, and the CR values were all above 0.7, indicating that the measurement models for each first-order variable achieved an excellent level of reliability.

(2) Content Validity: The questionnaire was developed through standardized steps, including analysis of relevant domestic and international literature, interviews, and expert consultations, ensuring content validity.

(3) Convergent Validity: All first-order factor loadings were greater than 0.5, and the AVE values were all above 0.5, meeting the requirements for convergent validity.

(4) Discriminant Validity: The square root of the AVE for each first-order variable was greater than the correlation coefficients between all latent variables, and the t-values between all first-order variables met the criteria for discriminant validity. Most of the HTMT values for the first-order variables were below 0.85. Although a few values slightly exceeded the acceptable reference range from a statistical perspective, they were retained in the data analysis from a theoretical standpoint. Overall, the discriminant validity criteria for the first-order variables were met.

The results of the reliability and validity analysis for the second-order variables are as follows:

(1) Significance of Second-Order Factors: The β coefficients of first-order factors on second-order factors are statistically significant, with all t-values exceeding 1.96. This indicates the validity of the formative factors and their higher-order constructs for service failure attribution, severity, response speed, apology and explanation, compensation, interactional fairness, informational fairness, outcome fairness, procedural fairness, satisfaction, loyalty, and recommendation.

(2) Multicollinearity: The VIF values for all latent variables are below 5, indicating no serious multicollinearity issues.

(3) Reliability: The Cronbach's α values for all second-order variables exceed the standard of 0.8, and the CR values are all above 0.7, indicating that the measurement models for each variable achieve an excellent level of reliability.

(4) Convergent Validity of Second-Order Variables: All first-order factor loadings are greater than 0.5, and the AVE values are all above 0.5, meeting the requirements for convergent validity.

(5) Discriminant Validity: The square root of the AVE for each second-order variable is greater than the correlation coefficients between all variables. All HTMT ratio values are below 1.00, meeting the requirements for discriminant validity. The results of the structural equation modeling analysis are as follows:

(6) Explained Variance: The model accounts for a significant portion of total variance, explaining 72.1% of patients' subsequent intentions.

(7) Hypothesis Testing: A total of four hypotheses were proposed in this study, all of which were supported.

(8) Mediating Effects: Service failure scenarios, awareness of service recovery policies, service recovery strategies, and patient subsequent intentions all show partial mediating effects. The direct impacts of service failure scenarios, awareness of recovery policies, and recovery strategies on patients' subsequent intentions remain significant. The links among service failure scenarios, awareness of recovery policies, recovery strategies, and patient intentions are partially mediated by recovery strategies or perceived fairness, creating a complementary relationship.

5.1 Reliability and validity analysis of first-order variables

5.1.1 Reliability test of first-order variables

The reliability analysis results (Table 5.1) show that the Cronbach's α values for all first-order variables surpass the psychological measurement standard of 0.8, with most exceeding 0.9. Specifically, the reliability coefficients for compensation (0.997), awareness of service recovery policies (0.988), and response speed (0.988) are very close to 1, indicating strong internal consistency among the items. The composite reliability (CR) values are all above 0.7 and exceed 0.9, as seen in the CR values for recommendation (0.996) and loyalty (0.993), demonstrating that the measurement models for each variable are highly stable and that the items reliably represent the latent constructs.

Table 5.1 Reliability tests of first-order constructs

	Cronbach's α	Composite Reliability (CR)）
1.1 Severity of the Issue	0.941	0.958
1.2 Attribution of Service Failure	0.895	0.924
2.1 Awareness of Service Recovery Policies	0.988	0.990
3.1 Response Speed	0.988	0.991
3.2 Apology and Explanation	0.976	0.982
3.3 Compensation	0.997	0.997
4.1 Interactional Justice	0.991	0.993
4.2 Informational Justice	0.986	0.990
4.3 Outcome Justice	0.989	0.992
4.4 Procedural Justice	0.987	0.990
5.1 Satisfaction	0.983	0.985
5.2 Loyalty	0.991	0.993
5.3 Recommendation	0.994	0.996

5.1.2 Validity test of first-order variables

The development of this measurement questionnaire followed a standardized process, including analyzing relevant domestic and international literature, conducting interviews, and consulting experts to ensure content validity. At this stage, the main focus is on assessing the convergent validity and discriminant validity of the questionnaire.

5.1.2.1 Convergent validity of first-order variables

During the confirmatory factor analysis, all item factor loadings were above 0.5, satisfying convergent validity requirements; therefore, no items needed removal. As shown in Tables 5.2，

all first-order factor loadings exceed 0.5, and the AVE values are all above 0.5, confirming the criteria for convergent validity.

Table 5.2 First-order AVE

		First-order	
Service failure		1.1 Severity	1.2 Attribution of service failure
Average variance extracted (AVE)		0.851	0.71
1.1.a.	The situation you complained about is very serious.	0.93	
1.1.b.	This situation has caused you a great deal of inconvenience.	0.921	
1.1.c.	This situation has caused you a great deal of stress.	0.939	
1.1.d.	This situation is very unfair.	0.898	
1.2.a.	The occurrence of this situation was not intentional on the part of the hospital.		0.738
1.2.b.	The occurrence of this situation was not intentional on the part of the doctor.		0.727
1.2.c.	The cause of this complaint is controllable by the hospital.		0.911
1.2.d.	The cause of this complaint is preventable by the hospital.		0.918
1.2.e.	The hospital could have done something to avoid this situation.		0.898
Hospital service recovery policies		2.1 Recovery policy	
Average variance extracted (AVE)		0.953	
2.1.a.	You are very clear about the government's requirement for hospitals to establish relevant systems for complaint management and medical dispute resolution.	0.957	
2.1.b.	You are very familiar with the procedures for handling complaints and disputes in the relevant hospital systems.	0.982	
2.1.c.	You are very familiar with the time - limit requirements for handling complaints and disputes in the relevant hospital systems.	0.982	
2.1.d.	You are very familiar with the outcomes of handling complaints and disputes in the relevant hospital systems.	0.975	
2.1.e.	You are very familiar with the relevant hospital systems that develop different handling plans	0.984	

	for different complaint and dispute scenarios.				
Service recovery		3.1Apology	3.2Compensation	3.3Response speed	
Average variance extracted (AVE)		0.964	0.932	0.99	
3.1.a	You have received an apology from the hospital.	0.979			
3.1.b	The hospital's apology is very sincere.	0.983			
3.1.c	The hospital acknowledges its responsibility.	0.983			
3.1.d	The hospital has provided an appropriate explanation for your experience.	0.982			
3.2.a	The hospital has offered you a very reasonable compensation plan.		0.959		
3.2.b	The hospital has offered you a very reasonable compensation plan based on the type of loss you have suffered.		0.950		
3.2.c	The hospital has offered you a very reasonable compensation plan based on the extent of your loss.		0.984		
3.2.d	The hospital has offered you a very reasonable compensation plan based on the demands you have made.		0.969		
3.3.a	After you expressed your dissatisfaction to the hospital, it responded quickly.			0.994	
3.3.b	After you expressed your dissatisfaction to the hospital, it began to handle the matter immediately.			0.996	
3.3.c	After you expressed your dissatisfaction to the hospital, it promptly investigated the situation.			0.996	
3.3.d	After you expressed your dissatisfaction to the hospital, it resolved the situation quickly.			0.994	
Perceived justice		4.1 Interaction justice	4.2 Information justice	4.3 Outcome justice	4.4 Procedural justice
Average variance extracted (AVE)		0.966	0.960	0.969	0.950
4.1.a	The hospital was very patient when dealing with your situation (B. Choi & Choi, 2014).	0.984			
4.1.b	The hospital showed a lot of empathy when dealing with your situation.	0.988			
4.1.c	The hospital took your situation very seriously.	0.982			
4.1.d	The relevant personnel were very respectful to you when handling the situation.	0.983			

4.1.e	The relevant personnel were very proactive and diligent during the resolution process.	0.978			
4.2.a	You understood the reasons for the complaint.		0.974		
4.2.b	The hospital provided you with the necessary relevant information.		0.982		
4.2.c	The hospital proactively explained the relevant circumstances during the complaint handling process.		0.984		
4.2.d	The hospital fully communicated with you regarding the final resolution plan.		0.979		
4.3.a	Considering the time and effort the hospital spent on handling this complaint, you believe the final outcome is fair.			0.980	
4.3.b	Overall, the hospital's final response was sufficient to resolve your complaint.			0.986	
4.3.c	Your complaint was handled fairly.			0.986	
4.3.d	Although there was a complaint, you are satisfied with the hospital's handling outcome.			0.985	
4.4.a	The hospital handled your complaint fairly and reasonably.				0.974
4.4.b	The hospital's use of rules and regulations in handling your complaint was fair and reasonable.				0.971
4.4.c	The hospital demonstrated sufficient flexibility in dealing with this complaint.				0.980
4.4.d	After the complaint arose, you believe the hospital initiated the handling procedure in a very timely manner.				0.975
4.4.e	The hospital's complaint handling process is fair and just.				0.973
Patient' subsequent intentions		5.1 Satisfaction	5.2 Loyalty	5.3 Word-of-Mouth	
Average variance extracted (AVE)		0.894	0.974	0.982	
5.1.a	Your satisfaction - Overall, you are very satisfied with the hospital's experience in resolving this complaint.	0.955			
5.1.b	Overall, you are satisfied with the hospital's process in handling this complaint.	0.960			
5.1.c	Overall, the hospital has provided you with a satisfactory solution.	0.953			
5.1.d	Overall, you are satisfied with the doctors at this hospital.	0.922			
5.1.e	Overall, you are satisfied with the nurses at this hospital.	0.916			

5.1.f	Overall, you are satisfied with the other staff at this hospital.	0.934		
5.1.g	Overall, you are satisfied with the doctor - patient relationship at this hospital.	0.958		
5.1.h	Overall, you are satisfied with the service quality at this hospital.	0.966		
5.2.a	This hospital will be your first choice for your next visit.		0.987	
5.2.b	You will continue to choose this hospital in the future.		0.990	
5.2.c	Even if there are other options, you will still choose this hospital next time.		0.987	
5.2.d	From now on, you are inclined to choose this hospital.		0.984	
5.3.a	You are willing to recommend this hospital to others.			0.990
5.3.b	If someone asks for your review, you will give this hospital a positive rating.			0.993
5.3.c	You will encourage your relatives and friends to choose this hospital.			0.991
5.3.d	You are willing to leave a positive review for this hospital online.			0.991

Specifically, the first-order factor loadings for service failure scenarios exceed 0.5, and the AVE values are all above 0.5, satisfying the requirements for convergent validity. For example, the factor loadings for "severity" range from 0.898 ("This situation is very unfair") to 0.939 ("It causes much stress"), with an AVE of 0.851. For "service failure attribution," the factor loading for "cause is controllable" is 0.911, with an AVE of 0.71, both of which meet the standard of AVE > 0.5 and factor loadings > 0.5.

The first-order factor loadings for awareness of hospital recovery policies are above 0.5, and the AVE values all exceed 0.5, satisfying the requirements for convergent validity.

The first-order factor loadings for hospital service recovery strategies exceed 0.5, and the AVE values are all above 0.5, meeting the requirements for convergent validity. Specifically, the factor loadings for "response speed" all exceed 0.994 (for example, "After you provided feedback to the hospital about your dissatisfaction, the hospital immediately began to handle it" is 0.996), with an AVE of 0.99. The factor loadings for "apology and explanation" range from 0.979 to 0.983, with an AVE of 0.964, indicating strong convergent validity. The factor loadings for "compensation" range from 0.950 to 0.984, with an AVE of 0.932, fulfilling the criteria for convergent validity.

The first-order factor loadings for perceived justices are all above 0.5, and the AVE values exceed 0.5, satisfying the criteria for convergent validity. Specifically, the factor loadings for

"interactional fairness" range from 0.978 to 0.988, with an AVE of 0.966; the loadings for "informational fairness" range from 0.974 to 0.984, with an AVE of 0.960; the loadings for "outcome fairness" range from 0.980 to 0.986, with an AVE of 0.969; and the loadings for "procedural fairness" range from 0.971 to 0.980, with an AVE of 0.95. These results demonstrate that all items strongly align with their respective dimensions.

The first-order factor loadings for patient subsequent behavioral intentions are above 0.5, and all AVE values exceed 0.5, satisfying the criteria for convergent validity. Specifically, the factor loadings for "satisfaction" range from 0.916 to 0.966, with an AVE of 0.894; the factor loadings for "loyalty" range from 0.984 to 0.987, with an AVE of 0.974; and the factor loadings for "word of mouth" range from 0.990 to 0.993, with an AVE of 0.982. All items strongly agree with their corresponding dimensions.

5.1.2.2 Discriminant validity of first-order variables

The data on the diagonal in Table 5.3 represent the square root of the AVE, which is higher than the correlation coefficients between all variables. As shown in Table 5.3, the HTMT values for most first-order variables are below 0.85. Although a few values slightly surpass the acceptable reference range from a statistical standpoint, these indicators are still kept in the data analysis based on a theoretical perspective. Overall, the criteria for discriminant validity of the first-order variables are satisfied.

Table 5.3 First-order variable discriminant validity

	1.1 Severity	1.2 Service Failure Attribution	2.1 Service Recovery Policy Awareness	3.1 Response Speed	3.2 Apology and Explanation	3.3 Compensation	4.1 Interactional Fairness	4.2 Informational Fairness	4.3 Outcome Fairness	4.4 Procedural Fairness	5.1 Satisfaction	5.2 Loyalty	5.3 Recommendation
Fornell - Larcker Criterion													
1.1 Severity	0.922												
1.2 Attribution of Service Failure	0.793	0.843											
2.1 Awareness of Service Recovery Policy	-0.541	-0.538	0.976										
3.1 Response Speed	-0.539	-0.501	0.661	0.982									
3.2 Apology and Explanation	-0.523	-0.515	0.645	0.862	0.966								
3.3 Compensation	-0.551	-0.541	0.593	0.774	0.86	0.995							
4.1 Interactional Fairness	-0.553	-0.532	0.681	0.756	0.754	0.69	0.983						
4.2 Informational Fairness	-0.555	-0.538	0.684	0.75	0.756	0.722	0.926	0.98					
4.3 Outcome Fairness	-0.558	-0.541	0.672	0.72	0.759	0.736	0.878	0.938	0.984				
4.4 Procedural Fairness	-0.564	-0.541	0.692	0.755	0.749	0.719	0.932	0.967	0.935	0.975			
5.1 Satisfaction	-0.555	-0.542	0.679	0.729	0.744	0.708	0.784	0.793	0.774	0.795	0.946		
5.2 Loyalty	-0.564	-0.553	0.651	0.717	0.704	0.695	0.758	0.793	0.771	0.786	0.896	0.987	

	1.1 Severity	1.2 Service Failure Attribution	2.1 Service Recovery Policy Awareness	3.1 Response Speed	3.2 Apology and Explanation	3.3 Compensation	4.1 Interactional Fairness	4.2 Informational Fairness	4.3 Outcome Fairness	4.4 Procedural Fairness	5.1 Satisfaction	5.2 Loyalty	5.3 Recommendation
5.3 Recommendation	-0.564	-0.558	0.667	0.714	0.706	0.696	0.767	0.799	0.773	0.791	0.908	0.968	0.991
HTMT													
1.1 Severity													
1.2 Attribution of Service Failure	0.868												
2.1 Awareness of Service Recovery Policy	0.561	0.581											
3.1 Response Speed	0.559	0.542	0.669										
3.2 Apology and Explanation	0.545	0.56	0.657	0.878									
3.3 Compensation	0.568	0.581	0.597	0.78	0.871								
4.1 Interactional Fairness	0.572	0.576	0.687	0.764	0.767	0.694							
4.2 Informational Fairness	0.576	0.582	0.692	0.76	0.771	0.729	0.937						
4.3 Outcome Fairness	0.578	0.584	0.679	0.729	0.772	0.741	0.886	0.95					
4.4 Procedural Fairness	0.585	0.586	0.701	0.765	0.764	0.725	0.942	0.981	0.946				

	1.1 Severity	1.2 Service Failure Attribution	2.1 Service Recovery Policy Awareness	3.1 Response Speed	3.2 Apology and Explanation	3.3 Compensation	4.1 Interactional Fairness	4.2 Informational Fairness	4.3 Outcome Fairness	4.4 Procedural Fairness	5.1 Satisfaction	5.2 Loyalty	5.3 Recommendation
5.1 Satisfaction	0.577	0.587	0.689	0.74	0.759	0.715	0.794	0.806	0.785	0.807			
5.2 Loyalty	0.584	0.597	0.657	0.725	0.715	0.699	0.765	0.802	0.779	0.795	0.907		
5.3 Recommendation	0.583	0.601	0.673	0.721	0.717	0.699	0.772	0.807	0.779	0.798	0.918	0.975	

5.2 Reliability and validity analysis of second-order variables

5.2.1 Importance of indicators

To validate the second-order constructs such as service failure scenarios, service recovery strategies, perceived fairness, and patient subsequent intentions, we followed the guidelines discussed by Marakas et al. (2007). First, we assessed the significance of the indicators, which only included effects from first-order to second-order factors. As shown in Table 5.4, all β coefficients are statistically significant (with p-values below 0.01), and all t-values exceed 1.96. These results confirm the validity of the formative factors and their higher-order constructs for service failure attribution, severity, response speed, apology and explanation, compensation, interactional fairness, informational fairness, outcome fairness, procedural fairness, satisfaction, loyalty, and recommendation.

Table 5.4 Importance of indicators

Second - order variable	Relationship	Initial coefficient	Mean coefficient	Standard deviation	t - value	p - value
Service Failure Scenarios	Service failure scenarios -> 1.1 Severity	0.945	0.945	0.008	125.161	< 0.001
	Service failure scenarios -> 1.2 Attribution of service failure	0.948	0.948	0.008	124.806	< 0.001
Service Recovery Strategies	Service Recovery Strategies -> 3.1 Response Speed	0.932	0.933	0.008	121.1	< 0.001
	Service Recovery Strategies -> 3.2 Apology and Explanation	0.963	0.963	0.004	222.101	< 0.001
	Service Recovery Strategies -> 3.3 Compensation	0.932	0.932	0.008	114.831	< 0.001
Perceived Fairness	Perceived Fairness -> 4.1 Interactional Fairness	0.963	0.963	0.006	164.748	< 0.001
	Perceived Fairness -> 4.2 Informational Fairness	0.983	0.983	0.003	345.198	< 0.001
	Perceived Fairness -> 4.3 Outcome Fairness	0.96	0.96	0.005	204.369	< 0.001
	Perceived Fairness -> 4.4 Procedural Fairness	0.986	0.986	0.002	468.483	< 0.001
Patient Subsequent Intentions	Patient Subsequent Intentions -> 5.1 Satisfaction	0.975	0.975	0.003	295.296	< 0.001
	Patient Subsequent Intentions -> 5.2 Loyalty	0.969	0.969	0.004	222.389	< 0.001
	Patient Subsequent Intentions -> 5.3 Recommendation	0.974	0.974	0.003	342.169	< 0.001

To identify multicollinearity in the model, we calculated the variance inflation factor (VIF) for each latent variable. The results indicate that the VIF values for all latent variables are below 5 (VIF range: 1.23-4.56), showing no significant multicollinearity problems. See Table 5.5.

Table 5.5 Internal model collinearity statistics

	Initial Coefficient	Mean Coefficient	Standard Deviation	0.025	0.975
2.1 Awareness of Service Recovery Policy -> Service Recovery Strategies	1.485	1.489	0.003	1.380	1.609
Patient Subsequent Intentions -> 5.1 Satisfaction	1.000	1.000	0.000	1.000	1.000
Patient Subsequent Intentions -> 5.2 Loyalty	1.000	1.000	0.000	1.000	1.000
Patient Subsequent Intentions -> 5.3 Recommendation	1.000	1.000	0.000	1.000	1.000
Perceived Fairness -> 4.1 Interactional Fairness	1.000	1.000	0.000	1.000	1.000
Perceived Fairness -> 4.2 Informational Fairness	1.000	1.000	0.000	1.000	1.000
Perceived Fairness -> 4.3 Outcome Fairness	1.000	1.000	0.000	1.000	1.000
Perceived Fairness -> 4.4 Procedural Fairness	1.000	1.000	0.000	1.000	1.000
Perceived Fairness -> Patient Subsequent Intentions	2.847	2.889	0.042	2.326	3.602
Service Failure Scenarios -> 1.1 Severity	1.000	1.000	0.000	1.000	1.000
Service Failure Scenarios -> 1.2 Attribution of Service Failure	1.000	1.000	0.000	1.000	1.000
Service Failure Scenarios -> Service Recovery Strategies	1.485	1.489	0.003	1.380	1.609
Service Recovery Strategies -> 3.1 Response Speed	1.000	1.000	0.000	1.000	1.000
Service Recovery Strategies -> 3.2 Apology and Explanation	1.000	1.000	0.000	1.000	1.000
Service Recovery Strategies -> 3.3 Compensation	1.000	1.000	0.000	1.000	1.000
Service Recovery Strategies -> Patient Subsequent Intentions	2.847	2.889	0.042	2.326	3.602
Service Recovery Strategies -> Perceived Fairness	1.000	1.000	0.000	1.000	1.000

5.2.2 Reliability test of second-order variables

The reliability analysis results for the second-order variables are presented in Table 5.6. As shown in the table, the Cronbach's α values for all second-order variables surpass the standard of 0.8, and the CR values are all above 0.7. Specifically, for service failure scenarios, Cronbach's α is 0.944 and CR is 0.946; for service recovery strategies, α is 0.984 and CR is 0.959; for perceived fairness, α is 0.994 and CR is 0.986; and for patient subsequent intentions, α is 0.991 and CR is 0.981. These findings indicate that the first-order factors linked to each second-order variable are highly consistent, and the measurement models for the second-order variables demonstrate excellent reliability.

Table 5.6 Reliability of second-order variables

	Cronbach's α	Composite Reliability (CR)
Service Failure Scenarios	0.944	0.946
Service Recovery Strategies	0.984	0.959
Perceived Fairness	0.994	0.986
Patient Subsequent Intentions	0.991	0.981

5.2.3 Convergent validity of second-order variables

As shown in Figure 5.1 and Tables 5.7, the factor loadings for all second-order variables are above 0.5, and the AVE values are all greater than 0.5, demonstrating that the convergent validity of the second-order variables meets the criteria.

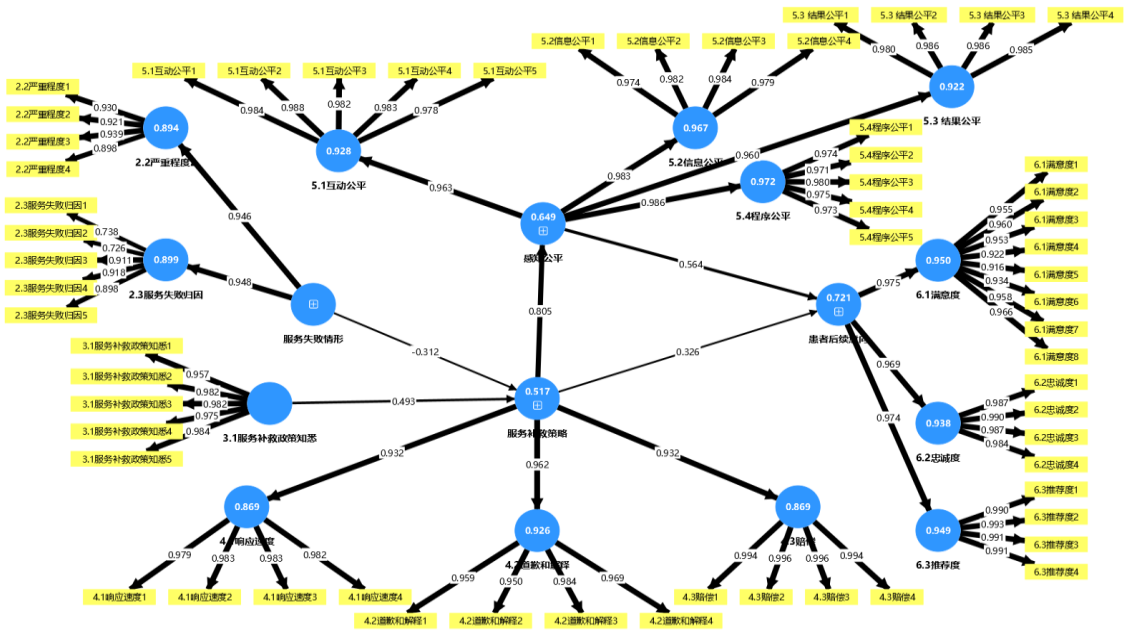

Figure 5.1 Factor loadings

Specifically, as shown in Table 5.7, the factor loadings for the second-order variable "service failure scenarios" are above 0.5, and the AVE values are all greater than 0.5, indicating that the convergent validity of the second-order variable "service failure scenarios" meets the standards. The AVE for service failure scenarios is 0.692, and the factor loadings for each measurement indicator range from 0.733 to 0.876. The lowest loading is for "Service Failure Attribution 1," with a factor loading of 0.733; the highest is for "Severity 1," with a factor loading of 0.876.

Table 5.7 Second-order AVE

	Loading
Service failure-AVE	0.692
1.1 Severity a	0.876
1.1 Severity b	0.869
1.1 Severity c	0.870
1.1 Severity d	0.873
1.2 Attribution of Service Failure a	0.733
1.2 Attribution of Service Failure b	0.738
1.2 Attribution of Service Failure c	0.836
1.2 Attribution of Service Failure d	0.851
1.2 Attribution of Service Failure e	0.826
Service recovery-AVE	0.854
3.1 Response Speed a	0.899
3.1 Response Speed b	0.918
3.1 Response Speed c	0.920
3.1 Response Speed d	0.925
3.2 Apology and Explanation a	0.916
3.2 Apology and Explanation b	0.912
3.2 Apology and Explanation c	0.943
3.2 Apology and Explanation d	0.945
3.3 Compensation a	0.929
3.3 Compensation b	0.929
3.3 Compensation c	0.925
3.3 Compensation d	0.927
Perceived justice-AVE	0.910
4.1 Interactional Fairness a	0.944
4.1 Interactional Fairness b	0.944
4.1 Interactional Fairness c	0.953
4.1 Interactional Fairness d	0.937
4.1 Interactional Fairness e	0.954
4.2 Informational Fairness a	0.965
4.2 Informational Fairness b	0.967
4.2 Informational Fairness c	0.958
4.2 Informational Fairness d	0.963
4.3 Outcome Fairness a	0.935
4.3 Outcome Fairness b	0.948
4.3 Outcome Fairness c	0.947
4.3 Outcome Fairness d	0.950
4.4 Procedural Fairness a	0.962
4.4 Procedural Fairness b	0.955
4.4 Procedural Fairness c	0.962

4.4 Procedural Fairness d	0.961
4.4 Procedural Fairness a	0.964
Patient' subsequent intentions-AVE	0.886
5.1 Satisfaction a	0.922
5.1 Satisfaction b	0.926
5.1 Satisfaction c	0.919
5.1 Satisfaction d	0.914
5.1 Satisfaction e	0.892
5.1 Satisfaction f	0.900
5.1 Satisfaction g	0.941
5.1 Satisfaction h	0.957
5.2 Loyalty a	0.954
5.2 Loyalty b	0.960
5.2 Loyalty c	0.953
5.2 Loyalty d	0.957
5.3 Word-of-Mouth a	0.961
5.3 Word-of-Mouth b	0.973
5.3 Word-of-Mouth c	0.963
5.3 Word-of-Mouth d	0.965

The factor loadings for the second-order variable "service recovery strategies" are above 0.5, and the AVE values are all over 0.5, indicating that the convergent validity of the second-order variable "service recovery strategies" meets the standards. The AVE for service recovery strategies is 0.854, and the factor loadings for each measurement indicator range from 0.899 to 0.927. The lowest loading is for "Response Speed 1," with a factor loading of 0.899; the highest is for "Compensation 4," with a factor loading of 0.927.

The factor loadings for the second-order variable "perceived fairness" are above 0.5, and all AVE values exceed 0.5, indicating that the convergent validity of the second-order variable "perceived fairness" meets the criteria. The AVE for perceived fairness is 0.910, and the factor loadings for each measurement indicator range from 0.935 to 0.967. The lowest loading is for "Outcome Fairness 1," with a factor loading of 0.935; the highest is for "Informational Fairness 2," with a factor loading of 0.967.

The factor loadings for the second-order variable "patient' subsequent intentions" are above 0.5, and the AVE values all exceed 0.5, indicating that the convergent validity of the second-order variable "patient subsequent intentions" meets the standards. The AVE for patient subsequent intentions is 0.886, with factor loadings for each measurement indicator ranging from 0.892 to 0.973. The lowest loading is for "satisfaction 5," at 0.892; the highest is for "recommendation 2," at 0.973.

The data on the diagonal in Table 5.8 show the square root of the AVE. The AVEs for patient subsequent intentions, perceived fairness, service failure scenarios, and service recovery strategies are 0.941, 0.954, 0.832, and 0.924, respectively. It is clear that the square root of the

AVE is higher than the correlation coefficients among all variables. We used the HTMT ratio to evaluate discriminant validity between all independent factors (second-order variables). To pass this test, the HTMT ratio must be below 1.00 (Henseler et al., 2015). The results of discriminant validity for the second-order variables are shown in Table 5.8, with HTMT ratios between factors ranging from 0.618 to 0.833; all ratios remained below 1.00. Consequently, the discriminant validity of the second-order variables meets the criteria.

Table 5.8 Second-order variable discriminant validity analysis

	Patient Subsequent Intentions	Perceived Fairness	Service Failure Scenarios	Service Recovery Strategies
Fornell - Larcker Criterion				
Patient Subsequent Intentions	0.941			
Perceived Fairness	0.827	0.954		
Service Failure Scenarios	-0.604	-0.597	0.832	
Service Recovery Strategies	0.780	0.805	-0.594	0.924
HTMT				
Patient Subsequent Intentions				
Perceived Fairness	0.833			
Service Failure Scenarios	0.626	0.618		
Service Recovery Strategies	0.790	0.814	0.618	

5.3 Structural equation modeling (SEM) analysis results

After testing the measurement model for reliability and validity, this study used SmartPLS 4.0 software to analyze the structural equation model (SEM). The SEM consists of two main parts: the structural equations and the measurement equations. The structural equations primarily examine the effects of independent variables on dependent variables and the causal relationships between them. In contrast, the measurement equations focus on the relationships between latent variables (i.e., independent and dependent variables) and their observed measurement indicators. The results of the structural equations and the path coefficients are presented in Figure 5.2. The evaluation of the formative structural model mainly relies on three criteria: (1) the R^2 of endogenous variables, (2) the estimates of path coefficients, and 3) the effect size (f^2) of hypothesis relationships.

5.3.1 Descriptive statistics

Descriptive analysis was performed on the scores of each variable using mean and standard deviation. Based on the dimensions and scoring methods related to the items of service failure scenarios, service recovery strategies, perceived fairness, and patient subsequent intentions, the evaluation scores for dynamic capabilities and service capabilities were summarized with mean and standard deviation. Specific results are shown in Table 5.9.

Table 5.9 Descriptive results of each variable

Second - order Variable	First - order Variable	Question Number	Item	Mean	Standard Deviation
1. Service Failure Scenarios	1.1 Severity	1.1.a.	The situation you complained about is very serious.	5.638	1.706
		1.1.b.	This situation has caused you a great deal of inconvenience.	5.951	1.563
		1.1.c.	This situation has caused you a great deal of stress.	5.609	1.745
		1.1.d.	This situation is very unfair.	5.777	1.669
	1.2 Attribution of Service Failure	1.2.a.	The situation that occurred this time was not intentional on the part of the hospital.	4.969	2.101
		1.2.b.	The situation that occurred this time was not intentional on the part of the doctor.	5.018	2.228
		1.2.c.	The cause of this complaint is something the hospital can control.	6.137	1.482
		1.2.d.	The cause of this complaint is something the hospital could have prevented.	6.182	1.452
		1.2.e.	The hospital could have done something to avoid this situation.	6.189	1.448
2. Hospital's Remedial Policy	2.1 Awareness of Remedial Policy	2.1.a.	You are very clear about the government's requirement for hospitals to establish relevant systems for complaint management and medical dispute resolution.	4.777	2.059
		2.1.b.	You are very familiar with the procedures for handling complaints and disputes in the relevant hospital systems.	4.695	2.060
		2.1.c.	You are very familiar with the time - limit requirements for handling complaints and disputes in the relevant hospital systems.	4.658	2.066
		2.1.d.	You are very familiar with the outcomes of handling	4.650	2.080

Second - order Variable	First - order Variable	Question Number	Item	Mean	Standard Deviation
			complaints and disputes in the relevant hospital systems.		
		2.1.e.	You are very familiar with the relevant hospital systems that develop different handling plans for different complaint and dispute scenarios.	4.609	2.082
	3.1 Apology	3.1.a	You have received an apology from the hospital.	5.018	2.129
		3.1.b	The hospital's apology is very sincere.	4.986	2.140
		3.1.c	The hospital acknowledges its responsibility.	5.000	2.151
		3.1.d	The hospital has provided an appropriate explanation for your experience.	4.978	2.158
	3.2Compensation	3.2.a	The hospital has offered you a very reasonable compensation plan.	5.277	2.098
		3.2.b	The hospital has offered you a very reasonable compensation plan based on the type of loss you have suffered.	5.231	2.116
3. Service Recovery Strategies		3.2.c	The hospital has offered you a very reasonable compensation plan based on the extent of your loss.	5.133	2.164
		3.2.d	The hospital has offered you a very reasonable compensation plan based on the demands you have made.	5.016	2.221
	3.3 Response Speed	3.3.a	After you expressed your dissatisfaction to the hospital, it responded quickly.	4.636	2.363
		3.3.b	After you expressed your dissatisfaction to the hospital, it began to handle the matter immediately.	4.609	2.347
		3.3.c	After you expressed your dissatisfaction to the hospital, it promptly investigated the situation.	4.613	2.344
		3.3.d	After you expressed your dissatisfaction to the hospital, it resolved the situation quickly.	4.645	2.339
4. Perceived Fairness	4.1 Interactional Fairness	4.1.a	The hospital was very patient when dealing with your situation (B. Choi & Choi, 2014).	5.124	2.129

Second - order Variable	First - order Variable	Question Number	Item	Mean	Standard Deviation
		4.1.b	The hospital showed a lot of empathy when dealing with your situation.	5.085	2.151
		4.1.c	The hospital took your situation very seriously.	5.038	2.175
		4.1.d	The relevant personnel were very respectful to you when handling the situation.	5.169	2.095
		4.1.e	The relevant personnel were very proactive and diligent during the resolution process.	5.079	2.141
	4.2 Informational Fairness	4.2.a	You understood the reasons for the complaint.	4.962	2.212
		4.2.b	The hospital provided you with the necessary relevant information.	5.013	2.152
		4.2.c	The hospital proactively explained the relevant circumstances during the complaint handling process.	5.059	2.143
		4.2.d	The hospital fully communicated with you regarding the final resolution plan.	5.072	2.170
	4.3 Outcome Fairness	4.3.a	Considering the time and effort the hospital spent on handling this complaint, you believe the final outcome is fair.	4.905	2.221
		4.3.b	Overall, the hospital's final response was sufficient to resolve your complaint.	4.937	2.207
		4.3.c	Your complaint was handled fairly.	4.942	2.193
		4.3.d	Although there was a complaint, you are satisfied with the hospital's handling outcome.	4.941	2.204
	4.4 Procedural Fairness	4.4.a	The hospital handled your complaint fairly and reasonably.	5.013	2.131
		4.4.b	The hospital's use of rules and regulations in handling your complaint was fair and reasonable.	5.043	2.129
		4.4.c	The hospital demonstrated sufficient flexibility in dealing with this complaint.	5.009	2.151
		4.4.d	After the complaint arose, you believe the hospital initiated	5.020	2.162

Second - order Variable	First - order Variable	Question Number	Item	Mean	Standard Deviation
			the handling procedure in a very timely manner.		
		4.4.e	The hospital's complaint handling process is fair and just.	5.036	2.133
		5.1.a	Your satisfaction - Overall, you are very satisfied with the hospital's experience in resolving this complaint.	4.924	2.196
		5.1.b	Overall, you are satisfied with the hospital's process in handling this complaint.	4.899	2.187
		5.1.c	Overall, the hospital has provided you with a satisfactory solution.	4.919	2.190
	5.1 Patient Satisfaction	5.1.d	Overall, you are satisfied with the doctors at this hospital.	5.002	2.095
		5.1.e	Overall, you are satisfied with the nurses at this hospital.	5.141	2.028
		5.1.f	Overall, you are satisfied with the other staff at this hospital.	5.178	1.976
		5.1.g	Overall, you are satisfied with the doctor - patient relationship at this hospital.	5.077	2.026
		5.1.h	Overall, you are satisfied with the service quality at this hospital.	5.022	2.074
5. Remediation Effectiveness		5.2.a	This hospital will be your first choice for your next visit.	4.899	2.127
		5.2.b	You will continue to choose this hospital in the future.	4.897	2.121
	5.2 Loyalty	5.2.c	Even if there are other options, you will still choose this hospital next time.	4.778	2.201
		5.2.d	From now on, you are inclined to choose this hospital.	4.742	2.198
		5.3.a	You are willing to recommend this hospital to others.	4.773	2.188
		5.3.b	If someone asks for your review, you will give this hospital a positive rating.	4.804	2.153
	5.3 Word - of - Mouth	5.3.c	You will encourage your relatives and friends to choose this hospital.	4.771	2.185
		5.3.d	You are willing to leave a positive review for this hospital online.	4.750	2.186

5.3.2 Analysis results of the research model and hypotheses

The results of the structural model are shown in Figure 5.2 and summarized in Table 5.10. The values in Figure 5.2 include path coefficients and their t-values, which indicate a good model fit with high R^2 values and significant path coefficients. Overall, the current model demonstrates a good fit based on these criteria. The R^2 values for the three dependent variables—service recovery strategies, perceived fairness, and patient subsequent intentions behavior (latent constructs)—all exceed 0.5, showing the model has strong explanatory power. In this study, the total variance explained by the model (shown in the center of the endogenous variables) is sufficient, as the model accounts for 72.1% of patients' subsequent intentions.

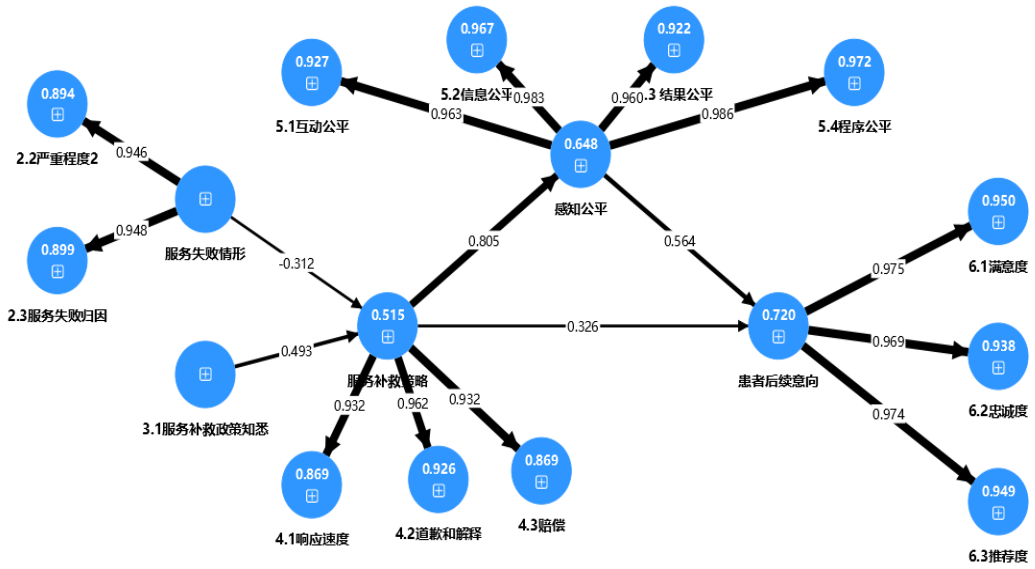

Figure 5.2 Results of structural equation model testing

The model presented in this study includes four statistically significant hypotheses ($p < 0.001$ and $p < 0.05$): H1, H2, H3, and H4. The overall analysis results for the R^2 values, path coefficients, total effects, and effect sizes (f^2) of each hypothesis relationship demonstrate a good model fit, as shown in Table 5.10. These tests not only provide statistical validation for the model and the proposed hypotheses but also offer valuable insights for researchers and practitioners. A brief discussion of the insights gained from interpreting the statistical results of each hypothesis is provided. For further discussion, please refer to Chapter 6.

Table 5.10 Hypotheses, path coefficient and test results

Hypothesis Number	Established	Relationship	Initial Coefficient β	Mean Coefficient	Standard Deviation	t - value	p - value	f2 Value
H1	YES	Service Failure Scenarios -> Service Recovery Strategies	-0.312	-0.313	0.028	11.179	< 0.001	0.136
H2	YES	Awareness of Service Recovery Policy -> Service Recovery Strategies	0.493	0.493	0.037	13.376	< 0.001	0.339
H3	YES	Service Recovery Strategies -> Perceived Fairness	0.805	0.806	0.024	33.283	< 0.001	1.847
H4	YES	Perceived Fairness -> Patient Subsequent Intentions	0.564	0.564	0.060	9.402	< 0.001	0.401

H1: Service failure characteristics negatively impact service recovery strategies ($\beta = -0.312$, $t=11.179$, $p < 0.001$). Empirical analysis indicates a medium effect size ($f^2 = 0.136$). Specifically, the service failure characteristics discussed in this study include two dimensions: "severity" and "attribution of service failure". The empirical analysis results of these two dimensions are as follows:

(1) Severity: the Cronbach's α for severity is 0.941, and the Composite Reliability (CR) is 0.958, reflecting very high reliability; all factor loadings are above 0.898, and the Average Variance Extracted (AVE) is 0.851, demonstrating good convergent validity. Descriptive statistics show that the mean scores of items for "severity" range from 5.609 to 5.951, with standard deviations from 1.563 to 1.745. This suggests that patients strongly perceive the severity of service failure, though individual differences exist. Regarding discriminant validity, the square root of the AVE for "severity" is 0.922, which exceeds its correlations with recovery strategy dimensions such as "response speed" and "compensation" (all < 0.551), and the Heterotrait-Monotrait Ratio (HTMT) is 0.559, below the threshold of 0.85. These findings indicate that the two constructs are independent but negatively correlated. Moreover, the f^2 of service failure scenarios on recovery strategies is 0.136 (medium effect), with severity contributing the most variance, confirming its central role in the negative relationship.

(2) Service failure attribution: The controllability attribution of service failure is negatively linked to perceptions of service recovery strategies. The AVE of service failure attribution is 0.71, and the factor loadings show that each measurement item strongly correlates with controllability attribution (see Table 5.2). Descriptive statistics reveal that the mean scores of multiple indicators are above 6 on a 7-point scale, all in the high-score range. This indicates that patients generally believe hospitals are responsible for service failures, meaning survey participants tend to view hospitals as controllable sources of failure. In the structural equation model, the indirect effect of service failure attribution on recovery strategies is transmitted through the overall path ($\beta = -0.312$). Coupled with its correlation coefficient of -0.541 with recovery strategies (see Table 5.7), this confirms that higher controllability attribution corresponds to a worse perception of recovery strategies. Regarding HTMT values, the HTMT between "service failure attribution" and "response speed" is 0.542, and between "service failure attribution" and "compensation" is 0.581; both are below 0.85, confirming discriminant validity. However, the negative correlation coefficients suggest that higher controllability attribution leads to lower evaluations of each recovery strategy dimension, such as speed and compensation. The negative impact of service failure scenarios in the overall model ($\beta = -0.312$) and the high proportion of attribution in this effect (factor loading = 0.948, see Table 5.8) demonstrate that "service failure attribution" has a significant independent negative effect on "service recovery strategies".

The above empirical results regarding the impact of service failure characteristics on service recovery strategies are consistent with the conclusions drawn from similar research such as (de Mesquita et al., 2023) and (Nikbin et al., 2014). These findings indicate that the higher the severity of service failure and the greater the hospital's responsibility for the service failure, the poorer the effectiveness of recovery strategies. Therefore, it is imperative for hospitals to improve internal management and standards to minimize the escalation and expansion of service failures and reduce institutional negligence as much as possible.

H2: Hospitals' service recovery policies influence service recovery strategies ($\beta = 0.493$, $t = 13.376$, $p < 0.001$). For each 1-unit increase in policy awareness, the perception of recovery strategies rises by 0.493 units. This shows that the clearer the service recovery policies of medical institutions, the more likely patients are to recognize the service recovery strategies. The R^2 value for service recovery strategies is 0.517, with awareness of service recovery policies accounting for 33.9% of the variance, making it the key factor affecting the perception of recovery strategies. However, descriptive statistics indicate that patients' average policy

awareness generally falls below 5, with the lowest mean value of "understanding handling plans for different scenarios" at 4.609. This suggests that patients lack sufficient knowledge of the policies.

The empirical results show that the clearer patients' understanding of medical institutions' service recovery policies is, the higher their recognition of the recovery plans adopted by hospitals will be. However, according to the sample data, patients' overall awareness of such policies is generally low. Therefore, it is necessary for hospitals to strengthen relevant publicity and education efforts to enhance patients' understanding of the hospital's service recovery policies.

H3: Service recovery strategies are positively linked to patients' perceived justice ($\beta = 0.805$, $t = 33.283$, $p < 0.001$), and the effectiveness of recovery strategies has a very strong explanatory power for perceived justice ($f^2 = 1.847$). In terms of model explanatory power, the R^2 value for perceived justice is 0.648, with service recovery strategies explaining 80.5% of the variance, making it the main factor influencing perceived justice. At the first-order variable level, regarding descriptive statistics, the mean value of "compensation rationality" is 5.133, the mean of "sincerity of apology" is 4.986, and the mean of "response speed" is 4.636. These values indicate a positive trend in correlation with the mean scores of each perceived justice dimension (4.905–5.169), confirming that better implementation of recovery strategies leads to higher perceived justice. Each component of service recovery strategies has a significant positive relationship with each component of perceived justice.

(1) Response speed: the correlation coefficient between response speed and "interactional justice" is 0.756, with "informational justice" is 0.750, with "distributive justice" is 0.720, and with "procedural justice" is 0.755;

(2) Apology and explanations: the correlation coefficient between apology explanations and "interactional justice" is 0.754, with "informational justice" is 0.756, with "distributive justice" is 0.759, and with "procedural justice" is 0.749;

(3) Compensation: the correlation coefficient between compensation and "interactional justice" is 0.690, with "informational justice" is 0.722, with "distributive justice" is 0.736, and with "procedural justice" is 0.719.

At the second-order variable level, the results of the analysis on the impact of service recovery on patients' perceived justice are basically consistent with the conclusions of Prior research, such as Nuansi and Ngamcharoenmongkol (2021) and Z. X. Wang and Lu (2018). However, there are discrepancies in the conclusions at the first-order variable level. Q. Yao and

Song (2018) and J. Yan et al. (2013) argued that the recovery strategy with the greatest impact on distributive justice should be compensation, but the findings of this research indicate that apology and explanation exert the most significant influence on distributive justice, followed by compensation. C. Wei et al. (2020) proposed that apology and explanation have the strongest effect on interactional justice, yet this research shows that the impact of response speed on interactional justice is almost equivalent to that of apology and explanation.

The above conclusions imply that after a service failure occurs, medical institutions should respond promptly, offer apologies and explanations to patients, and provide reasonable compensation. Given that apology and explanation have a greater impact on distributive justice than compensation, more emphasis should be placed on training employees responsible for service recovery in terms of effective communication and related competencies.

H4: Perceived justice is positively linked to patients' subsequent intentional behavior ($\beta = 0.564$, $t = 9.402$, $p < 0.001$). For every 1-unit increase in perceived justice, the subsequent intention rises by 0.564 units. The model has strong explanatory power, with a notable effect size ($f^2 = 0.401$). Regarding the model's explanatory power, the R^2 value for patients' subsequent intention is 0.721, with perceived justice directly accounting for 64.9% of the variance ($R^2 = 0.649$), making it the key factor influencing subsequent intention. At the first-order variable level, each dimension of perceived justice shows a significant positive correlation with every indicator of patients' subsequent intention:

(1) the correlation coefficient between interactional justice and satisfaction is 0.784, with loyalty 0.758, and with word-of-mouth 0.767;

(2) the coefficient between informational justice and satisfaction is 0.793, with loyalty 0.793, and with word-of-mouth 0.799;

(3) the correlation between distributive justice and satisfaction is 0.774, with loyalty 0.771, and with word-of-mouth 0.773; and between procedural justice and satisfaction is 0.795, with loyalty 0.786, and with word-of-mouth 0.791.

The above research conclusions are consistent with the viewpoints of Mathew et al., （2020) and Z. X. Wang and Lu (2018), indicating that it is feasible for medical institutions to achieve more effective service recovery by improving patients' level of perceived justice during the service recovery process.

5.3.3 Mediating effects of second-order variables

Building on previous mediation effect testing procedures, Zhao et al. (2010) proposed a new method for testing mediating effects, suggesting that only indirect mediating effects need to be considered, as shown in Figure 5.3. We followed the latest method they proposed for testing mediating effects—the Bootstrap method. Simulating the study to find bias-corrected percentiles provides more accurate confidence interval estimates. In SmartPLS 4.0, the Bootstrap samples were set to 5000.

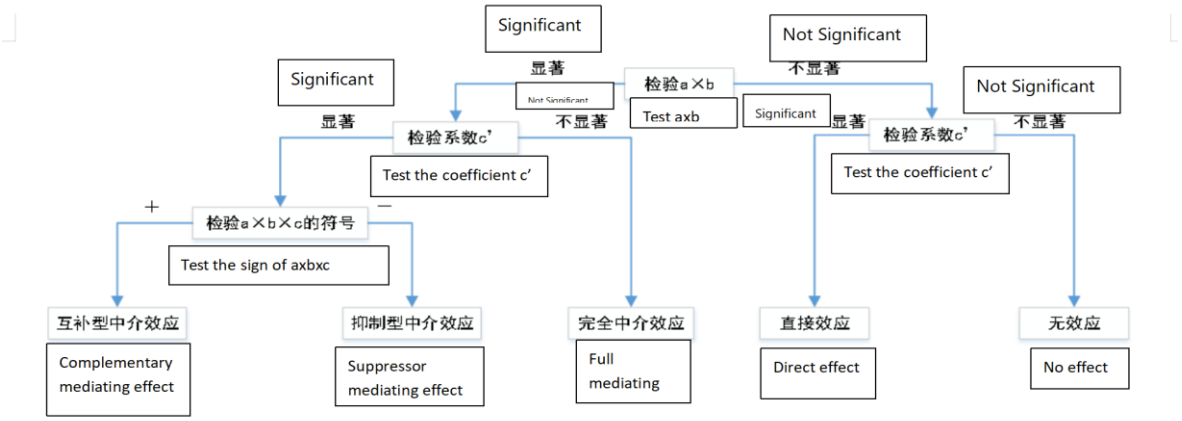

Figure 5.3 Type of mediating effect

Source: Zhao et al. (2010)

According to Zhao et al. (2010), to test the mediating role of the second-order variable "perceived fairness," we examined the direct relationships between service failure scenarios, awareness of service recovery policies, service recovery strategies, and the outcome variable patient subsequent intentions. The results indicated that service failure scenarios, awareness of service recovery policies, service recovery strategies, and patient subsequent intentions exhibit partial mediating effects, as shown in Figure 5.4 and Table 5.11.

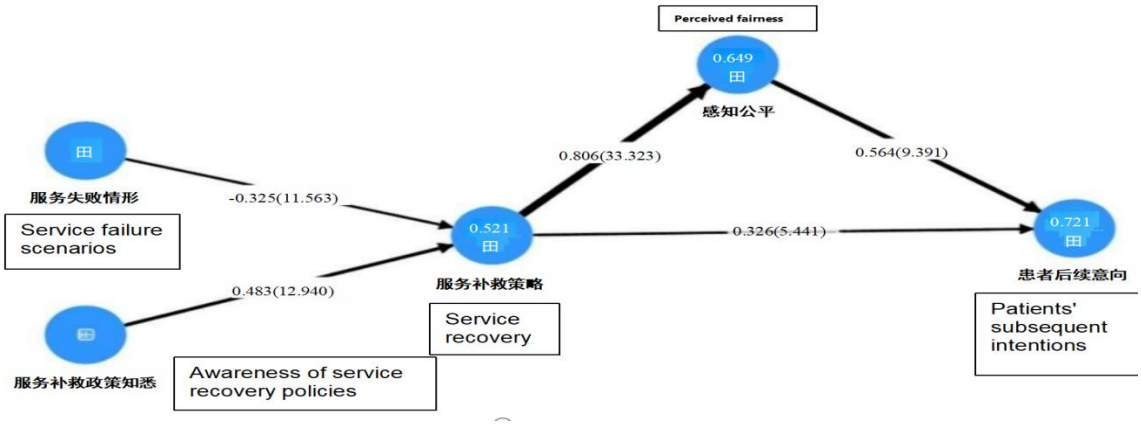

Figure 5.4 Mediating effect of second-order variables

Table 5.11 displays the total effects of second-order variables. The total effect of service failure scenarios on perceived fairness is -0.251 (t = 10.584, p < 0.001), and on patient subsequent intention behavior is -0.244 (t = 10.425, p < 0.001), both showing negative impacts. The total effect of awareness of service recovery policies on perceived fairness is 0.397 (t = 10.999, p < 0.001), and on patient subsequent intention behavior is 0.385 (t = 10.685, p < 0.001), both demonstrating positive influences. The total effect of service recovery strategies on patient subsequent intention behavior is 0.780 (t = 28.391, p < 0.001), indicating a strong positive impact.

Table 5.11 Results of mediating effect test for second-order variables - total

	Initial Coefficient β	Mean Coefficient	Standard Deviation	0.025	0.975	T - value	P - value	Type of Mediation
Service Failure Scenarios -> Perceived Fairness	-0.251	-0.252	0.024	-0.299	-0.205	10.584	＜0.001	Partial Mediation
Service Failure Scenarios -> Patient Subsequent Intentions	-0.244	-0.244	0.023	-0.290	-0.198	10.425	＜0.001	Partial Mediation
Awareness of Service Recovery Policy -> Perceived Fairness	0.397	0.397	0.036	0.327	0.469	10.999	＜0.001	Partial Mediation
Awareness of Service Recovery Policy -> Patient Subsequent Intentions	0.385	0.385	0.036	0.316	0.456	10.685	＜0.001	Partial Mediation
Service Recovery Strategies -> Patient Subsequent Intentions	0.780	0.780	0.027	0.724	0.832	28.391	＜0.001	Partial Mediation

Since the direct effects of service failure scenarios, awareness of service recovery policies, and service recovery strategies on patient subsequent intentions are significant, the relationships among these variables are partially mediated by service recovery strategies or perceived fairness, forming complementary mechanisms. Specifically, the direct effect of service recovery strategies on patient subsequent intentions is 0.326, with an indirect effect of 0.454 (β = 0.805 × 0.564) through perceived fairness, leading to a total effect of 0.780. The directions of both the direct and indirect effects align, indicating a complementary mechanism. The indirect path coefficient for the "service failure scenario – service recovery strategy – perceived justice – patient subsequent intention" path is -0.142 (t = 7.200, p < 0.001). Its absolute value is lower

than the total effect (-0.244), but the direction remains consistent. Similarly, the indirect path coefficient for the "awareness of service recovery policies – service recovery strategy – perceived justice – patient subsequent intention" path is 0.224 ($t = 8.393$, $p < 0.001$). Its absolute value is less than the total effect (0.385), and the direction is consistent as well. These findings confirm the transmission chain through which service failure scenarios and awareness of service recovery policies influence patients' subsequent behavior via service recovery strategies and perceived justice. Moreover, this transmission process demonstrates a complementary nature. These results are presented in Table 5.12.

Table 5.12 Results of mediating effect test for second-order variables - indirect

	Initial Coefficient	Mean Coefficient	Standard Deviation	0.025	0.975	T - value	P - value	Type of Mediation
Service Failure Scenarios -> Service Recovery Strategies -> Perceived Fairness	-0.251	-0.252	-0.001	-0.298	-0.203	10.584	＜0.001	Complementary
Service Failure Scenarios -> Service Recovery Strategies -> Patient Subsequent Intentions	-0.102	-0.102	0.000	-0.147	-0.064	4.836	＜0.001	Complementary
Service Failure Scenarios -> Service Recovery Strategies -> Perceived Fairness -> Patient Subsequent Intentions	-0.142	-0.142	0.000	-0.184	-0.106	7.200	＜0.001	Complementary
Awareness of Service Recovery Policy -> Service Recovery Strategies ->	0.397	0.397	0.000	0.327	0.468	10.999	＜0.001	Complementary

	Initial Coefficient	Mean Coefficient	Standard Deviation	0.025	0.975	T - value	P - value	Type of Mediation
Perceived Fairness Awareness of Service Recovery Policy -> Service Recovery Strategies -> Patient Subsequent Intentions	0.161	0.161	0.001	0.099	0.238	4.531	＜0.001	Complementary
Awareness of Service Recovery Policy -> Service Recovery Strategies -> Perceived Fairness -> Patient Subsequent Intentions	0.224	0.224	-0.001	0.176	0.279	8.393	＜0.001	Complementary
Service Recovery Strategies -> Perceived Fairness -> Patient Subsequent Intentions	0.454	0.454	0.000	0.358	0.550	9.289	＜0.001	Complementary

Based on the above empirical analysis results, the following conclusions can be drawn:

Perceived justice partially mediates the relationship between service recovery strategies and patients' subsequent intentional behavior. The total effect of service recovery strategies on patients' deliberate actions is 0.780 ($t=28.391$, $p<0.001$); the direct effect on patients' intentional behavior is $\beta=0.326$ ($t=5.434$, $p<0.001$); the indirect effect, where service recovery strategies influence perceived justice and then impact patients' behavior, is $0.805\times0.564=0.454$ ($t=9.289$, $p<0.001$). The 95% confidence interval for this indirect effect ranges from 0.358 to 0.550, excluding 0, which confirms its significance. Service recovery strategies account for 64.9% of the variance in perceived justice ($R^2=0.648$); combined, perceived justice and service recovery strategies explain 72.1% of the variance in patients' intentional behavior ($R^2=0.721$), demonstrating the model's strong explanatory power.

The service failure situation significantly negatively impacts service recovery strategies (β=-0.312, t=11.179, p<0.001). It creates a negative effect through the pathway of "service recovery strategies → perceived justice → patients' subsequent intentional behavior," with an indirect effect of -0.142 (t=7.200, p<0.001) and a total effect of -0.244 (t=10.425, p<0.001). Notably, the indirect effect of the service failure situation on perceived justice is -0.251 (p<0.001); the combined direct effect (-0.102) and indirect effect (-0.142) on patients' subsequent intentional behavior represent a partial mediating effect. This suggests that the more severe the service failure, the worse patients perceive the recovery strategy, which consequently diminishes their perceived justice and negatively influences their subsequent intentional behavior. Additionally, the indirect effect (-0.142) accounts for 58.2% of the total effect, making it stronger than the direct effect.

Awareness of service recovery policies significantly influences service recovery strategies (β=0.493, t=13.376, p<0.001). It has a positive effect in the pathway of "service recovery strategies → perceived justice → patients' subsequent intentional behavior," with an indirect effect of 0.224 (t=8.393, p<0.001) and a total effect of 0.385 (t=10.685, p<0.001). The indirect effect of policy awareness on perceived justice is 0.397 (p<0.001). The combined direct effect (0.161) and indirect effect (0.224) of policy awareness on patients' subsequent intentional behavior show a partial mediating effect.

5.3.4 Results of control variable analysis

Patient demographic factors were incorporated into the research model as control variables for patients' subsequent intentional behaviors. Specifically, this study examines whether differences in patients' age, gender, and department of treatment affect the verification results of the research hypotheses.

The analysis results show that after controlling for patients' age, gender, and department of treatment, the significance of the paths remains unchanged, meaning that the control variables did not affect the robustness of the main paths. According to Table 5.13, the p-values of the impacts of patients' age, gender, and department of treatment on their subsequent intentions are all higher than 0.05, indicating that none of these impacts are significant within the 95% confidence interval. Therefore, the control variables have no significant effect on patients' subsequent intentions, and the main hypothesis paths still hold.

Table 5.13 Total effect of control variables

	Initial Coefficient	Mean Coefficient	Standard Deviation	T - value	P - value
Gender->Patients' subsequent intentions	0.057	0.057	0.043	1.316	0.188
Gender-> Satisfaction	0.055	0.056	0.042	1.316	0.188
Gender-> Loyalty	0.055	0.055	0.042	1.316	0.188
Gender->WOM	0.055	0.056	0.042	1.316	0.188
Age -> Patients' subsequent intentions	0.004	0.004	0.021	0.175	0.861
Age -> Satisfaction	0.004	0.004	0.021	0.175	0.861
Age -> Loyalty	0.004	0.004	0.021	0.175	0.861
Age -> WOM	0.004	0.004	0.021	0.175	0.861
Treatment department -> Patients' subsequent intentions	-0.006	-0.005	0.021	0.273	0.785
Treatment department -> Satisfaction	-0.006	-0.005	0.021	0.273	0.784
Treatment department -> Loyalty	-0.006	-0.005	0.021	0.273	0.784
Treatment department -> WOM	-0.006	-0.005	0.021	0.273	0.785

5.4 Summary of results

This chapter primarily examines the reliability and validity of the research measurement model for service failure scenarios, awareness of hospital remedial policies, service recovery strategies, and patient intentions afterward. It also summarizes the conceptual structural model of the path relationships among service failure scenarios, awareness of hospital remedial policies, service recovery strategies, and patient intentions, as well as the mediating effects and hypothesis testing results.

According to the results of the empirical research analysis, the measurement model demonstrates good reliability and validity, with clear discriminant validity among various indicators, confirming its credibility and dependability. Regarding hypothesis testing, all four research hypotheses proposed in this research received statistical support ($p<0.001$) and were validated. These hypotheses include: service failure characteristics influence service recovery strategies (H1), hospital service recovery policies influence service recovery strategies (H2), perceived justice is positively associated with patients' subsequent intentional behavior (H3), and service recovery strategies are positively linked to patients' perceived justice (H4). The explained variance (R^2) of the model for the three endogenous variables shows a gradual increase: the R^2 of service recovery strategies is 0.515, indicating that service failure situations (β=-0.312) and awareness of recovery policies (β=0.493) together account for 51.5% of its variance; the R^2 of perceived justice reaches 0.648, mainly explained by the positive impact of

service recovery strategies (β=0.805); and the R^2 of patients' subsequent intentional behavior is high at 0.721, with perceived justice (β=0.564) and the direct influence of service recovery strategies (β=0.326) being the primary factors. Specifically, service failure situations significantly negatively impact service recovery strategies, awareness of service recovery policies significantly positively influences these strategies, and in turn, service recovery strategies positively affect patients' subsequent intentional behavior, with perceived justice mediating this effect. The path coefficient for "service failure situation - patients' subsequent intentional behavior" is -0.244, for "awareness of service recovery policies - patients' subsequent intentional behavior" is 0.350, and for "service recovery strategies - patients' subsequent intentional behavior" is 0.780.

The research findings also confirm the chain transmission logic of "service failure situation - service recovery strategy - perceived justice - patients' subsequent intentional behavior" and "awareness of service recovery policies - service recovery strategy - perceived justice - patients' subsequent intentional behavior," which aligns closely with the "loss compensation - justice evaluation - behavioral intention" framework in social exchange theory. Specifically, service failure situations and awareness of service recovery policies influence patients' subsequent intentional behavior through service recovery strategies and perceived justice. Service failure situations have a negative effect, while awareness of service recovery policies has a positive effect, and both pathways serve as complementary mediators. Service recovery strategies significantly positively impact patients' subsequent intentional behavior via the mediating role of perceived justice.

The next chapter will combine the research on service recovery and management practices in the healthcare to conduct a more detailed discussion and analysis of the empirical results.

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Chapter 6: Discussion

Based on the actual situation of patient complaint handling at two large tertiary hospitals in China, this research examines how service recovery influences patients' subsequent intentions under different service failure scenarios. It proposes four core hypotheses and tests them using structural equation modeling (SEM). The goal is to uncover the transmission mechanism among service failure characteristics, recovery policies, recovery strategies, perceived fairness, and patient subsequent intentions. This chapter primarily discusses the research results based on empirical analysis, further outlines the research's theoretical and practical contributions, and concludes with the limitations of the research and suggestions for future studies.

6.1 Summary of research findings

6.1.1 Service failure scenarios and service recovery strategies

The analysis results of this research show that the higher the severity of service failure and the perceived controllability of attribution, the lower patients' perceived effectiveness of recovery strategies.

Regarding service failure severity, after experiencing a failure, patients form an immediate perception of its negative impact. The research's survey covers specific aspects such as whether it causes serious inconvenience, significant pressure, or unfairness. Empirical analysis indicates that the higher the perceived severity of the service failure, the less patients recognize the effectiveness of the hospital's subsequent recovery strategies. For those who view the failure as more severe, their evaluation of the recovery measures is lower than that of patients who perceive the failure as less severe, even if the hospital implements corresponding recovery actions.

Regarding service failure attribution, this research examines whether the reason for a failure is controllable by the hospital, whether it could have been prevented in advance, and if the hospital could have taken steps to avoid it. The findings indicate that most patients tend to believe that the causes of service failure are largely within the hospital's control. Additionally, patients who perceive that medical institutions have greater control over service failures tend

to have a more negative view of service recovery strategies. In other words, patients often assume hospitals are responsible for preventing failures, which can lead to the mindset that "hospitals should have avoided the problem, and recovery is just to fix the mistake," thus diminishing their perception of the effectiveness of recovery strategies.

Overall, the service failure situation negatively impacts service recovery strategies due to the adverse experiences caused by severity and the attribution of controllability. This suggests that the more severe the service failure and the stronger the attribution of controllability, the lower patients' evaluations of recovery strategies. Therefore, for medical institutions, it is of great practical necessity and value to improve internal management systems and service standards, establish a full-process service failure prevention mechanism, and take other such measures to minimize the escalation and expansion of service failures and reduce institutionally controllable negligence as much as possible. For instance, medical institutions can refine the service operation norms of each department, strengthen the professional training and service awareness education of medical staff, and build an inter-departmental collaborative response system, thereby reducing the probability and severity of service failures at the procedural level. They can also establish a pre-warning mechanism for service failures: through regular service quality inspections, real-time patient demand feedback channels, and other means, potential service risks can be identified and intervened in a timely manner; meanwhile, clarifying the responsibility definition standards for service failures can reduce patients' bias in attributing failures to the hospital's controllable factors, laying a solid foundation for the effective implementation of subsequent service recovery strategies.

6.1.2 Awareness of service recovery policies and service recovery strategies

According to empirical research, awareness of service recovery policies significantly positively influences service recovery strategies. The level of patients' understanding of the hospital's policies affects their comprehension and acceptance of subsequent recovery measures. Specifically, combined with the survey data from this research, when patients clearly understand the government's relevant institutional requirements for hospital complaint management and medical dispute resolution, as well as the hospital's specific procedures, time limits, possible outcomes for complaints and disputes, and tailored handling plans for different complaint scenarios, they are more likely to recognize the effectiveness of the recovery strategies. From the perspective of the internal logic of patients' cognition and behavior, their level of understanding of hospitals' service recovery policies is not merely a matter of basic

information awareness; instead, it directly shapes their cognitive framework and acceptance threshold for subsequent hospital recovery measures. When patients clearly grasp the applicable scenarios, specific procedures, rights boundaries, and implementation standards of a hospital's service recovery policies, they can form a more objective judgment on the rationality and necessity of recovery measures, reducing doubts and resistance stemming from information asymmetry. Conversely, if patients have no knowledge of or only a vague understanding of recovery policies, even if the hospital takes professional and compliant recovery actions, these efforts may be misinterpreted as "passive responses" or "perfunctory gestures", thereby lowering patients' willingness to accept the recovery strategies.

The research also revealed that patients' current awareness of service recovery policies is generally low. There is a clear lack of knowledge about the overall policy framework, specific procedures, and differentiated plans for various situations. Even if the hospital's recovery strategies are scientifically sound and effective, they may go unrecognized due to patients' cognitive biases.

Therefore, for medical institutions, systematically strengthening the publicity and popularization of service recovery policies and accurately improving patients' overall policy awareness will not only help enhance their recognition of service recovery strategies but also remove cognitive barriers to the implementation of recovery measures, thereby optimizing the overall recovery effect. Hospitals may consider carrying out publicity and education through various channels: for example, they can simultaneously publicize service recovery policies on official websites, official WeChat accounts, offline service halls, and medical consultation guidebooks; they can also develop targeted policy interpretation manuals or short videos based on common types of service failures in different medical scenarios such as outpatient clinics, inpatient care, and emergency departments.

6.1.3 Service recovery strategies and perceived fairness

Service recovery strategies significantly influence perceived justice. During service failure, they are crucial in helping patients develop a sense of justice, and their effectiveness directly impacts how just patients feel during the recovery process. This research discusses three specific recovery strategies: response speed, apology and explanation, and compensation. Specifically, from the perspective of the four-dimensional structure of perceived justice (distributive justice, interactional justice, procedural justice, and informational justice), the three types of service recovery measures—apology and explanation, rapid response, and

compensation—all exert significant impacts on justice across every dimension. In terms of response speed, if hospitals can respond quickly to patients' complaints, immediately initiate handling procedures, and conduct timely investigations to clarify the situation, patients will perceive that their demands are valued by the hospital. In terms of apology and explanation, sincere apologies, explicit acknowledgment of responsibilities, and clear explanations of the causes of service failures can make patients feel respected and understood, reducing misunderstandings arising from information asymmetry. In terms of compensation, a compensation plan formulated based on the type and magnitude of patients' losses as well as their reasonable demands will make patients feel that their losses have been properly compensated.

This insight provides hospitals with two key implications. On one hand, hospitals should establish a coordinated linkage system of “apology and explanation + rapid response + reasonable compensation”, breaking the limitations of individual measures. Through inter-departmental collaboration, seamless integration of these measures can be achieved, which not only leverages each measure's role in strengthening its advantageous justice dimensions but also realizes full coverage of the four justice dimensions (distributive, interactional, procedural, and informational), maximizing the overall effectiveness of service recovery. On the other hand, it is imperative for hospitals to hierarchically enhance the specialized capabilities of recovery measures to accurately meet the demands of different justice dimensions. Given that apology and explanation have the most prominent impact on informational justice and distributive justice, a standardized communication script system can be established, requiring staff to offer sincere apologies while clearly explaining the causes of errors, rectification plans, and compensation basis, thereby eliminating information barriers and reinforcing the perception of result rationality. In light of the core role of rapid response in interactional justice and procedural justice, an efficient emergency response mechanism can be built by setting up dedicated docking windows and clarifying response time limits for various scenarios, so as to enhance patients' sense of being valued through standardized processes.

6.1.4 Perceived fairness and patient subsequent intention behavior

Combined with the research model and empirical analysis results, perceived justice has strong explanatory power for patients' subsequent intentional behavior and is a key factor influencing their behavioral choices. Specifically, perceived justice significantly positively impacts patients' future intentional actions. Its level not only affects patients' satisfaction with the hospital but

also directly influences their subsequent medical decisions and word-of-mouth communication. It is closely related to whether patients continue to choose the hospital and are willing to recommend it. Therefore, the higher the perceived justice during the service recovery process, the greater the patients' trust and approval of the hospital, making them more likely to choose the hospital for future treatment. The research findings indicate that, among hospitals with high perceived justice, patients will prioritize this hospital even if other medical options are available. Furthermore, patients with a strong sense of justice are not only more loyal to the hospital but also more likely to actively recommend it to others, such as introducing it to relatives and friends, providing positive feedback when asked, and leaving favorable reviews online, thus becoming "positive promoters" of the hospital.

In the context of service recovery in medical institutions, the influence of perceived justice on subsequent intentional behavior results from the combined effect of its various dimensions. The research identifies four dimensions of perceived justice: distributive justice, informational justice, interactional justice, and procedural justice. Higher perceived justice in these areas leads to better service recovery outcomes, increasing patients' satisfaction, loyalty, and positive word-of-mouth. Interactional justice makes patients feel respected and valued during communication, boosting their perception of the hospital's service attitude. Informational justice reduces patients' doubts caused by lack of information and enhances their trust in the hospital. Distributive justice ensures patients feel their demands are reasonably met and acknowledges the hospital's recovery efforts. Procedural justice guarantees that the recovery process is systematic and efficient, demonstrating the hospital's professionalism in handling issues. The sense of justice created by these four dimensions can effectively alleviate negative emotions resulting from service failure, strengthen positive perceptions and satisfaction with the hospital, and ultimately lead to lasting medical loyalty and positive word-of-mouth communication.

To improve the implementation effectiveness of medical service recovery and strengthen patients' subsequent medical-seeking intentions, medical institutions should take the four-dimensional structure of perceived justice as the core framework, and combine the differentiated impacts of different service recovery measures on patients' justice perceptions across various dimensions to construct and refine a systematic and coordinated service recovery optimization system. This system must be based on the adaptability logic between recovery measures and justice dimensions. For example, it should link apology and explanation measures to informational justice and distributive justice: transparent information disclosure can resolve the dilemma of information asymmetry between medical staff and patients, and compensation

schemes matching patients' losses can fulfill the value of distributive justice. Meanwhile, rapid response measures should be organically integrated with interactional justice and procedural justice: an efficient appeal response mechanism can convey respect for patients' rights and interests, and standardized recovery processes can demonstrate the professional governance capabilities of medical institutions. On this basis, a coordinated empowerment mechanism for the four-dimensional justice should be formed to realize the transformation from negative emotion resolution to trust relationship reconstruction, ultimately converting positive justice perceptions into patients' high satisfaction and stable medical-seeking loyalty.

6.1.5 Mediating effects between second-order variables

Overall, among the second-order variables, service failure situations and awareness of service recovery policies have a significant negative impact on service recovery strategies, and through this mediator, they also significantly negatively affect perceived justice. Furthermore, they negatively influence patients' subsequent intentional behavior via service recovery strategies and perceived justice. This research confirms the following three mediating transmission chains:

It confirms the mediating effect chain of "service recovery strategies - perceived justice - patients' subsequent intentional behavior." Perceived justice partially mediates the relationship between service recovery strategies and patients' subsequent intentional behavior. Since both the direct and indirect effects are positive, the mediating role of perceived justice is considered complementary mediation. This means that service recovery strategies not only directly influence patients' subsequent intentional behavior but also indirectly reinforce this effect by increasing perceived justice.

It confirms the transmission chain of "service failure situation - service recovery strategy - perceived justice - patients' subsequent intentional behavior." Service failure situations significantly negatively impact service recovery strategies, and through this mediator, they also greatly diminish perceived justice. That is, the more severe the service failure, the worse patients perceive the recovery strategy, which in turn negatively influences their subsequent intentional behavior via service recovery strategies and perceived justice. Since the indirect effect of service failure situations on patients' subsequent intentional behavior is stronger than the direct effect, this shows that the more serious the failure, the more important it becomes to counteract the negative effects by enhancing recovery strategies (such as excessive compensation) and increasing perceived justice.

It confirms the complementary mediating chain of "awareness of service recovery policies - service recovery strategy - perceived justice - patients' subsequent intentional behavior." Awareness of service recovery policies significantly positively impacts service recovery strategies, which in turn significantly positively influence perceived justice through this mediator. Additionally, it positively affects patients' subsequent intentional behavior via service recovery strategies and perceived justice. This shows that higher awareness of policies leads to patients perceiving recovery strategies as more effective, thereby better influencing their subsequent intentional behavior by enhancing their sense of justice.

6.2 Theoretical contributions

6.2.1 Filling the research gap in China's healthcare management field

This research confirms the unique way that service recovery works in the medical field. Medical services have special features that distinguish them from services in other industries. Their high level of professionalism often leaves patients at a disadvantage regarding information during service delivery. The imbalance of information can sometimes cause conflicts between doctors and patients (J. Liu et al., 2020). Moreover, the irreversibility of service outcomes, such as permanent physical damage caused by surgical errors, highlights the seriousness of the consequences of service failure in the medical field.

Through empirical analysis, this research confirms that service failure in the medical field impairs recovery strategies. This indicates that when a service failure occurs in medical services, and the failure is severe or the patient believes the hospital is mainly responsible, the patient's acceptance and recognition of subsequent recovery strategies will decrease. Additionally, the mediating effect of perceived fairness between recovery strategies and patient intentions is stronger than the direct effect of recovery strategies on patient intentions, further emphasizing the essential role of "perceived fairness" in patient decision-making within the medical context.

When patients evaluate the effectiveness of medical service recovery, they not only focus on the actual recovery measures taken but also pay more attention to whether they have been treated fairly throughout the process. This includes distributive fairness (such as whether compensation is reasonable), procedural fairness (such as whether the complaint handling process is fair and transparent), and interactional fairness (such as whether the attitude and communication style of medical staff respect patients). The validation of this transmission path

provides empirical evidence to support our in-depth understanding of the recovery mechanism following medical service failure.

The research develops a multi-dimensional evaluation system for medical service recovery. In proposing research hypotheses, we build on previous research findings to create a system covering four key dimensions: service failure, recovery strategies, perceived fairness, and patient intentions (Smith et al., 1999). We also introduce a new important variable, "awareness of service recovery policies," which fills a gap in existing research on the linkage mechanism between "institutional environment and recovery behavior" and becomes a significant theoretical innovation in this research. Public medical institutions are the most important entities in China's healthcare industry (reference), subject to government oversight and management.

In recent years, the Chinese government has consistently issued policies, such as the "Action Plan for Improving Medical Experience and Enhancing Patient Experience" and the "Regulations on Complaint Management in Medical Institutions," which set requirements for medical facilities to handle patient complaints and improve patient satisfaction. However, previous research has rarely addressed the theoretical aspects of the policy supervision environment. Based on the regulatory constraints of Chinese public hospitals, we design the variable "awareness of service recovery policies" and develop five measurement indicators to quantify patients' understanding of the policy system using a 7-point Likert scale, incorporating it into the structural equation model for analysis.

The empirical analysis shows that this variable has a significant positive effect on service recovery strategies ($\beta = 0.493$, $t = 13.376$, $p < 0.001$). This finding also confirms the pathway through which policy awareness influences patients' psychological expectations, thereby affecting their evaluation of recovery strategies. In terms of theoretical development, this innovation combines macro policy variables with meso-level recovery strategies and micro-level patient intentions into an "institution-organization-individual" cross-level model. It demonstrates that awareness of service recovery policies not only directly impacts recovery strategies but also positively influences patients' subsequent intentions by increasing perceived fairness. This mechanism uncovers the unique process of "policy disclosure - cognitive enhancement - strategy recognition" in Chinese public hospitals. This theoretical contribution offers a new perspective for understanding how institutional context moderates the effectiveness of service recovery and provides a theoretical foundation for hospitals to

implement policy transparency (such as publicizing complaint handling systems), aligning the research model more closely with medical management practices in China.

6.2.2 Applying social exchange theory and equity theory in the medical

This research broadens the application of social exchange theory and equity theory within the medical service context, uncovering the unique mechanisms involved in this high-risk setting through empirical analysis. Previous research mainly focused on the balance of economic and emotional exchanges in industries like hotels and e-commerce (Xu et al., 2022). However, the irreversibility of patient losses in medical services—such as health damage caused by diagnostic and treatment errors—makes applying a simple equivalent exchange logic difficult. This research introduces the variable "perceived controllability of service failure attribution." Empirical findings indicate that when patients see the failure as controllable by the hospital, their perceived effectiveness of recovery strategies significantly drops (β=-0.312, $p<0.001$), and the correlation coefficient between attribution controllability and compensation perception reaches 0.736, demonstrating the reinforcing effect of "responsibility attribution - compensation expectation" in the medical field context.

Regarding the application of equity theory, this research uniquely includes "informational fairness" as an independent dimension in the model within the medical field, addressing the information asymmetry inherent in medical services. The traditional three-dimensional framework of equity theory (distributive, procedural, and interactional fairness) does not sufficiently explain patients' urgent need for information about the causes of treatment failure and the rationale behind handling procedures (Bies & Moag, 1986; R. Huang, 2016). Empirical results indicate that the direct effect of informational fairness on patient intentions (β=0.564, $p<0.001$) is comparable to that of interactional fairness (β=0.517), and the "clarity of explanation" in service recovery strategies (factor loading 0.982) is a key element influencing perceptions of informational fairness.

Through confirmatory factor analysis, the research constructs a four-dimensional fairness model consisting of distributive fairness, procedural fairness, interactional fairness, and informational fairness. In the measurement model, this research refines informational fairness into four indicators: "information awareness," "information disclosure," and "process transparency." Empirical analysis results show that the Cronbach's α value and composite reliability (CR) of informational fairness both exceed 0.9, with factor loadings of each item

ranging from 0.974 to 0.984, and an AVE of 0.960, indicating good reliability and validity. This provides theoretical support for information management in medical complaint handling.

6.2.3 Measurement and evaluation of patient subsequent behavioral intentions

This research enhances the measurement and analysis of patients' behavioral intentions. Current research in China's medical industry on service recovery mainly assesses patients' subsequent actions based on two aspects: satisfaction and loyalty (W. W. Guo et al., 2024; Zhai et al., 2022), without incorporating word-of-mouth into their research model. This omission fails to reflect the significant influence of word-of-mouth on patients' medical behaviors in today's era of highly developed internet and social media. This research further divides patients' subsequent intentions into three dimensions: satisfaction, loyalty, and recommendation. Regarding measurement indicators, this research, drawing on previous research literature, designs items such as "overall satisfaction with the hospital," "satisfaction with hospital staff," and "satisfaction with hospital service quality" (P. Chen & Kim, 2019; Siu et al., 2013; Chi et al., 2008) to measure patient satisfaction. It further refines satisfaction with staff into satisfaction with doctor-patient relationships, doctors, and nurses, improving how measurement indicators apply in medical services context.

The research revealing how controllability attribution influences patient behavioral intentions supports hospitals in developing targeted management strategies. While traditional attribution theory has seen limited research within the context of medical services, this research introduces the variable "perceived controllability of service failure attribution" into the analysis model. Empirical results demonstrate a strong positive relationship between controllability attribution and perceptions of compensation. Descriptive statistics show that multiple indicators have mean values above 6, within the high range (out of 7). This indicates that, in medical services, patients often see controllable failures—such as misdiagnosis—as a breach of hospital responsibility. This perception sharpens the scrutiny of recovery strategies and extends attribution theory's application in the high-risk environment of healthcare services. Given the significant impact of controllability attribution on patient intentions, hospitals can develop a "controllability assessment model for failure causes" to identify high-risk situations early and devise recovery plans that include responsibility statements and emergency measures. This shifts response from reactive to proactive, providing theoretical backing and ultimately leading to a systematic enhancement of patient behavioral intentions.

6.3 Practical implications

Currently, to meet the various internal and external management demands of government department oversight, hospital management pressures, and improving doctor-patient relationships (Mao et al., 2020; Y. W. Wang, 2018), China's public medical institutions must address service failures and handle patient complaints effectively. Studying service recovery in the medical sector and examining how hospital service recovery measures influence patient satisfaction across different service failure scenarios can help medical institutions better understand patient needs and expectations and prevent conflicts between doctors and patients from escalating after service failures. This research uses a structural equation model to empirically analyze patient complaint experiences at two large Class-Three-A hospitals in Guangzhou, offering valuable practical guidance for optimizing management in medical institutions.

6.3.1 To optimize the service recovery strategy system

This research confirms that service recovery strategies significantly influence patients' subsequent intentions, with perceived fairness acting as a mediator, providing empirical evidence for hospitals to develop targeted service recovery systems.

(1) Hospitals can adopt different strategies depending on the type of service failure. For outcome failures, such as misdiagnosis and overtreatment, economic compensation methods should be justified and strengthened. Compensation plans should be tailored according to the nature and extent of patient losses to improve perceived fairness in distribution. For process failures, like poor service attitude and complicated procedures, sincerity in apologies and quick responses should be prioritized. Prompt communication and emotional reassurance can enhance perceived fairness in interactions. The research also shows that response speed most significantly influences perceived procedural fairness. Hospitals can improve the complaint process and set up an "emergency-style" recovery system to reduce response times for "investigation results" and "solutions." Medical institutions can further boost perceived procedural fairness and build patient trust by increasing process transparency, such as proactively informing patients about the progress of their case. Additionally, in the "compensation" area, hospitals should establish clear loss assessment standards, like creating tiered compensation plans based on the severity of medical errors, to prevent dissatisfaction caused by a one-size-fits-all approach remediation.

(2) Strengthening the transparency of service recovery policies and building trust between doctors and patients are essential. This research confirmed that awareness of service recovery policies positively influences perceptions of recovery strategies, highlighting the importance of policy transparency in improving recovery effectiveness. In practice, hospitals can promote their complaint management policies through multiple channels, such as displaying the "Complaint Handling Process Manual" on electronic screens in the outpatient hall and on their official social media accounts, clearly explaining processing time limits, responsible departments, and procedures. Policy transparency should also be paired with a dynamic feedback system. Hospitals can set up a "Policy Awareness Survey" system to gather patients' understanding of complaint policies quarterly via Questionnaire Star, allowing for targeted content improvements. For example, if patients show the lowest awareness of "different situation handling plans," hospitals can create scenario-based illustrated manuals. For instance, differences between "surgical error" and "service attitude" complaints can be clearly depicted to make handling processes more accessible. Additionally, hospitals must ensure policy publicity through institutional measures, which can offset negative impacts from service failures and foster a cycle of "institutional trust - recovery recognition - behavioral loyalty."

(3) Reconstruct the complaint management process to improve procedural and distributive fairness. This research confirms that procedural and distributive fairness are the key factors influencing patient satisfaction, providing a quantitative basis for redesigning the complaint management system. Regarding procedural fairness, hospitals can implement a digital complaint management platform to visualize the entire process, from "complaint registration - investigation - feedback": patients can track the progress in real-time via the official WeChat public account, and the system automatically sends updates such as "accepted," "under investigation," or "completed," thus enhancing processing efficiency and the perception of fairness. To improve distributive fairness, hospitals should establish a standardized compensation assessment system. Forming a "Remediation Assessment Committee" consisting of legal, medical, and management experts can help set compensation benchmarks based on the severity of service failures and the controllability of the cause: for serious and controllable issues (like misdiagnosis), apply "full compensation for losses + compensation for mental distress," while for minor or uncontrollable errors (such as occasional equipment failure), offer "service upgrades + apologies," to prevent bias in fairness perception caused by inconsistent compensation approaches. Additionally, a "complaint result review" system should be created to analyze whether compensation plans align with patient satisfaction every six months,

allowing for dynamic adjustments to assessment criteria and ensuring ongoing improvement in perceptions of distributive fairness.

(4) Guide patients to develop reasonable attributions and expectations to reduce bias from perceived service failures. The research revealed that patients' controllability perceptions of service failures significantly impact the success of remediation efforts, highlighting the importance of improving attribution understanding through patient education. Hospitals can provide medical service knowledge at different treatment stages to decrease information asymmetry between doctors and patients by professionally disclosing information. This helps patients better understand responsibility limits and prevents overestimating the hospital's control over service failures. For example, doctors can explain in detail the limitations of the treatment plan and available alternatives before discharge. Using 'expectation management + attribution guidance' can lessen negative emotions when postoperative outcomes fall short of expectations, thus easing remediation challenges after service failures. For already occurred failures, medical facilities can offer attribution guidance during remediation. Complaint handlers can utilize an 'attribution explanation template.' For example, regarding 'delayed test results,' they can state it was caused by 'unplanned equipment maintenance (uncontrollable factor) + the hospital has purchased backup equipment (improvement measure).' This approach recognizes the hospital's responsibility and diminishes perceived controllability by explaining uncontrollable factors, thereby strengthening patient trust in remedial actions. Moreover, establishing a 'patient attribution survey' mechanism to analyze complaint attribution types quarterly can help tailor educational content effectively. This reduces subjective bias in understanding service failures at the cognitive level and creates beneficial conditions for the successful implementation of remediation strategies.

6.3.2 To improve hospital strengthen remediation implementation capabilities

The research confirms that frontline employees' remedial actions, such as sincere apologies and quick responses, significantly influence perceived fairness. This suggests that hospitals can enhance service recovery by improving professional training in complaint handling. The training should cover key areas: First, recognizing service failures and applying targeted strategies, such as matching handling plans to the failure type—like "emphasizing compensation for outcome failures and apologies for process failures." Second, developing better communication skills with patients to ensure effective interaction, using techniques like "empathetic expression + information transparency." Third, streamlining the remediation

process, such as ensuring complaint responses occur within a designated timeframe. To evaluate training effectiveness, hospitals should use empirical data: conducting remediation capability tests before and after training, comparing behavioral changes in areas like "sincerity of apologies" and "response speed," and collecting patient feedback on remedial services post-training. Additionally, integrating remediation capability into employee performance evaluations—by setting a "remediation satisfaction" metric—and employing incentive mechanisms are vital for enforcement. For high-contact roles such as outpatient guides and nurses, establishing a "remediation capability certification" could be beneficial, with certified employees receiving additional allowances. This approach supports ongoing improvement in employees' remediation skills and reinforces the cycle of "strategy implementation—perception of fairness—behavioral intention."

6.3.3 Provide empirical support for government regulation

This research highlights the crucial role of awareness of service remediation policies in improving remediation effectiveness, offering empirical support for the government to refine regulatory policies. Regulatory authorities can add "complaint policy transparency" to hospital management requirements, mandating public disclosure of the complaint handling process, deadlines, and compensation standards. They can also evaluate policy implementation through third-party surveys and regularly gather patients' feedback on areas like "process understanding" and "result awareness" to develop quantitative regulatory indicators. This encourages hospitals to shift from "passive complaint handling" to "active transparent management." Additionally, the research provides data to help the government establish industry standards for service remediation. Authorities can set compensation principles and reference standards for various failure types based on the compensation data from this research, preventing large discrepancies in remedial measures among hospitals that could cause patients to perceive unfairness. Moreover, integrating service remediation effectiveness—such as increased patient willingness to return—into hospital performance metrics, and linking these to financial subsidies and insurance quotas, can create a positive cycle of "regulatory pressure - hospital motivation - patient benefit."

6.4 Research Limitations

The limitations of this research are mainly reflected in three aspects: sample data, research perspective, and measurement indicators.

The sample for this research mainly comes from two large Class-Three-A hospitals in Guangzhou (Southern Medical University Nanfang Hospital and Guangzhou First People's Hospital). Although it includes both outpatient and inpatient populations, there are limitations regarding geographical location and hospital level. On one hand, as a first-tier city with highly concentrated medical resources, Guangzhou shows significant differences in patient demographics and healthcare delivery models compared to second- and third-tier cities and primary healthcare facilities. For example, service failures in primary hospitals are often due to outdated equipment and staffing shortages. In contrast, Class-Three-A hospitals tend to focus more on technical errors and complex procedures. The lack of samples from primary care settings may restrict the ability to generalize the findings to the national healthcare system.

On the other hand, the sample only includes public Class-Three-A hospitals and excludes private hospitals or specialized hospitals. The service recovery strategies of private hospitals are more influenced by market competition, and patients' recovery expectations may differ from those in public hospitals (e.g., a greater focus on financial compensation). This kind of omission suggests that the model should be used cautiously in non-public medical settings. Additionally, 73.3% of the patients in the sample hold a bachelor's degree or higher. The information gathering and attribution skills of highly educated groups may affect their perception of service failure, potentially biasing the applicability of the research results to patients with lower education levels.

The research only assesses service failure and recovery effectiveness from the patient perspective, without considering the implementation perspective of medical staff, leading to a missing mechanism of "strategy design - execution deviation." For example, how well medical staff understand recovery policies (such as their familiarity with compensation standards) might influence the success of strategy implementation; however, the research did not examine the implementation of "recovery policy awareness" at the staff level. Additionally, workload factors like the average number of patients seen per day could cause delays in response times. Yet, the model did not account for these implementation-side variables, creating an explanatory gap in analyzing the "response speed-procedural fairness" pathway. The document mentions "front-line employee extra-role recovery" (such as spontaneous additional communication), but did

not measure factors influencing employee proactivity (such as the level of organizational empowerment), leading to an incomplete attribution of strategy effectiveness.

Although the measurement model passed the reliability and validity tests, it still has some limitations in capturing the dynamic process of service recovery. On one hand, the research concentrates on one-time recovery actions following service failure, such as apologies and compensation. It does not consider the effects of multiple recoveries or ongoing follow-up. Complex errors in medical services, like misdiagnosis leading to subsequent treatments, often require long-term recovery efforts, and strategy adjustments across multiple interactions may significantly influence perceived fairness. The current model does not account for the dynamic effects of time. On the other hand, the measurement of service failure situations mainly relies on patients' subjective perceptions, such as severity and attribution. However, it lacks integration with objective indicators of medical errors, including whether the error qualifies as a medical accident or the professional classification of technical errors. The disconnect between subjective perception and objective error levels may produce bias in attribution analysis.

The aforementioned research limitations can serve as directions for future research expansion. On this basis, it is possible to continuously supplement and improve the research results of service recovery in the healthcare field, thereby providing more sufficient theoretical support for medical institutions to optimize their management.

6.5 Future research

Future research can address the current sample limitations of Class-Three-A public hospitals in Guangzhou by expanding the sample coverage across three dimensions: geographic location, hospital type, and patient characteristics. Geographically, it should include cities with varying levels of development and primary healthcare facilities, such as county-level hospitals and community health centers, to compare how service recovery strategies differ with different medical resource allocations. Regarding hospital type, it should incorporate samples from private and specialized hospitals to examine differences in patient expectations of recovery strategies within market-driven mechanisms. Concerning patient characteristics, it should focus on including samples from groups with lower education levels and the elderly to verify perceptual differences in areas like "response speed" and "information equity," thereby helping refine targeted recovery strategies.

Adopting a three-dimensional perspective of "patient - medical staff - hospital management," the practical value of the model can be enhanced through a mixed-methods approach. In the quantitative aspect, increase the number of questionnaires for medical staff to measure execution-side variables, such as "implementation degree of recovery policies" and "the impact of work pressure on response speed." In the qualitative aspect, conduct in-depth interviews to explore patient emotional experiences, medical staff execution difficulties, and manager performance assessment pressures, to fill the gaps in the quantitative model and reveal the key mechanisms of trust rebuilding in special scenarios (such as irreversible medical damage).

Future research can incorporate objective indicators, such as the severity grading of failures in electronic medical records, into the measurement model to reduce subjective perception bias. Regarding statistical methods, use multi-group analysis to test the model's universality, and apply machine learning algorithms to identify key strategy combinations. This approach can refine the mediating effect weights of the four-dimensional perception of equity, thereby improving the accuracy and practicality of research findings.

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Annex A

Table of Measurement Scales

Constructs	Dimensions	Items	Source
1. Characteristics of Failure	1.1 Type of Failure	Which of the following situations does your complaint belong to (multiple choices allowed): Related to the diagnosis and treatment outcome**:** □ Over-treatment □ Misdiagnosis □ Severe complications □ Treatment outcome did not meet expectations Other (please specify): Related to the diagnosis and treatment process (multiple choices allowed): □ Long waiting time □ Unclear costs □ Dissatisfaction with service attitude □ Poor doctor-patient communication experience □ Unreasonable process □ Insufficient hospital environment and facilities □ Unsmooth medical insurance reimbursement □ Medical ethics and conduct Other (please specify):	Huang (2016) Expert Interviews
	1.2 Severity of Failure	You have a serious problem.	Tsarenko & Tojib (2012) Basso & Pizzutti (2016)
		This problem has caused you great inconvenience.	Tsarenko & Tojib (2012)
		This problem is causing you a lot of stress.	Tsarenko & Tojib (2012)
		This situation is very unfair.	(Tsarenko & Tojib, 2012)
	1.3 Controllability of Failure	This problem was not intentional on the part of the hospital/doctor.	Nikbin et al. (2015)
		The cause of the problem was within the hospital's control.	Nikbin et al. (2015)
		The cause which originated the problem can be prevented by the hospital.	Lee & Cranage (2018) Nikbin et al. (2015)
		The hospital could have done something to avoid the problem.	Nikbin et al. (2015) Nikbin et al. (2015)

Constructs	Dimensions	Items	Source
	1.3 Controllability of Failure	This problem was not intentional on the part of the hospital/doctor.	Lee & Cranage (2018) Nikbin et al. (2015)
2. Hospital Failure Recovery Policy	2.1 Knowledge of Recovery Policy	You know that the government requires hospitals to formulate relevant systems for complaint management and medical dispute handling.	Expert Interviews
		You know that the hospital system calls for the handling process of complaints and disputes.	Expert Interviews
		You know that the relevant hospital system will require the handling time of complaints and disputes.	Expert Interviews
		You know that the relevant hospital system will require the handling results of complaints and disputes.	Expert Interviews
		You know that the relevant system of the hospital will make different handling plans for different complaints and disputes.	Expert Interviews
3. Recovery Strategy	3.1 Apology	The hospital apologized to you.	Nikbin et al. (2015)
		The hospital's apology was very sincere.	Bachman & Guerrero (2006)
		The hospital accepted responsibility for your problem.	Bachman & Guerrero (2006)
		The hospital explained what happened to you.	Bradley & Sparks (2012)
	3.2 Compensation	The hospital provides you with reasonable compensation.	Bradley & Sparks (2012); Wirtz & Mattila (2004)
		The hospital offers a reasonable compensation according to your type of loss.	Expert Interviews
		The hospital offer a reasonable compensation according to your size of loss.	Expert Interviews
		The hospital provides a reasonable compensation plan based on your claim.	Expert Interviews
	3.3 Response Speed	The hospital respond quickly after you reported your dissatisfaction.	H. Min et al. (2015)
		The hospital immediately began to address your problem after you reported your dissatisfaction.	H. Min et al. (2015)
		The hospital promptly conducted an investigation after you reported your dissatisfaction.	Wirtz & Mattila (2004)
		The hospital solve the problem quickly after you reported your dissatisfaction to the hospital.	Wirtz & Mattila (2004)
4. Perceived Justice	4.1 Interactive Justice	The hospital's staff was patient when dealing with your problem.	B. Choi & Choi (2014)
		The hospital's staff was compassionate when dealing with your problem.	
		The hospital attached great importance to your question.	B. Choi & Choi (2014)

Constructs	Dimensions	Items	Source
			P. Chen & Kim (2019)
		The hospital's staff respected you very much.	P. Chen & Kim (2019)
		In the process of solving the problem, the hospital's staff did everything possible to solve your problem.	P. Chen & Kim (2019)
		You know the reason why this problem occurred.	Expert Interviews
	4.2 Information Justice	Your questions have been answered.	Expert Interviews
		The hospital took the initiative to explain to you what happened in the process of dealing with the problem.	Expert Interviews
		The hospital's final decision was fully communicated to you.	Expert Interviews
		Considering the time and energy spent by the hospital in dealing with this problem, you believe that the final response you received was fair.	B. Choi & Choi (2014) Chen & Kim
	4.3 Distributive Justice	Overall, the hospital's final response is sufficient to solve your problem.	B. Choi & Choi (2014)
		Your problem was handled fairly.	B. Choi & Choi (2014)
			P. Chen & Kim (2019)
		Although there were issues, were you satisfied with the hospital's handling of the outcome?	P. Chen & Kim (2019)
		The hospital has a fair and reasonable regulations to your problem.	B. Choi & Choi (2014)
		The hospital has a fair and reasonable procedures to your problem.	B. Choi & Choi (2014)
		The hospital was flexible enough to deal with the problem.	B. Choi & Choi (2014)
	4.4 Procedural Justice		P. Chen & Kim (2019)
		After the problem arose, you felt that the hospital's procedures were initiated timely.	B. Choi & Choi (2014)
			P. Chen & Kim (2019)
		The hospital's regulations for dealing with the problem were fair and equitable.	P. Chen & Kim (2019)
		The hospital's procedures for dealing with the problem were fair and equitable.	P. Chen & Kim (2019)
		Overall, in this experience the hospital provides a satisfactory solution.	Siu et al. (2013)
5. Patient's Subsequent Intentional Behavior			P. Chen & Kim (2019)
	5.1 Satisfaction	In general, you are satisfied with the hospital.	Siu et al. (2013)
			Siu et al. (2013)
		In general, you are satisfied with the whole visit.	Siu et al. (2013)
		In general, you are satisfied with the service quality of this hospital.	Expert Interviews

Constructs	Dimensions	Items	Source
5. Patient's Subsequent Intentional Behavior	5.2 Loyalty	This hospital is your first choice for your next visit.	Expert Interviews
		You will continue to choose this hospital in the future.	Expert Interviews
		You would choose this hospital next time even if there were other options.	Expert Interviews
		You may prefer this hospital from now on.	Siu et al. (2013)
	5.3 WOM	You would recommend this hospital to others.	Chi et al. (2008); Migacz et al. (2018)
		You would say positive things of this hospital if asked.	Chi et al. (2008); Migacz et al. (2018)
		You would tell your relatives and friends to choose this hospital.	Migacz et al. (2018)
		You would like to leave a favourable review of this hospital on the internet.	Migacz et al. (2018)
	5.1 Satisfaction	Overall, in this experience the hospital provides a satisfactory solution.	B. Choi & Choi (2014)
		In general, you are satisfied with the hospital.	B. Choi & Choi (2014)
		In general, you are satisfied with the whole visit.	B. Choi & Choi (2014); Migacz et al. (2018)
		In general, you are satisfied with the service quality of this hospital.	Migacz et al. (2018)

Annex B

Questionnaire

Dear Patient,

We sincerely invite you to participate in this survey. The data collected will be kept entirely confidential. No personal information will be analyzed or disclosed, and no records will be kept in the hospital. The data will be used solely to improve our research. You can feel free to provide your genuine feelings and suggestions.

Best regards,

1. Have you ever made a complaint about the hospital during your visit here? (Including phone complaints, on-site complaints, online complaints, etc.)?

□ No (End of this question, proceed to Question 27, and record the survey number and date)

□ Yes

2. Regarding your complaint, did our hospital provide a resolution?

□ No (End of this question, proceed to Question 27, and record the survey number and date)

□ Yes 有

Part I: Complaint Background Information

3. The time of your most recent dissatisfaction with our hospital's medical services and your complaint to the hospital is [Fill-in-the-blank]: _____ Year _____ Month

4. Your identity in this complaint is [Multiple-choice question]:

□ The patient himself/herself

□ The patient's child

□ The patient's parents

□ The patient's friend

□ Other (Please describe in detail) _____

5. How did you make the complaint? [Multiple-choice question]

□ On-site complaint

□ Hospital's official complaint hotline

□ Government hotline “12345”

□ Hospital's official public account

□ Other (Please describe in detail) _____

6. What type of medical service were you receiving when you made the complaint? [Multiple-choice question]

□ Outpatient

□ Inpatient

7. Which department(s) did you visit? (Please select all relevant departments) [Multiple-choice question]

□ Internal Medicine

□ Surgery

□ Emergency Department

□ Obstetrics and Gynecology

□ Pediatrics

□ Other departments (Please describe in detail) _____

8. What was the content of your complaint? [Multiple-choice question]

Related to the diagnosis and treatment outcomes

□ Misdiagnosis

□ Over-treatment

□ Severe complications

□ Treatment outcomes did not meet expectations

□ Other (Please describe in detail) _____

Related to the diagnosis and treatment process

□ Long waiting time

□ Unclear costs

□ Dissatisfaction with service attitude

□ Doctor-patient communication issues

□ Unreasonable process

□ Hospital environment issues

□ Insufficient hospital facilities

□ Unsmooth medical insurance reimbursement

□ Medical ethics and conduct issues

□ Other (Please describe in detail) _____

9. How was the medical expense for your visit paid when you made the complaint? [Fill-in-the-blank]:

Medicare portion (e.g., 80%): _____%

Out-of-pocket (e.g., 20%): _____%

Other (Please describe in detail) _____ ____%

10. How long did your visit to our hospital last during the complaint? (From arrival at the hospital to departure) [Fill-in-the-blank]

For example: 5 days, 2 hours, 30 minutes, etc.

_____

11. How long did it take you to get from your home to the hospital during the complaint? [Fill-in-the-blank]

For example: 1 day, 4 hours, 1 hour, 20 minutes, etc.

_____

12. How long did it take from your complaint to the hospital's final response?

For example: 2 days, 12 hours, 2 hours, etc.

_____

13. During the complaint resolution process, which methods did the hospital use to communicate with you? (Please select all relevant methods) [Multiple-choice question]

□ Face-to-face on-site

□ Hospital's official complaint hotline

□ Government hotline “12345”

□ Mobile phone

□ WeChat

□ Other (Please describe in detail) _____

14. How did the hospital ultimately resolve your complaint? (Please select all relevant methods) [Multiple-choice question]:

□ Apology

□ Financial compensation

□ Other (Please describe in detail) _____

15. Your age: _____ (years old) [Fill-in-the-blank]

16. Your gender [Multiple-choice question]:

□ Male

□ Female

17. What is your highest level of education? [Multiple-choice question]:

□ Below bachelor's degree

□ Bachelor's degree

□ Master's degree

□ Doctoral degree

18. In which year did you first visit this hospital? [Fill-in-the-blank]: _____ year

19. How many times have you visited this hospital in the past three years? [Fill-in-the-blank]: _____ times

20. If you encounter any issues during your visit to our hospital that require follow-up and resolution, please leave your phone number for our staff to contact you (optional) [Fill-in-the-blank]: _____

Part II: Complaint Experience

Please rate the following statements based on your actual experiences, feelings, and thoughts during your medical visit and complaint process using a number from 1 to 7 (1 = Strongly Disagree; 2 = Disagree; 3 = Somewhat Disagree; 4 = Neutral; 5 = Somewhat Agree; 6 = Agree; 7 = Strongly Agree).

21. Nature of the Complaint

a	The issue you complained about was very serious.	1 2 3 4 5 6 7
b	The issue you complained about caused you a great deal of inconvenience.	1 2 3 4 5 6 7
c	The issue you complained about caused you a great deal of stress.	1 2 3 4 5 6 7
d	It was very unfair that you encountered this situation.	1 2 3 4 5 6 7
e	The situation you complained about happened because the hospital intended it.	1 2 3 4 5 6 7
f	The situation you complained about happened because the doctor intended it.	1 2 3 4 5 6 7
g	The cause of the situation was something the hospital could control.	1 2 3 4 5 6 7
h	The cause of the situation was something the hospital could have prevented.	1 2 3 4 5 6 7
i	The hospital could have done something to avoid the situation.	1 2 3 4 5 6 7

22. Your understanding of the hospital's complaint policy and process

a	I am very clear about the complaint management and medical dispute resolution policies that the government requires hospitals to establish.	1 2 3 4 5 6 7
b	I am very familiar with the hospital's complaint and dispute resolution procedures.	1 2 3 4 5 6 7
c	I am very familiar with the hospital's time limit requirements for handling complaints and disputes.	1 2 3 4 5 6 7
d	I am very familiar with the outcomes of the hospital's complaint and dispute resolution processes.	1 2 3 4 5 6 7
e	I am very familiar with the hospital's regulations regarding different handling plans for different complaint and dispute scenarios.	1 2 3 4 5 6 7

23.The hospital's response to your complaint

a	The hospital responded quickly after you made the complaint.	1 2 3 4 5 6 7
b	The hospital began handling the issue immediately after you made the complaint.	1 2 3 4 5 6 7
c	The hospital promptly investigated the situation after you made the complaint.	1 2 3 4 5 6 7
d	The hospital resolved your complaint very quickly.	1 2 3 4 5 6 7
e	The hospital was very patient in handling your situation.	1 2 3 4 5 6 7
f	The hospital showed a great deal of empathy in handling your situation.	1 2 3 4 5 6 7
g	The hospital took your situation very seriously.	1 2 3 4 5 6 7
h	The staff involved in handling the situation were very respectful to you.	1 2 3 4 5 6 7
i	The staff were very proactive and diligent during the resolution process.	1 2 3 4 5 6 7

24.The process of handling your complaint by the hospital

a	The hospital handled your complaint in a fair and reasonable manner.	1 2 3 4 5 6 7
b	The rules and regulations used by the hospital to handle your complaint were fair and reasonable.	1 2 3 4 5 6 7
c	The hospital demonstrated sufficient flexibility in dealing with this situation.	1 2 3 4 5 6 7
d	The hospital initiated the complaint handling process in a very timely manner.	1 2 3 4 5 6 7
e	The hospital's complaint handling process was reasonable.	1 2 3 4 5 6 7
f	The hospital's explanation for the cause of the complaint matched your understanding.	1 2 3 4 5 6 7
g	The hospital provided you with the necessary relevant information.	1 2 3 4 5 6 7
h	The hospital proactively informed you of various aspects of the complaint handling process.	1 2 3 4 5 6 7
i	The hospital fully communicated with you regarding the final resolution plan.	1 2 3 4 5 6 7

Part III: Complaint Resolution

25. The outcome of the hospital's handling of your complaint

a	You are satisfied with the hospital's apology.	1 2 3 4 5 6 7
b	The hospital's apology was very sincere.	1 2 3 4 5 6 7
c	The hospital acknowledged responsibility for the issue.	1 2 3 4 5 6 7
d	The hospital provided an appropriate explanation for what happened.	1 2 3 4 5 6 7
e	The hospital offered a very reasonable compensation plan.	1 2 3 4 5 6 7
f	The hospital provided a very reasonable compensation plan based on the type of loss you experienced.	1 2 3 4 5 6 7
g	The hospital provided a very reasonable compensation plan based on the extent of your loss.	1 2 3 4 5 6 7
h	The hospital provided a very reasonable compensation plan based on your demands.	1 2 3 4 5 6 7
i	Considering the time and effort the hospital spent in handling this situation, you think the final outcome is fair.	1 2 3 4 5 6 7
j	Overall, the hospital's final response was sufficient to resolve your issue.	1 2 3 4 5 6 7
k	Your situation was handled fairly.	1 2 3 4 5 6 7
l	Despite the complaint, you are satisfied with the hospital's handling of the situation.	1 2 3 4 5 6 7

26.Your satisfaction level

a	Overall, the hospital provided a satisfactory solution for your complaint this time.	1 2 3 4 5 6 7
b	Overall, you are satisfied with the hospital's handling of your complaint this time.	1 2 3 4 5 6 7
c	Overall, you are satisfied with the process the hospital used to handle your complaint this time.	1 2 3 4 5 6 7
d	Overall, you are satisfied with the doctors at this hospital.	1 2 3 4 5 6 7
e	Overall, you are satisfied with the nurses at this hospital.	1 2 3 4 5 6 7
f	Overall, you are satisfied with the other staff members at this hospital.	1 2 3 4 5 6 7
g	Overall, you are satisfied with the doctor-patient relationship at this hospital.	1 2 3 4 5 6 7
h	Overall, you are satisfied with the quality of service at this hospital.	1 2 3 4 5 6 7

27.Your recommendation for choosing this hospital

a	This hospital will be your first choice for your next visit.	1 2 3 4 5 6 7
b	You will continue to choose this hospital in the future.	1 2 3 4 5 6 7
c	Even if there are other options, you would still choose this hospital next time.	1 2 3 4 5 6 7
d	From now on, you are more inclined to choose this hospital.	1 2 3 4 5 6 7
e	You are willing to recommend this hospital to others.	1 2 3 4 5 6 7
f	If asked for your opinion, you would give this hospital a positive review.	1 2 3 4 5 6 7
g	You would encourage your relatives and friends to choose this hospital.	1 2 3 4 5 6 7
h	You are willing to leave a positive review for this hospital online.	1 2 3 4 5 6 7

The survey ends here. Thank you very much for your support and assistance in our research!