

A Proposal to Improve Korea's Project Financing Market Using Mixed Methods: Qualitative Approach and AHP Analysis

by

Taeyong Kim

B.S., Real Estate Studies

Konkuk University, 2015

SUBMITTED TO THE PROGRAM IN REAL ESTATE DEVELOPMENT IN CONJUNCTION WITH THE
CENTER FOR REAL ESTATE IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF

MASTER OF SCIENCE IN REAL ESTATE DEVELOPMENT
AT THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

FEBRUARY 2023

©2023 Taeyong Kim. All rights reserved.

The author hereby grants to MIT permission to reproduce and to distribute publicly paper and electronic copies of
this thesis document in whole or in part in any medium now known or hereafter created.

Signature of Author: _____

Center for Real Estate
January 13, 2023

Certified by: _____

Albert Saiz
Daniel Rose Associate Professor of Urban Economics and Real Estate
with tenure; Faculty Director, Urban Economics Lab
Thesis Supervisor

Accepted by: _____

Siqi Zheng
STL Champion Professor of Urban and Real Estate Sustainability
MIT Center for Real Estate + Department of Urban Studies and Planning
Faculty Director, MIT Center for Real Estate (CRE)
Director, MIT Sustainable Urbanization Lab

Page Left Intentionally Blank

A Proposal to Improve Korea's Project Financing Market Using Mixed Methods: Qualitative Approach and AHP Analysis

By

Taeyong Kim

Submitted to the Program in Real Estate Development in Conjunction with the Center for Real Estate on January 13, 2023 in Partial Fulfilment of the Requirements for the Degree of Master of Science in Real Estate Development at the Massachusetts Institute of Technology

ABSTRACT

The real estate finance industry is exposed to various risks due to its diverse economic factors. As such, project financing (PF), relying on the future cash flow from an asset, can play a positive role to diversify risk. As in other markets around the world, the PF market in South Korea has expanded over the last decade. However, concerns over PF risks have recently surged in the face of the crisis in the real estate market because of rising interest rates and increasing material costs.

Insolvency problems in PF have received attention in Korea since the Asian Financial Crisis of 1997 and the Global Financial Crisis of 2008. There are several key factors causing insolvency problems in the Korean PF markets. First, most development projects use the presale method, in which the prepayments from the buyers are used to cover development expenses. Second, credit enhancements from general contractors have been overused and distribution of risk by market participants has remained misaligned. Third, most developers are undercapitalized and use excessive leverage. Fourth, there are issues with the project evaluation systems in terms of professionalism, dependability, and openness. These factors underlie the potential risks that could adversely affect the stability of the financial system.

This study aims to examine and suggest practical ways to improve the stability of the Korean PF market. To this end, the research exploits qualitative and quantitative research methods.

In the initial qualitative research section, the study uses a review of the relevant literature and case studies. Specifically, it investigates the primary PF issues associated with “Policy”, “Risk Sharing Structure”, “Developers”, and “Project Evaluation System”. In addition, the thesis further proposes four improvement plans: first, “Enhancing the Institutional and Policy Framework”; second, “Activating Risk-sharing Structures”; third, “Improving the Capacity of Developers”; and fourth, “Transforming the Project Evaluation System”. These four measures are classified as high-level improvement plans, and each plan is further divided into three subplans (low-level). Thus, we propose twelve (4*3) proposals to improve the system in total.

Next, in the quantitative research part, an Analytic Hierarchy Process (AHP) analysis is applied to evaluate the relative importance of each of the improvement plans and to determine the priorities of real estate PF participants, who were divided into four groups: “Developers”, “General Contractors”, “Financial Institutions”, and “Other Groups”. Surveys were distributed to 60 experts from across these groups.

The results revealed that among the high-level classification of proposed industry improvement plans, “Enhancing the Institutional and Policy Framework” was the most important and “Improving the Capacity of Developers” was the second most important. At lower levels of classification, the importance of each plan was ranked in the following order: “Limiting Credit Enhancement Measures of General Contractors”, “Strengthening Risk Management System and Regulatory Measures”, and “Increasing Participation of Financial Investor (FI) in PF Market.” The results further show that the ranking of importance for the different reforms varied among the different stakeholder groups. Based on these findings, this study discusses how to improve the Korean PF market and suggests that further qualitative research is needed to find a compromise and reconcile the differing perspectives of its stakeholders.

The contribution of this study is that it identifies the fundamental problems of the PF market in Korea and proposes practical plans for reform. Additionally, by determining the priorities among them, it offers valuable data to guide the direction for the future development of this market.

Thesis Advisor: Albert Saiz

Title: Daniel Rose Associate Professor of Urban Economics + Real Estate,
Faculty Director, Urban Economics Lab

Acknowledgements

With deep appreciation, I offer my sincerest thanks to all these individuals who have supported and inspired me throughout my academic journey.

I wish to show my appreciation to Professor **Albert Saiz**, who has served as the best thesis advisor and guide throughout my thesis journey. I am truly honored to have worked under your guidance and to have had the chance to learn from your vast knowledge. Your patience, belief, and encouragement have inspired me to strive for excellence and to put my best effort forward in all that I do. I will never forget the way you patiently listened to my ideas regarding methodology and provided valuable feedback. Despite the limitations of this thesis, I hope it reflects my respect and admiration for you as a scholar and a person.

My heartfelt thanks to Professor **Siqi Zhang**, my exceptional academic advisor. It's been a true honor to have you guide me through my academic journey. Your support and encouragement pushed me to join the AREI and I am grateful for the opportunity to work with you. Your dedication to your students has inspired me and I will always remember the positive impact you have had on my life. Your confidence in me led to my victory in the Sustainable Real Estate competition, a moment I will cherish forever. Thank you so much.

I wish to express my sincere appreciation to **James Scott**. Your guidance and wisdom have been invaluable in shaping my academic journey, and I am honored to have had the opportunity to work with you on AREI. The experience of researching the PropTech market in Thailand with you remains one of the highlights of my time at MIT, and I am deeply grateful for your encouragement throughout the process. Your guidance has given me the foundation to write this thesis with confidence. I am deeply grateful for your support.

I am truly grateful to Professor **Jeong-seop Song** for your invaluable guidance and support throughout the process of selecting the appropriate content for this thesis. Your wisdom and support have been instrumental in shaping my academic journey, and I am thankful for the time and effort you have dedicated to me. I will always remember your positive influence during my time at MIT, and your unwavering support. I extend my best wishes for continued success and happiness in your future endeavors. Thank you, my brother.

With deep appreciation, I would like to extend my heartfelt thanks to my best friend, **Steven La** throughout my academic journey. Your encouragement and assistance have been invaluable for me, and I cannot thank you enough for the moments you have played in helping me to finish various challenges. The memories of our trip to Banff will forever hold a special place in my heart. Congratulations on your new journey at Landease, and I wish you a future filled with continued success and happiness.

Acknowledgements

I dedicate this thesis, my cherished wife, Hyunjee. The academic journey I undertook would not have been complete without you, and I have come to fully comprehend the immense value of your love. I understand that waiting for me must have been a difficult and lonely time for you, and I am eternally thankful for your unwavering support and encouragement. Your love illuminates my life like a bright light and fills me with endless gratitude every day. Your unwavering devotion has been my stronghold, providing me with the courage and resilience to face any obstacles that came my way. Your kind and selfless nature, combined with your deep understanding, has moved me deeply and continues to inspire me every day. I will forever cherish the memories we made in Boston, and I am proud of the way we faced and overcame the challenges that came our way. During the journey, our love for each other has only grown stronger, and I eagerly anticipate the day when we can once again go to Boston and relish the delicious Fra Diavolo at Saraceno. Hyunjee, you are my everything and my soulmate I am immeasurably grateful to have you as my wife, and I love you now and always, forever, and ever.

From the depths of my heart, I express my love and gratitude to my beloved mother, Soon-ja and father, Hwan-seok. Your unwavering support has been the foundation of my academic journey at MIT, providing me with constant encouragement and inspiration. Your love and sacrifices have had an immeasurable impact on my life, and I am eternally grateful for all that you have done. Your guidance and belief in me have been a shining light that has directed my path, and I am honored to pay tribute to you through this thesis. You are not just my parents, but the two most important and influential people in my life, who have always believed in me and shown me nothing but love and kindness. It is my hope that one day I may repay the love you have shown me, and the memories of your support and guidance will forever be cherished in my heart. I am overflowing with gratitude for my dear younger brother, Jin-yong. Your love and support have been a source of strength and comfort for me. Your presence in my life is a true blessing, and I am grateful for every moment we have shared together. I wish you all the success and happiness in your future endeavors and hope that we can continue to support each other through life's ups and downs. Thank you, Jin-yong, for being my brother, for always being there for me, I love you, brother.

With deepest gratitude, I extend my heartfelt thanks to my dearest mother-in-law, Hye-sun. Your constant love and support have been a source of strength and comfort to me. You have been a true blessing in my life, and I am eternally grateful for the gift of having you as my mother-in-law. Your steadfast belief in my academic journey has deeply touched me, and I am in awe of the love and support you have consistently shown us. I am truly grateful for the wonderful mother-in-law that you are, for being a steadfast source of support and care, and for always being there for us, offering love and guidance through your prayers. The trip we took to Boston will forever be a treasured memory, and we will always be thankful for the moments.

Table of Contents

I. Introduction	10
1. Study Background and Purpose	10
2. Methodology	13
1) Qualitative Research	13
2) Quantitative Research	13
II. Analysis of Korea's PF Market Through a Qualitative Approach	15
1. Literature Review	15
1) Project Financing (PF) Overview	15
2) Changes in Korea's PF Structure	15
3) Characteristics of Korea's PF market	18
4) Current Diagnosis and Future Scenarios	24
2. Case Studies	27
1) Project A: Officetel Development Project	28
2) Project B: Mixed-use Development Project	31
3) Project C: Industrial Building Development Project	34
4) Other Projects	37
3. Problem Analysis and Improvement Proposal	39
1) Implications Derived from the Literature Review and Case Studies	39
2) Analysis of Problems	40
3) Proposal of Improvement Plans	46
III. Analysis of Improvement Plans Through a Quantitative Approach	55
1. Designing an Analysis Model	55
1) Overview	55
2) Designing a Model: Analytic Hierarchy Process (AHP)	55
3) Hierarchical Structure	58
2. Importance Analysis	59
1) Survey Analysis	59
2) Logical Consistency Analysis	62
3) Analysis of the Relative Importance of Improvement Measures	63
4) Comprehensive Importance and Priority Analysis	68
IV. Conclusion	73
1. Summary & Implications	73
2. Directions for Future Research	75

List of Tables and Figures

[Tables]

Table 1: Comparison of Corporate Finance, Theoretical Project Finance, and Korea's Real Estate Project Finance

Table 2: General Contractors' Credit Enhancement Types

Table 3: Scale of Real Estate Asset Backed Securities (ABS) Issuance and Credit Enhancement by Securities Companies and General Contractors

Table 4: Summary of Three Development Projects

Table 5: Outline of Project A

Table 6: Outline of Project B

Table 7: Outline of Project C

Table 8: Improvement Proposals

Table 9: Random Index: RI

Table 10: AHP Analysis Procedure

Table 11: Hierarchical Structure of 12 Proposals

Table 12: General Characteristics of Respondents

Table 13: PF Participants' Market Awareness as of the End of 2022

Table 14: Comparison of Participants' Perception Differences

Table 15: Logical Consistency Analysis Among All Respondents

Table 16: Importance and Priority of "Major Classification Criteria"

Table 17: Importance of Each Factor in "Enhancing the Institutional and Policy Framework"

Table 18: Importance of Each Factor in "Activating Risk-sharing Structures"

Table 19: Importance of Each Factor in "Improving the Capacity of Developers"

Table 20: Importance of Each Factor in "Transforming the Project Evaluation System"

Table 21: Overall Weight and Priority by Participating Group

[Figures]

Figure 1: Research Diagram

Figure 2: Methods and Scope of Study

Figure 3: Housing Price Growth Rate in Major Countries (Q3 2021)

Figure 4: Housing Price Change Rate Compared to the End of the Previous Year

Figure 5: Changes in Investment Balance in Real Estate PF

Figure 6: Changes in the Composition of Investment in Real Estate PF

Figure 7: Changes in the Base Interest Rate in Korea

Figure 8: Changes in the Raw Material Price index

Figure 9: PF Structure of Project A

Figure 10: PF Structure of Project B

Figure 11: PF Structure of Project C

Figure 12: Overall Weight of Total Respondents

Figure 13: Overall Weight of Developers

Figure 14: Overall Weight of General Contractors

Figure 15: Overall Weight of Financial Institutions

Figure 16: Overall Weight of Other Groups

I. Introduction

1. Study Background and Purpose

The study background of this thesis focuses on the issues surrounding real estate project financing (PF) in South Korea. The Asian Financial Crisis of 1997 and the Global Financial Crisis of 2008 have had a significant impact on the country's economy, resulting in the bankruptcy of general contractors and financial institutions. These crises have transformed insolvency issues in the real estate PF market into systemic problems and have sparked numerous debates about the PF system in Korea.

The real estate PF market in Korea has seen significant growth in recent years, driven by favorable economic conditions and low interest rates. Despite this growth, the market faced a crisis in 2022 due to systemic problems and sudden changes in external variables, which exposed the potential for insolvency risks. As of late June 2022, the gross balance of PF loans in Korea stood at 112.2 trillion won, a three-fold increase from 35.2 trillion won at the end of 2013. However, the overdue balance of PF loans extended by insurers, securities companies, and capital (short-term) lenders in 2022 quadrupled, from 130 billion won compared to 31 billion won the previous year.¹ Additionally, the contingent liability² of 17 major general contractors increased by nearly 17% compared to 2018.³

While the real estate PF market has seen advancements, such as a wider range of investment methods and improved risk-sharing structures, credit enhancement from general contractors continues to be a key collateral for many projects. This has resulted in a more complex market closely tied to the capital market, raising the risk of financial difficulties and insolvency. Additionally, the market is now exposed to a greater number of systemic risks such as inflation, changes in interest rates, and even war, which can lead to insolvency, thereby increasing overall risk.

The thesis aims to address the underlying issues and take action to prevent future insolvencies in the real estate PF market in Korea. However, there are many obstacles to overcome in eliminating entrenched practices in the market. Therefore, it is crucial to shift the perception of stakeholders by considering their respective interests and prioritizing improvement plans accordingly. By focusing on practical measures that are applicable to the Korean market, the goal is to ensure that the PF market is stable and sustainable.

¹ Data Provided by Financial Supervisory Service Korea

² Note: A contingent liability is a potential liability that may or may not occur, depending on the result of an uncertain future event.

³ Data Provided by Korea Ratings

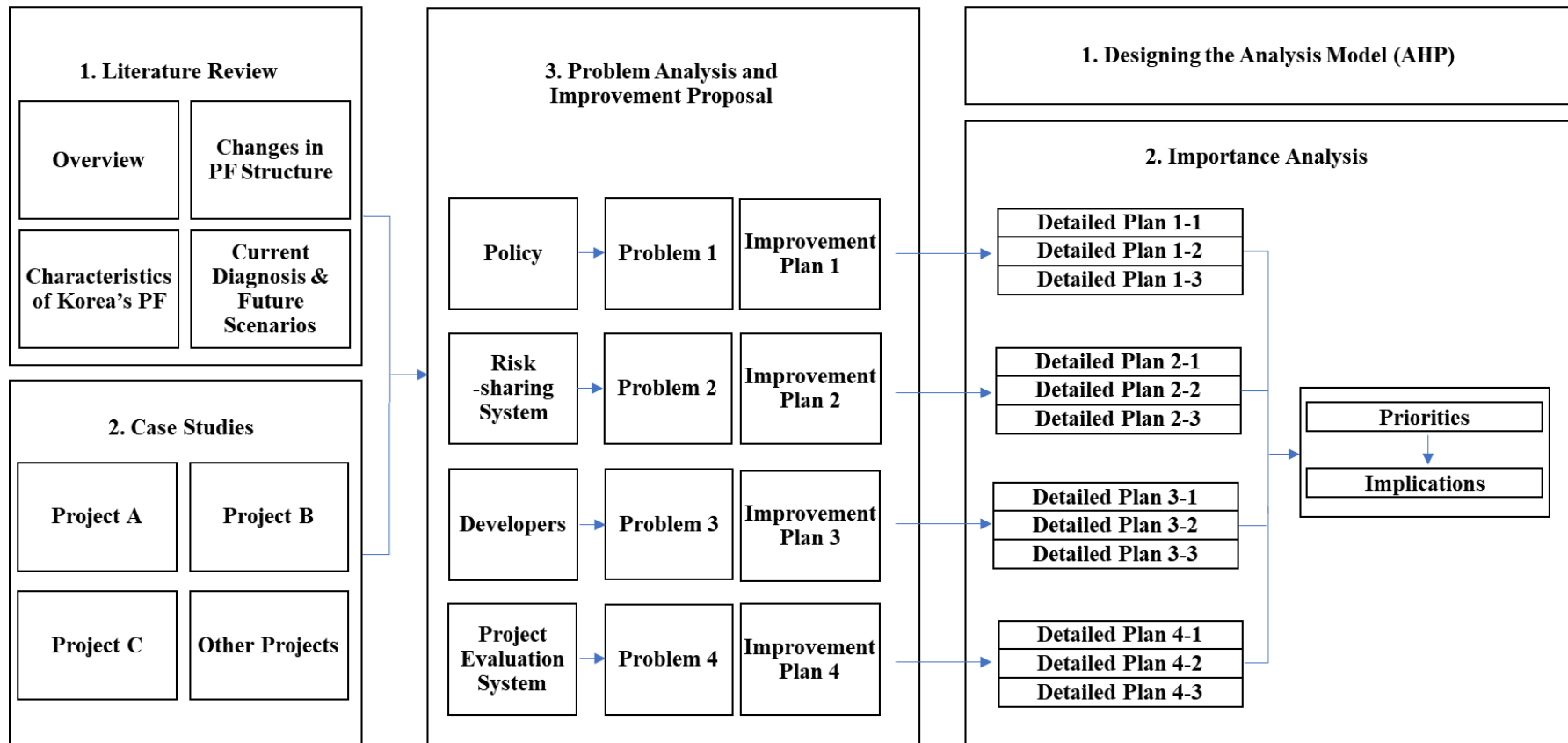
The methodology used in this study involves a thorough investigation of the problems of the Korea's real estate PF market to derive improvement plans through a literature review and case studies. This research will involve understanding the priorities of different groups of participants in the real estate market, including developers, general contractors, financial institutions, and others. The Analytic Hierarchy Process (AHP) method will be used to conduct the analysis. Based on the qualitative and quantitative approaches outlined above, the research will provide practical plans that are tailored to the needs and situations of participants in the PF market. The findings of this study will contribute to discussions on making significant changes to Korea's PF market, which could potentially improve the market and prevent future crises.

A diagram of the flow of this study based on an understanding of such problems is provided in [Figure 1].

Figure 1. Research Diagram

II. Analysis of Korea's PF Market Through a Qualitative Approach

III. Analysis of Improvement Plans Through a Quantitative Approach



2. Methodology

This study utilizes a combination of qualitative and quantitative research methods. A literature review and case studies were conducted using a qualitative approach, while an AHP (Analytic Hierarchy Process) analysis was performed using a quantitative method. The methods and procedures used in this study are described as follows:

1) Qualitative Research

A literature review and case studies are conducted to analyze the problems in the Korean real estate project financing (PF) market and propose improvement plans.

The “Literature Review” section examines the concepts, characteristics, and current market conditions of the Korea’s real estate PF market as of 2022.

The “Case Studies” section analyzes three real estate PF projects, exploring both the identified characteristics of the Korea’s PF market and the various issues related to the risk-sharing structures used in each project.

The “Problem Analysis and Improvement Proposal” section identifies four main issues related to insolvency risks and proposes 12 detailed improvement plans based on the literature review and case studies.

2) Quantitative Research

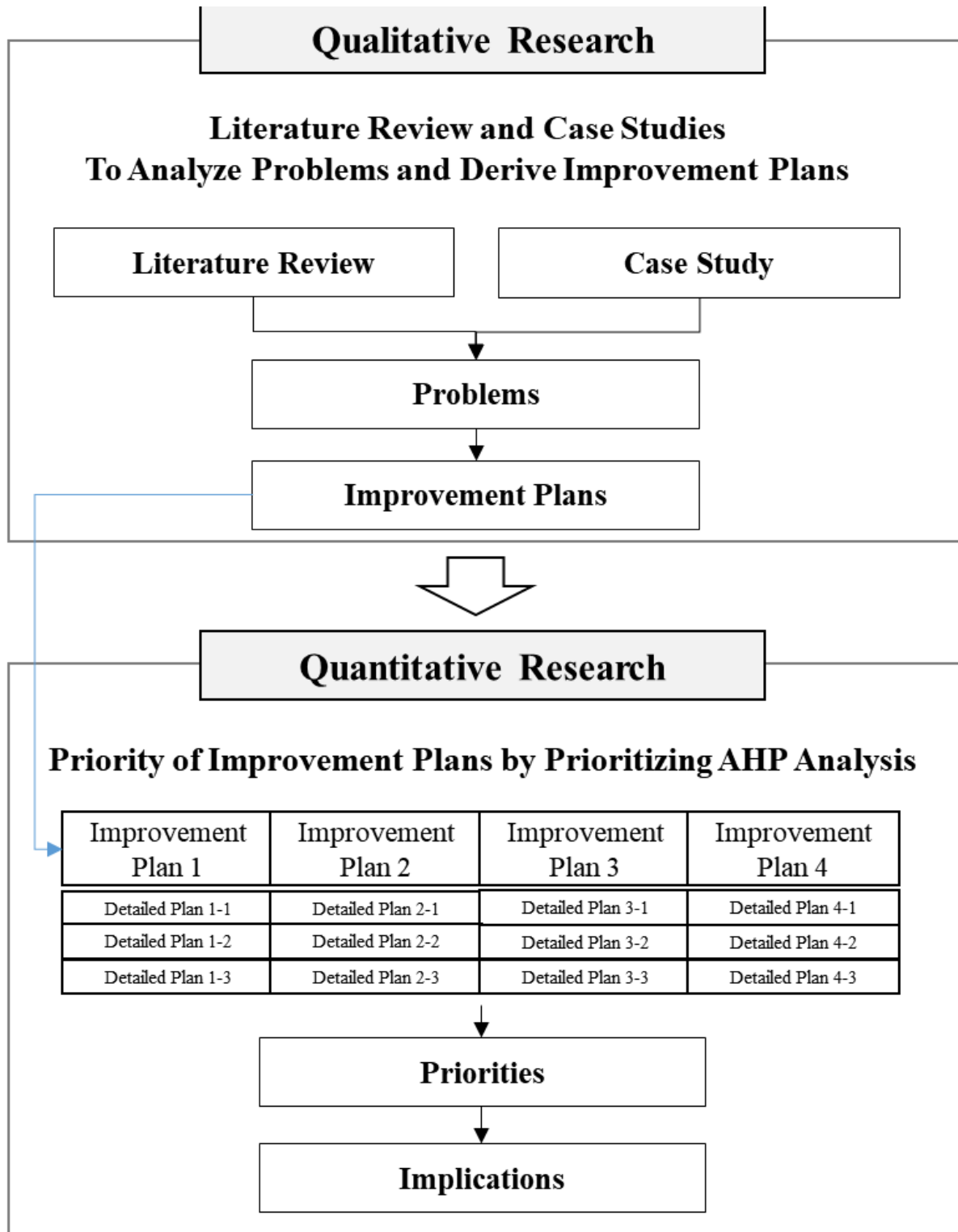
This study employs AHP analysis to evaluate the perception of improvement proposals derived from qualitative research among participants in PF projects.

First, the “Developing an Analysis Model” section discusses the concepts, procedures, and principles of the AHP. Also, a total of 12 proposals were categorized (consisting of 4 main classifications with 3 sub-classifications) to calculate their relative importance using the AHP method.

Second, in the “Importance Analysis” section, surveys were conducted with practitioners after classifying them under the categories of “Developers”, “General Contractors”, “Financial Institutions”, and “Other Groups”. This section identifies the consistency, importance, and priorities of the evaluation criteria through AHP analysis to explore specific future directions for the Korean PF market.

The analysis process has been outlined in [Figure 2] below.

Figure 2. Methods and Scope of Study



II. Analysis of Korea's PF Market Through a Qualitative Approach

1. Literature Review

1) Project Financing (PF) Overview

Project financing (PF), as stated by Pillai (2017), is a financing structure where funds are obtained for a specific project and the repayment of the debt is based on the assets and expected cash flows of the project. The success of the project is crucial for the investors to receive their repayment.⁴

Real estate project financing (Real Estate PF) is a subset of project financing, specifically used for real estate projects such as construction of buildings, development of land, or acquisition of existing properties. The financing is secured by the assets of the real estate project, including the land, buildings, and anticipated rental income from the properties.

In Korea, real estate PF has been widely used to procure necessary funds for real estate development projects (e.g., land, project, and financial costs) including apartments, officetels (upscale studio apartment units), offices, and shopping malls. Notably, residential development account for over 70% of the Korean real estate PF market.⁵ Thus, this study focuses on residential development projects.

2) Changes in Korea's PF Structure

(1) 1st Generation Development (~1997): Success driven by General Contractors

Korea's land development progressed quickly under state guidance. Before 1997, general contractors dominated the Korean development market and took on all the risks involved in all stages of development.⁶ During this period, the development structure did not approach anything resembling PF. This is because there was no clear division between developers and general contractors, and the development costs were financed directly by general contractors.

⁴ Pillai, R. (2017). *Project Finance: Concepts, Techniques, and Practices*. John Wiley & Sons.

⁵ Seok-hun Lee (2019). *Trend and Risk Analysis of the Real Estate PF Securitization Market in the Domestic Securities Industry*

⁶ Eun-sung Kim and Jae-jun Kim (2008). *A Study on the Composition of PFV (Project Financing Vehicles) Used in Large-scale Development Projects*

(2) 2nd Generation Development (1997–2008): Separation of Development and Construction, and Emergence of the PF Structure

The 1997 Asian Financial Crisis resulted in financial constraints on general contractors, which had previously led development projects, due to their high debt ratios. To overcome these limitations, general contractors established Special-Purpose Companies (SPCs) as the nominal entities for securing loans, separating development from construction. This allowed SPCs, now considered as 'developers', to obtain project financing loans instead of general contractors, who continued to manage the projects.

Meanwhile, financial institutions became more active in real estate project financing and achieved relatively high returns. However, they lacked the professional expertise to determine the feasibility of the projects, and developers, who were the actual borrowers of project financing loans, remained modest players and unable to raise funds independently. Accordingly, financial institutions diversified their risk by adding conditions to PF loan agreements (e.g., the necessity of contractor debt assumption or a joint guarantee for the repayment of the principal and interest of the loan).⁷ With limited expertise in participating directly in real estate project financing or the infrastructure to share the risk of development projects, most of the risk relied on the creditworthiness of the general contractor.⁸ In effect, this system was similar to corporate debt.

This structure led to the emergence of Korean Project Financing (PF) structure that relied on the general contractor's creditworthiness, which deviated from the typical approach of PF, which usually relies on the feasibility of the project itself.

⁷ Eun-yeong Choi (2011). Current Status of Real Estate PF Loans and Improvement Plans

⁸ Guk-hyeong Lee and Yeong-gi Moon (2013). Risk Sharing Plan for Real Estate PF Participants

(3) 3rd Generation Development (2008–Present): Development of PF Risk Sharing Structure and Current Limitations

During the second half of 2008, the global financial crisis had a significant impact on the real estate market in Korea. The rising payment guarantees of contractors resulted in many small and medium-sized general contractors going bankrupt. As a result, professional developers emerged as the lead players in the market and took over the role of acquiring land and reaping the profits of development.⁹

The diversification of credit enhancement providers was due to the strengthening of prudential regulations during the Global Financial Crisis, and also the drop in credit ratings of many general contractors. This resulted in PF lenders, such as securities companies, beginning to request credit enhancement from entities other than general contractors.¹⁰

As outlined above, the previous structure of the Korean PF market was simple, with general contractors bearing all risk. However, several financial institutions (e.g., securities, insurance, and specialized credit companies) emerged after the Global Financial Crisis along with a diverse range of business structures. Each of these had different risk-sharing mechanisms depending on the nature of the participating institutions and profit distribution structure.¹¹

However, despite this structural growth, several limitations remain. In the Korean real estate PF structure, loans are primarily underwritten by the contractor's credit enhancement as their most basic collateral, and additional credit enhancement is carried out through securitization handled by financial institutions.¹² General contractors continue to bear excessive risk in the Korean PF market. If they become insolvent, the impact will be felt by the wider financial market.

⁹ EBEST Investment & Securities (2020). Developer and Friends

¹⁰ Jeong-joo Kim (2022). Diagnosis of the Causes of the "Real Estate PF Crisis" and Policy Countermeasures

¹¹ Hyun-seok Lee, Jong-chil Shin, and Sung-kyun Park (2011). A Study on Improvement Plans for Project Financing Due to Changes in the Real Estate Market

¹² Jeong-joo Kim (2022). Diagnosis of the Causes of the "Real Estate PF Crisis" and Policy Countermeasures

3) Characteristics of Korea's PF market

(1) Overview

The overall characteristics of Korea's PF in comparison to theoretical PF can be depicted in [Table 1].

Table 1: Comparison of Corporate Finance, Theoretical Project Finance, and Korea's Real Estate Project Finance^{13 14}

Category	Corporate Finance	Project Finance	
		Theoretical PF	Korea's Real Estate PF
Borrower	Company	Special Purpose Company (SPC) or Developer	
Size of Financings	Flexible	Might Require Critical Mass to Cover High Transaction Costs Associated with the Financings	
Main Variables Underlying the Granting of Financing	Customer Relations, Solidity of Balance Sheet, and Profitability	Future Cash-flows	· Future Cash-flows · Credit Rating of Credit Providers (Including General Contractor)
Collateral	Assets of Borrower	Project Revenue	· Project Revenue · Affiliated Company's Guarantees · General Contractor's Guarantees (Including Responsible Completion Commitment)
Source of Reimbursement	Assets and Income of Borrower	Project Revenue	Project Revenue (Pre-sale Proceeds)
Recourse	Full recourse	Non-recourse	Limited Recourse (to Project Assets and Income)
Degree of Leverage Utilizable	Depends on Effects on Borrower's Balance Sheet	Future Cash-flows	· Future Cash-flows · Stakeholder Guarantees · General Contractor's Guarantee
Accounting Treatment	On Balance Sheet	Off-balance Sheet	Off-balance Sheet (Credit Provider on Balance Sheet)
Risk Allocation	Full Responsibility to the Borrower	Risk-sharing Among Participants	Risk-sharing Among Participants (With a Focus on General Contractor)
Cost of Capital	Relatively Lower	Relatively Higher	Relatively Higher (Linked to the Credit Rating and Credit Enhancement of General Contractor)

¹³ Yong-un Ahn and Min-seob Choi (2021). A Study on Real Estate Development Finance Risk Management Plan – Focusing on PFV

¹⁴ Note: The explanations of Ahn and Choi have been revised by the author to improve clarity and accuracy for the purposes of this thesis.

(2) Development of PF Structures Based on the Presale Method

① Rationale Behind the Introduction of the Presale System

The presale system involves selling a product or service before it becomes available for purchase or delivery.¹⁵ This system was adopted in the 1980s in Korea to help resolve housing shortages in downtown areas. The benefits of the presale system include reducing the financial costs for general contractors and increasing the supply of housing by providing easier access to construction funds.

② Characteristics of the Presale System

The presale system in Korea involves selling the occupancy rights of a real estate property to potential buyers before the completion of its construction. Developers, after securing land ownership rights and receiving a guarantee from the Housing and Urban Guarantee Corporation (HUG), can sell the occupancy rights to potential property buyers. Typically, buyers make a down payment of 10% of the property's price at the start of the sales process, with 40-50% paid during construction as interim payments and the remaining 40-50% paid when the construction is completed. This system provides a stable source of construction funds for developers, as they can secure 50-60% of the total sales revenue from buyers in advance. The presale system is widely adopted in Korea and has helped shape the country's PF market. Unlike in other developed markets, the sales proceeds from buyers in Korea are used to finance development costs, making it a “high-risk, high-return” approach.

③ The Government's Guarantee System

The Korean government operates a guarantee system through the Korea Housing and Urban Guarantee Corporation (HUG) to provide a safety net for housing buyers in the presale system. The HUG provides a guarantee to return the down payment and interim payments to the contracting party if the developer or general contractor goes bankrupt. Only developers who pre-sell projects with 30 or more housing units in Korea can solicit potential buyers after obtaining a sales guarantee from HUG. This guarantee system serves to protect the rights of the contracting party in the event of a supplier's bankruptcy.

¹⁵ Hsu, C. H., and Fan, J. P. (2017). A model of crowdfunding success: Evidence from Reward-based Campaigns. *International Journal of Management*

(3) The Increase in the Demand for Short-term Investments

① High Land Prices

The value of land in Korea is higher compared to other major developed countries, with a study showing that the cost of land in Korea is enough to purchase twice as much land in either Canada or Australia.¹⁶ The high land prices in Korea are due to the geographical terrain that makes real estate development challenging, with a large portion of forested areas and a limited amount of usable land due to strict regulations. To offset the high cost of acquiring development rights for a piece of land, developers aim to recover their costs early in the development process. As a result, they prioritize short-term sales through high presale prices instead of seeking long-term profits through leasing.¹⁷

② The Emergence of the Short-term Investment Market

The real estate market is characterized by high capital investments, long development periods, and sensitivity to economic and policy changes. However, it is dominated by short-term investments, making it vulnerable to changes in the real estate market and external financial trends. Despite the introduction of long-term investment vehicles such as REITs and real estate funds, they have not been effective in mitigating these structural issues and lag behind those in other major developed economies. In contrast, Korea has developed a robust short-term financial market. Short-term securities like Asset Backed Short-Term Bond (ABSTB) have maturities of less than a year and are issued to meet the short-term funding needs of companies and financial institutions. The balance of short-term financing in Korea has continued to increase, reaching 313.8 trillion won as of May 2022.¹⁸ This increase has heightened the sensitivity of the Korean private financial market to market volatility and created a situation where a market downturn could have a significant impact on the financial market as a whole.

¹⁶ Jin-su Lee (2018), Comparison of long-term trends in land prices by major countries

¹⁷ Kyoung-hee Shin (2015), Study of Analysis of Real Estate Project Financing Issues and Activated through Improvement of a System

¹⁸ Pil-kyu Kim (2022), A Study on the Characteristics and Implications of the Domestic Short-Term Securities Market

(4) Risk Sharing by General Contractors

① The Importance of General Contractors in the Korean PF Industry

Credit enhancement for contractors in the Korean PF market goes beyond the simple concept of a “guarantee”, as it reflects the stability of real estate PF loans with demonstrated prudential viability. In this regard, they bear the highest risk among stakeholders in the Korean PF market and play a significant role in determining the success of PF. Financing decisions are generally based on the credit rating and construction capability evaluation of the general contractor, and they are required to provide various forms of credit enhancement in many cases. This helps supplement the developer's limited capital, mitigate the risk of the development project, and raise the likelihood of loan repayment with interest.¹⁹

② Credit Enhancement Measures by General Contractors

In the Korean Project Financing (PF) market, general contractors play a crucial role by providing credit enhancement measures to lenders or investors when entering into PF agreements or issuing ABS²⁰, ABCP, and ABSTB. The measures include Responsible Completion Commitments, Joint Guarantees, Debt Assumption, and Fund Supplementation.²¹ The Responsible Completion Commitment, also known as the completion guarantee, is a promise by the general contractor to complete the real estate project by the scheduled completion date, except in the case of force majeure. This is of utmost importance to PF lenders as they prioritize project completion, and therefore require a guarantee that the project will be completed before the loan matures.²²

To meet the requirements set by Korean PF lenders, general contractors must meet strict criteria, such as being among the top 100 contractors in South Korea, having issued corporate bonds, and having a credit rating of A- or higher. However, this stringent selection process results in only a limited number of contractors, around 20, that meet these requirements.

¹⁹ In-hyeok Lee, Son Eun-kyung, and Choi hyun-woo (2010). Hana Finance Info. - Analysis of Real Estate PF Evaluation Models in the United States and Japan

²⁰ Note: The term “Asset-Backed Securities (ABS)” refers to a broader category of securities that are backed by assets, while ABCP and ABSTB are specific subcategories of ABS.

²¹ Yoon & Yang LLC (2022), Seminar on Responding to General contractors in Insolvent PF Workplaces.

²² Yul-ri Kang (2014). Jipyong LLC - Construction Real Estate Newsletter

Table 2: General Contractors' Credit Enhancement Types

Types	Contents
Responsible Completion Commitment	<ul style="list-style-type: none"> · This is the most common type of General Contractors' credit enhancement. · If General Contractors fail to complete construction, they must assume the debt for the PF loan.
Joint Guarantee & Debt Assumption	<ul style="list-style-type: none"> · General contractors are jointly liable for the borrower's PF loan obligations. · In the event of Events of Default (EOD) or when the borrower defaults on its obligations, General Contractors must assume the obligations.
Fund Supplementation	<ul style="list-style-type: none"> · General Contractors provide credit enhancements to SPCs for issuing ABS, ABCP, or ABSTB. · The agreement is concluded between the General Contractor, who are responsible for supplementation of funds, and the SPC, which is the issuer of securitized securities. · In the event of an EOD, the default of the borrower, or insufficient funds to repay the SPC's securitized securities, General Contractors must cover any remaining obligations.

Source: Korea Ratings

③ Risks in Korean PF Market Due to Contractor Collateral Dependence

Despite the growth in credit enhancement from financial institutions like securities companies, the primary form of collateral in the Korean PF market remains credit enhancement from general contractors. Furthermore, most of the credit enhancement provided by securities companies for Asset Backed Securities (ABS)²³ is based on the credit enhancement provided to lenders or investors by general contractors. In most cases, the credit rating of ABS is linked to the credit rating of general contractor.²⁴

As a result, the structure of Korea's real estate PF leaves it vulnerable to the financial stability of the general contractor. The general contractor's credit enhancement serves as the primary form of collateral, with supplementary credit enhancement from financial institutions via securitization. In the event of a general contractor's bankruptcy, it could trigger the insolvency of real estate PF loans and ABS, leading to a shock in the financial market.²⁵

²³ Note: The term "Asset-Backed Securities (ABS)" refers to a broader category of securities that are backed by assets, while ABCP and ABSTB are specific subcategories of ABS.

²⁴ Seok-hoon Lee and Geun-hyeok Jang (2019). Trend and Risk Analysis of the Real Estate PF Securitization Market in the Domestic Securities Industry

²⁵ Jeong-joo Kim (2022). Construction & Economy Research Institute of Korea - Diagnosis of the Causes of the "Real Estate PF Crisis" and Policy Countermeasures

Table 3: Scale of Real Estate Asset Backed Securities (ABS)²⁶ Issuance and Credit Enhancement by Securities Companies and General Contractors

(Unit: Number of cases, KRW 1 trillion)

Category		2018	2019	2020	2021	2022
Credit Enhancement of Securities Companies	Securitization Cases	563	687	1,008	1,741	1,832
	Balance of Securities Issuance	16.7	20.4	26.5	44.5	46.0
Credit Enhancement of General Contractors	Securitization Cases	214	208	196	251	224
	Balance of Securities Issuance	12.7	13.4	13.2	17.2	15.4

Note: Regarding credit enhancement for all asset backed securities, the share of securities and general contractors is approximately 90% based on the number of cases and approximately 80% based on the balance of issuance.

Source: Hong Seong-Ki, PF Securitization Portfolio - Current status by credit enhancement and project type, education seminar material

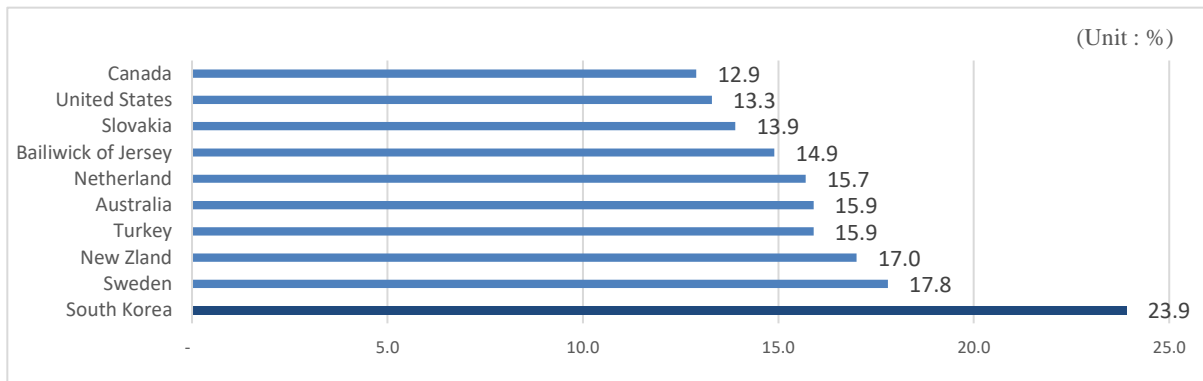
²⁶ Note: The term "Asset-Backed Securities (ABS)" refers to a broader category of securities that are backed by assets, while ABCP and ABSTB are specific subcategories of ABS.

4) Current Diagnosis and Future Scenarios

(1) A Continued Increase in Housing Prices

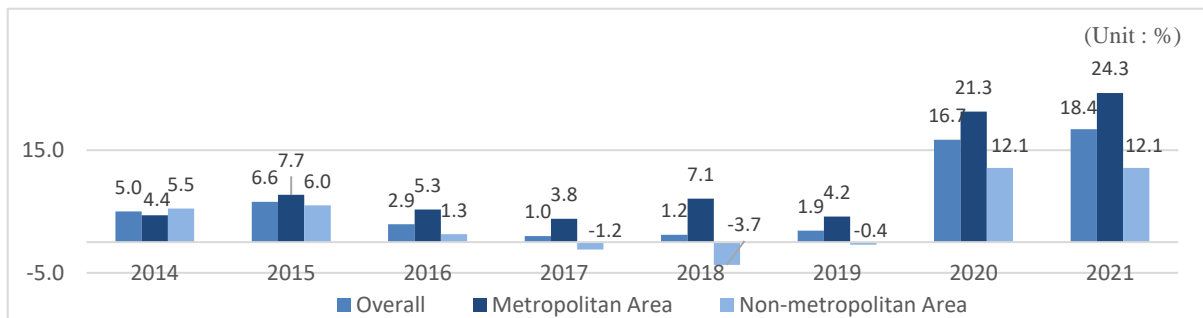
The Korean real estate market has experienced a significant surge in prices, particularly in the housing market in the Seoul metropolitan area, due to a low interest rate environment and increased liquidity from 2014 until 2021.²⁷ The rate of increase reached its peak in 2021, with housing prices rising by a staggering 23.9% year-over-year in Q3 2021, according to the “Global Housing Price Index” published by Knight Frank in December 2021. This made it the country with the highest increase among the 56 nations surveyed.²⁸

Figure 3: Housing Price Growth Rate in Major Countries (Q3 2021)



Source: Knight Frank

Figure 4: Housing Price Increase Rate Compared to the End of the Previous Year



Source: Korea National Statistical Office

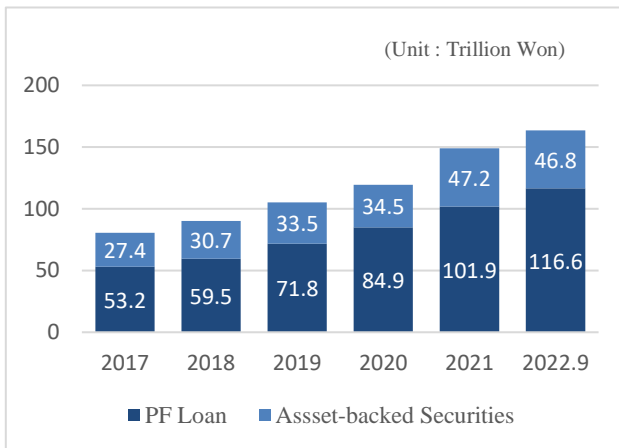
²⁷ Jeong-joo Kim (2022). Construction & Economy Research Institute of Korea - Diagnosis of the Causes of the "Real Estate PF Crisis" and Policy Countermeasures

²⁸ Seungho Lee. (2021, December 20) Korean house prices rose 24% in the third quarter, ranking first among 56 major countries. JoongAng Ilbo. <https://www.joongAng.co.kr/article/25033625#home>

(2) Increase in Risk Exposures²⁹ in Real Estate PF Market

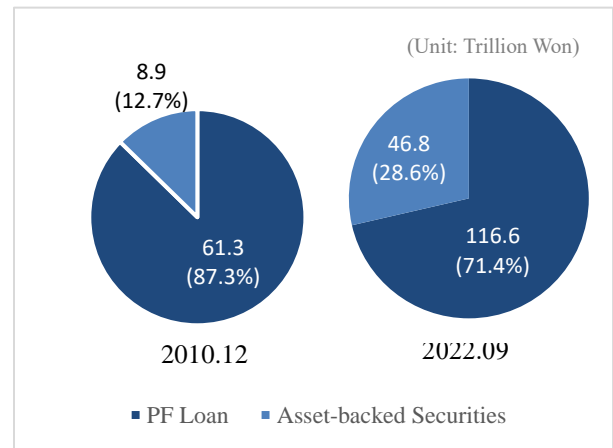
The rising housing prices have led to increased risk exposures in the Korean real estate PF market. With numerous companies entering the development sector, the amount of real estate PF exposures (PF loans and Asset Backed Securities³⁰) reached KRW 163.4 trillion as of September 2022, growing 18.2% YoY due to the increasing demand for real estate development. The investment in Project Financing-Backed Securities has also dramatically risen, from 12.7% in 2010 to 28.6% in 2022, indicating a growing interdependence among market participants. This increase raises concerns that any potential market shock could have widespread and severe consequences.

Figure 5: Changes in Investment Balance in Real Estate PF



Source: Yonhap Infomax

Figure 6: Changes in the Composition of Investment in Real Estate PF



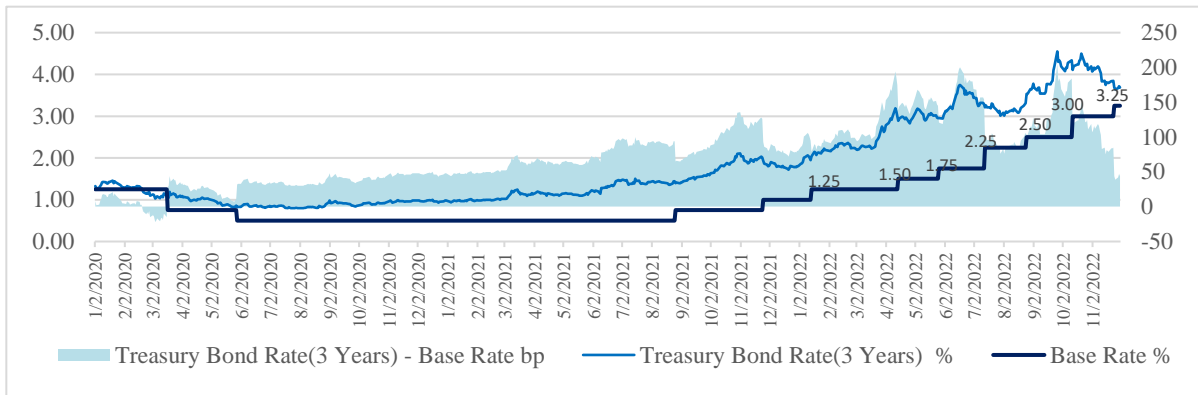
(3) External Factors Contributing to Market Instability in PF

The global economy's recovery in the latter half of 2020 led to a rise in raw material prices, which were exacerbated by the outbreak of war in Ukraine in 2022. Additionally, the rapid increase of the fed funds rate by the US Federal Reserve in 2021 caused a sharp rise in interest rates in Korea, making many projects unprofitable and increasing the risk of delays and suspensions. These factors are contributing to a challenging environment for the Korean real estate PF market.

²⁹ Note: "Exposure" in Korea's PF market refers to the percentage or amount of risk that may be incurred or faced in a real estate project financing investment according to Korea Financial Investment Association.

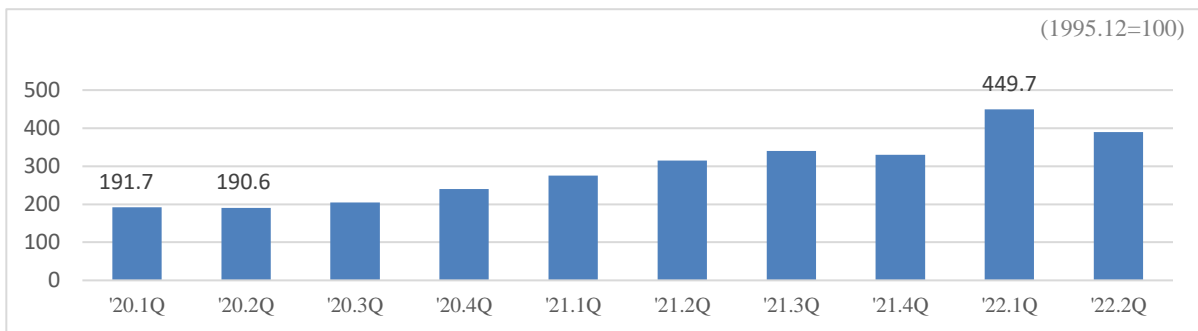
³⁰ Note: The term "Asset-Backed Securities (ABS)" refers to a broader category of securities that are backed by assets, while ABCP and ABSTB are specific subcategories of ABS.

Figure 7: Changes in the Base Interest Rate in Korea



Source: Bank of Korea

Figure 8: Changes in the Raw Material Price Index



Source: Korea Importers Association

(4) Implications and Prospects

The growth in real estate Project Financing (PF) has created a stronger connection between the PF market and capital markets. However, concerns regarding a slowdown in the real estate market and rising market interest rates have worsened the profitability prospects of various PF projects, leading to increased liquidity risks for financial institutions and general contractors. Moreover, declining project feasibility due to rising raw material prices and an increase in unsold property units have weakened the debt repayment capacity of developers.³¹ This has led to an increased risk of insolvency in the real estate PF market, raising concerns about its potential impact on the stability of the wider financial system.

³¹ Bank of Korea (2022). Financial Stability Report

2. Case Studies

This chapter will compare and review actual projects and examine how the characteristics of the Korea's PF market identified previously are represented in each project. The case studies were chosen from a pool of projects in which the author directly participated. To safeguard the confidentiality of the project details, the names of the developers have been replaced with initials. Certain details have been designated as "Confidential" to preserve the privacy of the parties involved.

Please note that due to confidentiality, this thesis may not provide all details of the projects discussed. Also, the information presented should be used for research purposes only and may not be entirely accurate.

*Table 4: Summary of Three Development Projects*³²

Category		Project A: Officetel	Project B: Mixed-use	Project C: Industrial
Total PF		KRW 72 billion (USD ³³ 57 million)	KRW 140 billion (USD 111 million)	KRW 70 billion (USD 55 million)
PF LTVs		25.6%	60.7%	63.4%
Borrower's Equity Investment Proportion (Compared to Land Cost / Total Cost)		18.1% / 8.1%	10.0% / 2.5%	9.5% / 2.1%
Sales Method		Presale	Presale	Presale
PF Contract Year		2021	2018	2019
Completion Year		2024	2020	2021
Expected Ratio of Ordinary Profit		42.7%	17.7%	14.8%
Developer	Name	Developer 1	Developer 2	Developer 3
	Classification in the Market	Major	Medium Scale	Small Scale
General Contractor	Name	General Contractor 1	General Contractor 2	General Contractor 3
	Corporate Bond Credit Rating	A-	A-	BBB+
Credit Enhancement	By General Contractor	o	o	o
	By Trust Company	-	-	o
	By Other Entity	-	o	-

³² Information Memorandum of Project A, B, and C

³³ Note: Based on the exchange rate of 1,262 Korean won to 1 US dollar as of December 2022.

1) Project A: Officetel Development Project

(1) Project Overview

This project is a real estate development undertaken by one of the major developers in Korea, “Developer 1,” to build an officetel³⁴ in Seoul. This area is known as one of the most affluent areas of the city and is often referred to as the Second Gangnam in Seoul. The developer's goal was to build a high-end Officetel to attract well-paid young professional residents.

In this project, “Developer 1” used a PFV (Property Development Fund Vehicle) approach to acquire land rights and ensure a steady distribution of risk. Initially, they encountered a problem in the form of high land costs which raised concerns about the tax burden from large land expenditures. To overcome this challenge, they established a PFV with a capital of 5 billion won and met certain requirements such as a minimum 5% investment in a financial institution. This allowed them to receive a 50% reduction in taxes for land acquisition and registration and additional corporate tax reductions. They also minimized potential losses by distributing development risks through preferred stock investments and by sharing development profits jointly.

The purpose of the project financing was to raise KRW 72 billion through a PF loan to repay an existing bridge loan of KRW 60 billion and use the remainder to pay for additional project expenses. The “Developer 1” was optimistic that the project will generate high revenue from presales and has devised a strategy to cover construction costs through the proceeds of presales payments received from buyers, rather than using PF loans to reduce financial costs. The Loan-to-Value (LTV) ratio for the project was merely 25.6%.

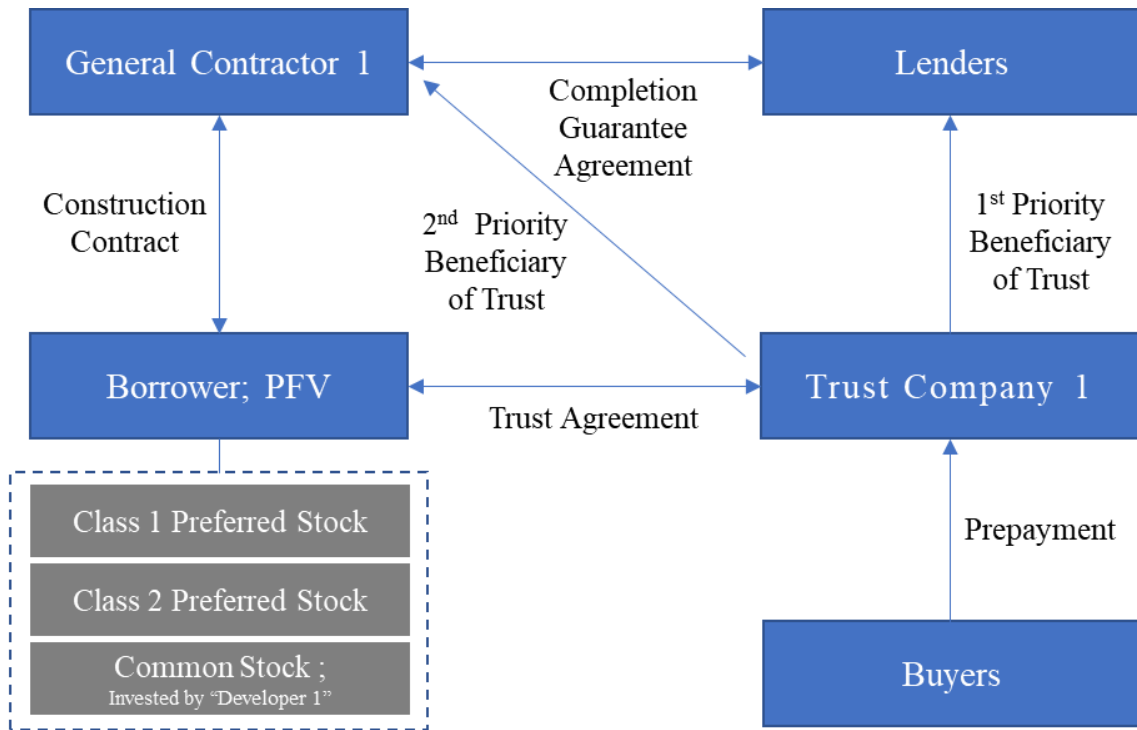
“General Contractor 1”, with a corporate bond credit rating of A- had a strong reputation among potential lenders who believed they would fulfill their Responsible Completion Commitments. Also, “Developer 1” was considered as a credible developer who could generate their own lines of credit; therefore, no further credit enhancement was needed. As a result, “Developer 1” was able to successfully raise a PF loan of KRW 72 billion from PF lenders without difficulty.

³⁴ Note: In South Korea, an officetel is a multi-purpose building with residential and commercial units. The residential units consist of studio apartments or flats.

*Table 5: Outline of Project A*³⁵

Category	Details
Developer	· Developer 1 (PFV's Common Shareholder)
Constructor	· General Contractor 1 (Corporate Bond Credit Rating: A-)
Location	· Seoul City
Facilities	· Officetel & Commercial Facilities

Figure 9: PF Structure of Project A



³⁵ Note: Confidentiality restricts disclosure of specific development information such as Land Area, GFA, FAR, BCR, etc

(2) Financial Terms

Category	Contents					
Stakeholders	<ul style="list-style-type: none"> · Borrower: Developer 1 (Shareholder of Common Stock in PFV) · Constructor: General Contractor 1 · Trust Company: Trust Company 1 					
Use of Loan	· Bridge Loan Repayment, Settlement of Borrower's Input Costs Such as Land Acquisition Costs, Financial Costs, Other Project Costs, Etc.					
Borrower's Equity	· KRW 12.5 billion (18.1% of Land Cost, 8.1% of Total Project Cost)					
Terms of Loan	Loan Amount	Interest Rate	Fees	All-In Cost	LTV	Sales Rate for Borrower's EXIT
	KRW 72 billion	3.85%	0.73%	4.05%	26%	52%
Maturity of Loan	· 30 Months from the Date of First Withdrawal					
Distribution Ratio of Revenue from Prepayment	Before Completion			After Completion		
	Project Expenses	Loan Repayment	Project Expenses	Loan Repayment		
	70%	30%	0%	100%		
Preservation of Claims	<ul style="list-style-type: none"> · Preferred Beneficial Rights in Financial Trust (1st Priority: Lenders / 2nd Priority: General Contractor) If HUG (Korea Housing & Urban Guarantee Corporation) demands collateral to obtain a PF guarantee, the borrower must designate HUG as the first priority beneficiary. · Responsible Completion Commitment from the Contractor: The contractor is responsible for completing the construction within 40 months from the start of the construction. If the contractor is unable to fulfill this commitment, the contractor must take over the debt of the project. 					

(3) Summary of Feasibility Study

(Unit: KRW Million)

Category	Item	Amount (Excluding VAT)	Ratio
Revenue	Officetel	252,267	93.9%
	Office	10,909	4.1%
	Commercial Facilities	5,106	1.9%
	Other Income	442	0.2%
	Total Amount	268,725	100.0%
Costs	Land Costs, etc.	68,957	44.6%
	Construction Costs	52,994	34.3%
	Indirect Construction Costs (Design Costs, Supervision Costs, etc.)	2,319	1.5%
	General Expenses & Additional Fees	23,219	15.0%
	Financial Expenses	7,125	4.6%
Total Amount	154,614	100.0%	
Ordinary Profit (Ratio of Ordinary Profit)		114,111	42.7%

2) Project B: Mixed-use Development Project

(1) Project Overview

This project is a mixed-use development in Hanam City, Gyeonggi-do. Hanam City is a well-known satellite city of Seoul, and the developer intended to construct an mixed-use facilities including officetel for sale to employees of new startups based in Hanam City.

The borrower for this PF loan was “Developer 2”, one of Korea's top 20 real estate developers by sales. The entire PF loan amount was KRW 140 billion for land acquisition, construction, and financial costs. Two lenders invested KRW 30 billion and KRW 10 billion as securitization, in the form of Asset Backed Short-Term Bonds (ABSTB)³⁶. To make this investment structure work, two SPCs were set up to raise funds by issuing ABSTB and lending them to borrowers. The SPCs would raise money by issuing these bonds and using the cash flow from securitized asset as collateral. And two security firms, acting as the actual lenders, provided an acquisition commitment to each SPC to enhance the certainty of repayment of these bonds.

Potential lenders were hesitant to invest in the real estate development project due to the high proportion of commercial facilities comprising approximately 48% of total sales. The primary concern was the low population density in the vicinity of the project site and the potential for high vacancy rates post-completion. Despite a feasibility study report provided by an evaluation agency indicating sufficient demand for commercial facilities in the future and a favorable pre-sale rate, potential lenders remained unconvinced. This was due to the borrower's direct engagement of the evaluation agency, leading to a report that favored the borrower's interests. Nevertheless, the borrower was able to secure an agreement with the lenders by presenting a comprehensive and detailed marketing strategies.

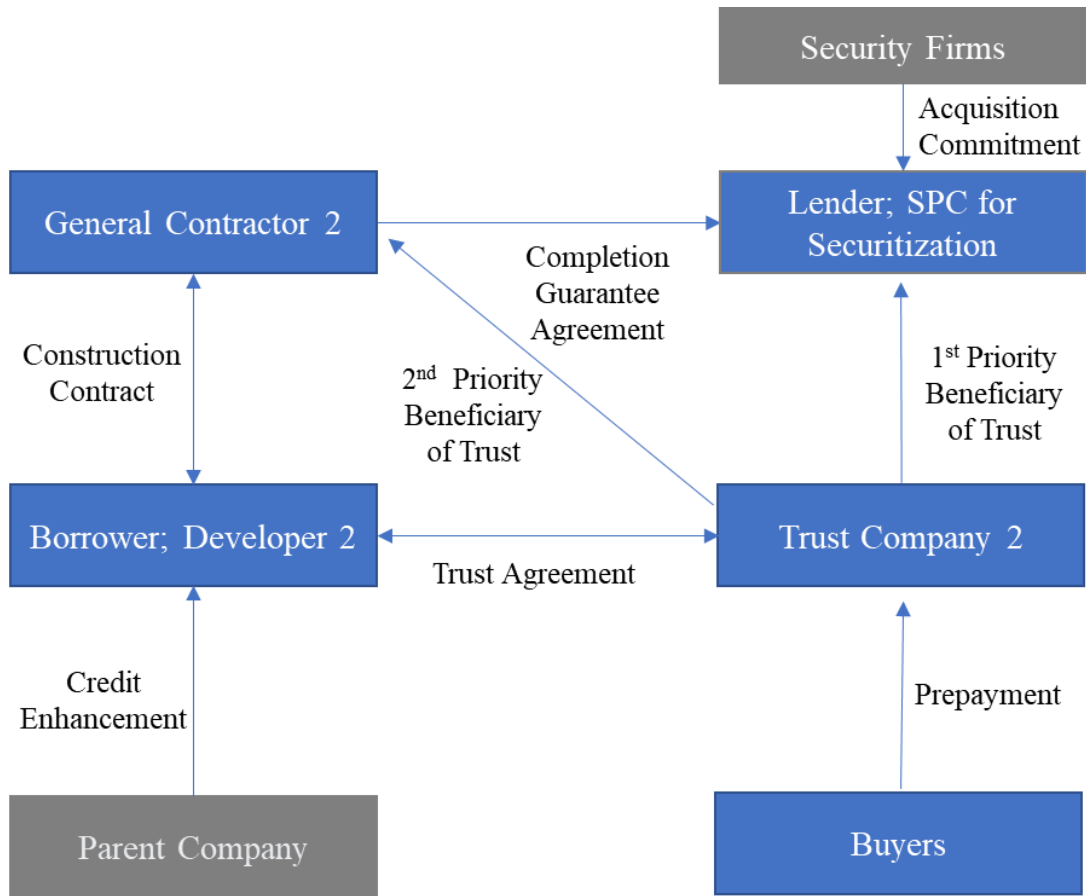
“General Contractor 2”, with a corporate bond credit rating of A-, had a strong reputation among potential lenders who believed they would fulfill their Responsible Completion Commitments. However, lender's confidence in “Developer 2” was not as high as they deemed their credit insufficient. To overcome this, “Developer 2” secured a joint guarantee with their parent company which enabled them to successfully fundraise a loan of KRW 140 billion from PF lenders.

³⁶ Note: ABCP and ABSTB are types of short-term investments, but they have different ways in which they mature in Korea. ABCP is mostly made up of regular deposits that are held for a year, so most of the issues are for 6-12 months. ABSTB, on the other hand, is mostly issued for less than 3 months.

*Table 6: Outline of Project B*³⁷

Category	Details
Developer	· Developer 2
Constructor	· General Contractor 2 (Corporate Bond Credit Rating: A-)
Location	· Hanam City, Gyeonggi Province
Facilities	· Officetel, Commercial Facilities, and Car Showroom

Figure 10: PF Structure of Project B



³⁷ Note: Confidentiality restricts disclosure of specific development information such as Land Area, GFA, FAR, BCR, etc

(2) Financial Terms

Category	Contents						
Stakeholders	<ul style="list-style-type: none"> · Borrower: Developer 2 · Constructor: General Contractor 2 · Trust Company: Trust Company 2 						
Use of Loan	· Land Costs (90%), Construction Costs, Financial Costs, Other Project Costs, and Etc.						
Borrower's Equity	· KRW 81.2 billion (10% of Land Costs, 2.48% of Total Project Costs)						
Terms of Loan	Category	Loan Amount (KRW billion)	Interest Rate	Fees	All-in Cost	Sales Rate for Borrower's EXIT	LTV
	Lender A	1,000	5.83%	2.00%	6.50%		
	Lender B	300	5.70%	1.50%	6.20%		
	Lender C	100	5.83%	2.00%	6.50%		
	Total	1,400	5.80%	1.89%	6.43%		
Maturity of Loan	· 36 Months from the Date of First Withdrawal						
Distribution Ratio of Revenue from Prepayment	Before Completion			After Completion			
	Project Expenses		Loan Repayment	Project Expenses		Loan Repayment	
	60%		40%	0%		100%	
Preservation of Claims	<ul style="list-style-type: none"> · Preferred Beneficial Rights in Trust (1st Priority: Lenders / 2nd Priority: General Contractor) · Responsible Completion Commitment of the Contractor: The contractor is responsible for completing the construction within 40 months from the start of the construction. If the contractor is unable to fulfill this commitment, the contractor must take over the debt of the project. 						

(3) Summary of Feasibility Study

(Unit: KRW Million)

Category	Item	Amount	Ratio
Revenue	Officetels (Including VAT)	194,348	48.8%
	Commercial Facilities (Including VAT)	188,696	47.4%
	Car Showroom (Including VAT)	32,820	8.2%
	VAT	-17,882	-4.5%
	Total Amount	397,982	100.0%
Costs	Land Costs, etc.	81,218	24.8%
	Construction Costs	152,639	46.6%
	Indirect Construction Costs (Design Costs, Supervision Costs, etc.)	11,474	3.5%
	General Expenses & Additional Fees	51,931	15.9%
	Financial Expenses	30,467	9.3%
Total Amount	327,729	100.0%	
Ordinary Profit (Ratio of Ordinary Profit)		70,253	17.7%

3) Project C: Industrial Building Development Project

(1) Project Overview

This project involves the construction of an industrial building, Knowledge Industrial Center (KIC)³⁸ in Pyeongtaek city, Gyeonggi-do. Pyeongtaek is known as the world's largest semiconductor hub and is home to Samsung Electronics' one-million-square-meter semiconductor factory. "Developer 3" planned to build the KIC for sale to employees of Samsung Electronics' vendors.

The borrower, "Developer 3", was a new developer with a weak market presence. The purpose of the KRW 70 billion PF loan was to finance land acquisition, construction, and financial costs. The top priority for "Developer 3" was to reduce construction costs to maximize revenue. Therefore, instead of choosing a major contractor, "Developer 3" chose "General Contractor 3", a mid-sized contractor ranked 94th in Korean market. However, the potential lenders had concerns about the creditworthiness of "General Contractor 3", who had pledged to fulfill Responsible Completion Commitments. The primary concern was that the Corporate Bond Credit Rating of "General Contractor 3" was BBB+, which is lower than the required A- rating³⁹. To address this, "Developer 3" sought credit enhancement measures from "Trust Company 3". These measures included a Credit Default Swap (CDS), which ensured that if "General Contractor 3" failed to complete the project, "Trust Company 3" would either repay the debt owed to the lenders or replace the contractor, thus ensuring the completion of the project.

The negotiation of the PF loan arrangement was delayed by two significant obstacles. The first challenge was the low equity input ratio of the borrower, which was only 9.54% of the land acquisition costs. This ratio caused concerns among potential lenders and led to a prolonged process for reaching a consensus on an appropriate ratio, as there were no clear guidelines in the market.

The second challenge faced by potential lenders was the uncertainty in the demand market for the Pyeongtaek project, specifically regarding the potential occupancy rate. There were doubts about whether the demand from vendors of Samsung Electronics would be sufficient to fill the project. Despite efforts to gather information from similar successful projects in the area, potential lenders were met with resistance as other players in the market were unwilling to disclose relevant data. This lack of

³⁸ Note: It is recognized as an industrial building in Korea that provides office space and facilities for small and medium-sized enterprises, particularly those in the technology and knowledge-based industries. These buildings are often located in urban areas, and they provide easy access to transportation, utilities, and other resources that are important for businesses.

³⁹ Note: The Responsible Completion Commitment set by Korean PF lenders establishes strict criteria for general contractors to meet to qualify. These criteria include being among the top 100 contractors in South Korea, having issued corporate bonds, and having a credit rating of A- or higher.

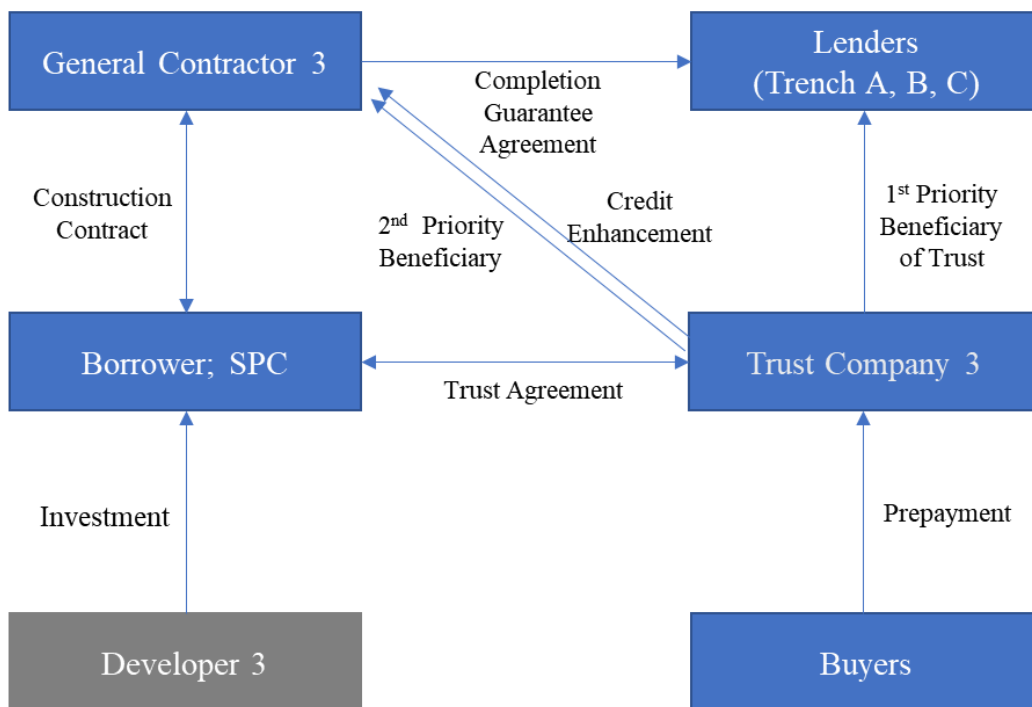
information made it difficult for lenders to make informed decisions and slowed down the lending process.

“Developer 3” was able to successfully address the two challenges mentioned and secure a KRW 70 billion PF loan after significant effort.

Table 7: Outline of Project C⁴⁰

Category	Details
Developer	· Developer 3
Constructor	· General Contractor 3 (Corporate Bond Credit Rating: BBB+)
Location	· Pyeongtaek City, Gyeonggi Province
Facilities	· Knowledge Industrial Center and Commercial Facilities

Figure 11: PF Structure of Project C



⁴⁰ Note: Confidentiality restricts disclosure of specific development information such as Land Area, GFA, FAR, BCR, etc

(2) Financial Terms

Category	Contents						
Stakeholders	<ul style="list-style-type: none"> Borrower: SPC (Invested by Developer 3) Constructor: General Contractor 3 Trust Company: Trust Company 3 						
Use of Loan	Land Costs (90%), Construction Costs, Financial Costs, Other Project Costs, etc.						
Borrower's Equity	KRW 15.3 billion (9.54% of Land Costs, 1.54% of Total Project Costs)						
Terms of Loan	Category	Loan Amount (KRW billion)	Interest Rate	Fees	All-in Cost	Sales Rate for Borrower's EXIT	LTV
	Tr.A Lender	540	5.30%	1.75%	6.05%	55.45%	48.9%
	Tr.B Lender	80	6.00%	3.50%	7.50%	63.66%	56.2%
	Tr.C Lender	80	8.00%	10.00%	12.29%	71.88%	63.4%
	Total	700			6.90%	71.88%	
Maturity of Loan	28 Months from the Date of First Withdrawal						
Distribution Ratio of Revenue from Prepayment	Before Completion			After Completion			
	Project Expenses	Loan Repayment		Project Expenses	Loan Repayment		
	20%	80%		0%	100%		
Preservation of Claims	<ul style="list-style-type: none"> Preferred Beneficial Rights in Trust (1st Priority: Lenders / 2nd Priority: General Contractor) Responsible Completion Commitment of the Contractor: The contractor is responsible for completing the construction within 20 months from the start of the construction. If the contractor is unable to fulfill this commitment, the contractor must take over the debt of the project. Responsible Completion Commitment of the Trust Company: The contractor is responsible for completing the construction within 27 months from the start of the construction. If the contractor is unable to fulfill this commitment, the trust company must take over the debt of the project. 						

(3) Summary of Feasibility Study

(Unit: KRW Million)

Category	Item	Amount (Excluding VAT)	Ratio
Revenue	KIC	95,972	87.0%
	Commercial Facilities	14,371	13.0%
	Total Amount	110,344	100.0%
Costs	Land Costs, etc.	16,032	17.1%
	Construction Costs	51,800	55.4%
	Indirect Construction Costs (Design Costs, Supervision Costs, etc.)	286	0.3%
	General Expenses & Additional Fees	18,125	20.0%
	Financial Expenses	7,041	7.5%
	Total Amount	93,965	100.0%
Ordinary Profit (Ratio of Ordinary Profit)		16,379	14.84%

4) Other Projects

The South Korean real estate market has experienced a high number of failures in project financing (PF). This is due to a variety of factors, including challenges in attracting lenders, suspension of construction during the development process, and default on debts from lenders. This issue is a significant concern within the industry and has been well-documented through research and case studies. Lee and Eum (2011) identified several unsuccessful projects in their studies. The following projects are examples of such failures: ⁴¹

- (1) Project E, Suwon Apartment Development (PF Loan Amount: KRW 20 billion): The general contractor, who had pursued credit enhancement through debt assumption and capital injection, faced financial difficulties during the construction process and filed for bankruptcy. The additional costs incurred during the prolonged delay ultimately led to the project's failure despite the developer's attempts to continue the project.
- (2) Project F, Goyang Samsung Apartment Development (PF Loan Amount: KRW 151.5 billion): Despite recognizing that the project was not economically feasible and would have cash flow problems, the developer moved forward with the next stage of the project due to their complete trust in the contractor's credit enhancement. This unsubstantiated reliance on the contractor's credit enhancement without conducting a proper feasibility study ultimately led to the project's failure.
- (3) Project G, Gimpo Apartment Development (PF Loan Amount: KRW 170 billion): Despite initial positive expectations due to a favorable feasibility study and the contractor's promise of financial support, the project's financing failed due to the contractor's lack of financial stability as determined by potential investors.
- (4) Project H, Incheon Apartment Development (PF Loan Amount: KRW 116 billion): Despite being aware of potential problems related to land acquisition during the initial stage, the developer moved forward with the next stage of the project and relied on a joint guarantee from the contractor. This caused the scope of the project to expand significantly, which led to additional costs and ultimately resulted in the project failing.
- (5) Project I, Incheon Apartment Development II (PF Loan Amount: KRW 180 billion): Despite a feasibility study indicating a business profit rate of less than 2.5%, the developer proceeded with the project. Furthermore, it was discovered that the developer did not provide any equity investment.

⁴¹ Bong-cheol, Lee and Soo-won, Eum (2012). A Study on Failure Factors of Real Estate Project Financing

(6) Project J, Gimpo Apartment Development II (PF Loan Amount: KRW 380 billion): The developer's impulsive decision to recoup their investment as soon as possible during the early stages of the project led to a deterioration of the project's overall outcome.

The primary cause of the previously mentioned project failures is the over-reliance on the credit enhancement or reputation of general contractors, rather than evaluating the actual feasibility of the project. Furthermore, the developer's lack of capacity can lead to poor decision-making and the failure of the project, causing significant harm to all parties involved in PF market.

3. Problem Analysis and Improvement Proposal

1) Implications Derived from the Literature Review and Case Studies

Based on the literature review and case studies, the following points were observed:

First, the need for policy-level discussions is imperative for the Korean real estate market. Above all, Korean government has long been supportive of the use of the presale method in the real estate market, as demonstrated by the literature review. However, this has resulted in significant risk for general contractors in the market. The government has tolerated this practice for an extended period, and it is time to do a fundamental review of it.

Second, a deeper examination of the market's Risk-sharing Structures is necessary. The case studies of projects A and C demonstrate a range of risk-sharing methods that have been introduced in recent years, expanding the scope of risk sharing beyond just general contractors. However, the current lack of infrastructure for risk sharing still results in a concentration of risk on general contractors.

Third, the requirements imposed on the primary stakeholders in PF, specifically developers, is essential. The case studies indicate that, except for project A, the developers are typically small entities without sufficient credit foundation. This prompts project financing investors to request additional credit enhancement. Additionally, the credibility of these developers is often lacking, leading to a continued reliance on general contractors, who were previously considered the primary stakeholders in Korean development. The case studies of projects I and J also demonstrate how a developer's limited capacity can result in poor decision-making and ultimately lead to project failure.

Finally, discussions on the project evaluation system are crucial for the market. The case studies show that investors often prioritize the general contractor, credit enhancements, and collateral when participating in project financing, rather than the overall viability of the project. For example, the developers in projects F, G, and I persisted despite unfavorable feasibility study results, leading to the ultimate failure of these projects. It is imperative that project financing stakeholders are aware that a project's success or failure is ultimately determined by its feasibility.

As a result, the next chapter will address fundamental issues and propose improvements for the Korean project financing market by analyzing four key areas: “Policy”, “Risk-sharing Structures”, “Developers”, and “Project Evaluation System”.

2) Analysis of Problems

The problems associated with “Policy”, “Risk-sharing Structures”, “Developers, and “Project Evaluation System” were identified through a literature review and case studies. These findings were validated by previous research on the topic.

(1) Problems with Policy

① Weaknesses of the Presales System

The presale system in the Korea’s real estate PF market creates a cash flow source for development expenses or loan principal repayment. However, when sales are slow at the start of the project, the burden of increased construction costs falls on the general contractor, leading to a risk of loss of the loan principal for the lender. Property buyers can purchase assets with only a small down payment, but they are also exposed to risks such as falling asset values and excessive borrowing if the real estate market slows down or if interest rates rise unexpectedly. If property buyers are unable to pay the balance when construction is completed, this lack of liquidity could negatively impact all parties involved in project financing. In addition, widespread PF insolvencies could lead to a major crisis in the Korean economy.

② Excessive Reliance on Credit Enhancement of General Contractors

In the Korean real estate project financing market, the role of general contractors has become excessive as they provide various forms of credit enhancements within the existing PF structure. This leads to overreliance on general contractors, and if the presales are weak for a particular project, the general contractor must fulfill its completion obligations without receiving the required payments for construction. Additionally, if the developer fails to repay its loans, the general contractor is also responsible for the guarantee. In the majority of cases, a large part of the Asset-backed securities provided by securities companies is based on the credit enhancement of the general contractor. This means that if the project fails, the bankruptcy of the general contractor may lead to a ripple effect on the financial sector and other general contractors linked through PF.⁴²

⁴² Jeong-joo Kim (2022). Construction & Economy Research Institute of Korea - Diagnosis of the Causes of the "Real Estate PF Crisis" and Policy Countermeasures

③ Deficiencies in Managing Risk Exposure⁴³ in PF Market

The current system in Korea for managing risk exposure in project financing (PF) is inadequate. Despite the existence of the “Comprehensive System to Manage Risk Exposure in PF” which calls for regular monitoring, several issues persist. Firstly, the data collection system is ineffective, as there is no unified system for collecting data from different financial institutions involved in PF investment such as banks, securities firms, insurance companies, etc.⁴⁴ Secondly, cooperation and information sharing among relevant governmental authorities is poor, making it difficult for the government to manage risks and take preventative measures. Furthermore, the regulations for managing risk exposure in PF also have limitations. In 2019, the Korean government introduced plans to improve the management of risk exposure in real estate PF, such as implementing an upper limit of 100% on equity capital and restricting securities companies from issuing debt guarantees beyond that limit.^{45 46} This quantitative regulation method failed to address the tendency of small securities firms to take on high risks for high returns, leading to high-risk investments and potential insolvency.

(2) Problems with Risk Sharing Structure

① Challenges for Financial Sector as a Financial Investor (FI) in PF Market

The Korean PF market is heavily dependent on general contractors, but to diversify risk and ensure the stability of the real estate finance market, it is crucial for financial institutions to actively participate as financial investors (FIs).⁴⁷ However, there are significant challenges that discourage financial institutions from participating as FIs in the PF market. Firstly, the stringent requirements for investment vehicles and high taxes on capital gains act as major barriers. Secondly, the principle of separating industrial and financial capital in Korea restricts the ownership of shares by non-financial entities and requires government approval if a single entity holds a substantial portion of a financial institution's shares.⁴⁸ As a result, financial institutions in the PF market tend to focus on securing profits through interest income or financing fees and adopt a lender's position instead of a FI's position. To overcome these challenges, practical measures need to be implemented to promote the participation of financial institutions as FIs in the PF market.

⁴³ Note: According to Korea Financial Investment Association, “Exposure” in Korea’s PF market refers to the percentage or amount of risk that may be incurred or faced in a real estate project financing investment.

⁴⁴ Byung-guk Lee. (2022, September 16) Standardizing the monitoring indicators for real estate PF to stabilize an otherwise volatile market. Herald Economics. <http://news.heraldcorp.com/view.php?ud=20220916000381>

⁴⁵ Financial Services Commission (2019), Measures to Improve Management of Risk Exposure in Project Finance

⁴⁶ Note: Generally, debt guarantees are classified as off-balance sheet financing, although market conditions may cause them to be included on the balance sheet. Despite debt guarantee restrictions such as capital requirements, asset quality categorization, and bad debt reserves, there are still regulatory loopholes.

⁴⁷ Jong-deok Park (2009). The Participation and Role of Financial Investors in Real Estate Development Financing

⁴⁸ Guk-hyeong Lee and Yeong-gi Moon (2013). Risk Sharing Plan for Real Estate PF Participants

② Challenges in Developing Projects Through Project Financing Vehicle (PFV)

PFV (Project Financing Vehicle) is a method used to manage risks in real estate development projects in Korea. It has been used primarily in large-scale urban development projects. In the past, the government offered tax benefits⁴⁹ to encourage the use of PFV, but the system for managing PFV projects was insufficient. There were limited laws regulating PFV, which created a weak legal framework, and there was no designated government department for managing PFV, leading to weak supervision. This led to various issues, such as fraudulent use of tax benefits, political interference, and special treatment for certain projects. As a result, the government reduced tax benefits and ended the corporate tax deduction for PFV on December 31, 2022.⁵⁰ This has had a negative impact on the feasibility of current and planned development projects, and the decision to abolish these benefits has been criticized by the real estate industry in Korea.⁵¹ As a result, this led to a decrease in the use of PFV as a development method.

③ Constraints Due to Excessive Land Acquisition Costs

The high proportion of land acquisition costs in development projects in Korea creates a challenge in risk distribution. The share of land acquisition costs compared to total project costs is around 30% in Korea and 15% in the US.⁵² For projects in metropolitan areas such as Seoul, where land acquisitions costs are particularly high, the developer often pays an unreasonable premium for land acquisition, relying on additional financing from the general contractor. This disproportionate cost increases the risk to the overall project structure and makes it challenging to secure funding from PF participants. To mitigate this issue, it is necessary to explore alternative methods such as developing partnerships with landowners.

⁴⁹ Note: Before December 31, 2022, when a corporation distributed more than 90% of its earning as dividends, the amount was deductible from the taxable income, and all of the amount excluding statutory reserves was tax-free. However, this benefit only applied to businesses ending before December 31, 2022 and has ultimately been abolished.

⁵⁰ Restriction of Special Taxation Act

⁵¹ Se-jin Jeon (2020, September 03) Elimination of the PFV tax benefits, a fatal blow to the profitability of the business. DealSite. <https://dealsite.co.kr/articles/64845>

⁵² Bok-hui Jeong (2016). A Study on Debt Preservation and Risk Improvement Plans in Real Estate Project Financing

(3) Problems with Developers

① Low Entry Barrier for Developers

The PF market in Korea is facing challenges in accurately evaluating the creditworthiness of real estate developers. This is due to the low barriers to entry set by the Real Estate Development Business Act, which allows a large number of small-scale entities to register as developers with minimal capital and professional resources. According to the Act, registration as a real estate developer requires only 300 million won in capital, an office, and employment of two professionals. This has led PF participants to view developers as unreliable entities and increased the need to assess the creditworthiness of general contractors instead. This is a significant factor contributing to the indiscriminate promotion of projects and difficulty in distributing risks among real estate PF participants.⁵³

② Low Capital Ratios in Development Projects

The real estate industry has seen a significant number of financially weak developers enter the market, who have been provided with excessive leverage through real estate development loans from the financial sector. To finance their projects, developers typically require loans as long as they can raise about 15% of the land acquisition costs. (10% down payment for land acquisition + down payment for design fees + a portion of the licensing fees). This is a mere 4% of total project expenses.⁵⁴ This weak structure discourages participation from the financial sector and increases the need for credit enhancements among contractors.⁵⁵ Additionally, the recognition of developer capital ratios by financial institutions is inconsistent, which complicates loan agreement negotiations.⁵⁶

③ Lack of Sustainability in the Development Industry

In Korea, the focus on short-term sales revenue through presale methods has become the norm in the real estate development industry. This has led to major developers securing profits from their projects and immediately reinvesting in new ones, as well as the emergence of financially weaker developers. Rather than pursuing qualitative growth, developers prioritize quantitative expansion and ignore long-term operations and management, hindering the industry's fundamental and qualitative growth. To promote sustainable growth for developers over the long run, government intervention is necessary to help them become strong entities with access to their own lines of credit.

⁵³ Bok-hui Jeong (2016). A Study on Debt Preservation and Risk Improvement Plans in Real Estate Project Financing

⁵⁴ Hyeon-a Seo (2022). A study on Financing Problems and Improvements in Housing Sale System – Focusing on Real Estate Project Financing

⁵⁵ Jong-deok Park (2009). The Participation and Role of Financial Investors in Real Estate Development Financing

⁵⁶ Su-hong Lim, Ho-gwan Jang, and Sang-yeop Lee (2020). A Study on the Scope of the Recognized Equity Capital of Developer in Real Estate Project Finance Loan Screening

(4) Problems with Project Evaluation System

① Problems With Project Evaluation Practices

The current evaluation practices in the Korean PF market focus on evaluating the companies involved in a project rather than the project itself.⁵⁷ The focus is on the general contractor who has signed a subcontracting agreement with the developer. Despite the use of various methods to assess investment conditions and risks, such as through the use of LTV and EXIT presales rates, PF lenders still make investment decisions based on the market standing and creditworthiness of the general contractor. If lenders are uncertain about a project's feasibility, they often require additional credit enhancement measures from the general contractor to mitigate risks. This inadequate evaluation of project feasibility poses challenges for the growth and stability of the Korea's PF market.

② Lack of Confidence in Evaluation Agencies of PF Projects

In the Korean PF market, credit rating companies and accounting firms serve as the main project evaluation agencies. Before entering into a PF loan agreement, stakeholders require a feasibility evaluation report from them. However, the developer, who is also the borrower, typically requests and pays for the evaluation. This creates a potential conflict of interest and raises concerns that the rating agencies may provide overly optimistic evaluations of the project's feasibility.⁵⁸ Against this backdrop, fostering a sense of public trust in evaluation agencies proves difficult. Meanwhile, the project feasibility evaluation data is used only as data for the evasion of subsequent responsibility by PF lenders. To improve on this system, stakeholders must find ways to make better use of the real-world professional capabilities of the project feasibility evaluation agencies within the Korean PF market.

⁵⁷ Bok-hui Jeong (2016). A Study on Debt Preservation and Risk Improvement Plans in Real Estate Project Financing

⁵⁸ Hee-nam Jung and Jae-hwan Kim (2013). Real Estate Development Project Assessment System: Introduction and Policy Tasks for the Earlier Introduction of Assessment Schemes.

③ Information Barriers in PF Market

There is a shortage of publicly available information on project evaluations or disclosures. Unless the entity in search of information is a stakeholder in a particular project, access to that information is extremely limited. Hence, PF market participants face difficulties in determining the objective cause behind insolvent projects, and conversely, identifying the actual success factors behind highly successful projects is equally problematic. Furthermore, due to limited access to information, it is difficult for participants in the PF market to assess the financial stability and track record of developers and other stakeholders. This creates a lack of transparency in the market, making it harder for investors to make informed decisions. To address this issue, a system needs to be put in place to enhance information disclosure and provide access to accurate and relevant information to PF market participants.

3) Proposal of Improvement Plans

To address the challenges faced in the Korean PF market, the study proposes several improvement plans. These plans target the areas of “Policy”, “Risk-sharing Structures”, “Developers”, and “Project Evaluation System”. The proposals are based on previous research and aim to provide solutions to the issues identified.

Table 8: Improvement Plans

Enhancing the Institutional and Policy Framework	Activating Risk-sharing Structures	Improving the Capacity of Developers	Transforming the Project Evaluation System
Moving towards a Post-sale Financing System	Increasing Participation of Financial Investor (FI) in PF Market	Strengthening Entry Requirements for Developers	Improving Evaluation Practices of Private Evaluation Agencies
Limiting Credit Enhancement Measures of General Contractors	Revitalizing PFV by Improving the System with Tax Benefits	Establishing a Minimum Capital Requirement for Borrowers	Establishing Public Evaluation Agencies for a Dual Evaluation System
Strengthening Risk Management System and Regulatory Measures	Inducing Development Partnerships with Landowners	Supporting Developers to Create Their Own Credit	Activating a Project Grading and Disclosure System

(1) Enhancing the Institutional and Policy Framework

Improving the Korean real estate finance market requires a focus on enhancing the institutional and policy framework. The steps towards this are outlined as follows.

① Moving towards a Post-sale Financing System

Hong (2008) suggested implementing a post-sale system to improve Korea's PF market in his research.⁵⁹ The PF structure currently in place within Korea based on a presale system can only remain sound in a market where suppliers have the advantage. As of the end of 2022, however, the Korean real estate market is transitioning into a market where the consumer has the advantage and faces deteriorating consumer sentiment. As such, it is now necessary to consider a switch to the post-sale method to finance housing purchases.

⁵⁹ Sung-joon Hong (2008). A Study on The Project Financing Application Plan for After Sale in Lots System: Focus on Example of the J Village Reconstruction

If a post-sale system is introduced, the property buyer will no longer serve as a medium of funding as PF lenders will directly supply the funds necessary for construction. In other words, instead of financing all business expenses, including land acquisition costs, the market will shift to a more dependable system of financing only the “construction process.” In this case, developers will be responsible for land acquisitions costs and the initial project cost, so only developers with the requisite financial strength will be able to carry out development projects. Considering Korea's existing ingrained real estate development practices, however, this transition requires the support and intervention of the government, as well as public consensus building and relevant legislation. This will help to overcome the obstacles posed by the traditional real estate development practices in Korea and ensure a smooth transition to the post-sale financing model.⁶⁰

② Limiting Credit Enhancement Measures of General Contractors

Park (2009) argued in his research that the Korean PF market should escape from excessive credit enhancement by general contractors.⁶¹ The government should aim to reduce the reliance on credit enhancement measures by general contractors in the Korean project financing market. Specifically, general contractors should only offer limited forms of credit enhancement, such as responsibility for construction project completion or additional financing, and eliminate direct forms of credit enhancement, such as joint guarantees or debt underwriting. The government should monitor and eliminate such practices by contractors, and in the long term, should develop policies that prohibit direct credit-enhancement practices by general contractors.

Choe (2011) stated that removing payment guarantees from the credit enhancement tools used by general contractors can result in a reduction of up to 11.1% in construction costs according to his research. This reduction in costs can provide financial institutions with additional revenue, offsetting the increased risk without credit enhancement measures.⁶² In the long run, a financially sustainable development structure can be established by balancing the risks and returns among project financing stakeholders.

⁶⁰ Bok-hui Jeong (2016). A Study on Debt Preservation and Risk Improvement Plans in Real Estate Project Financing

⁶¹ Jong-deok Park (2009). The Participation and Role of Financial Investors in Real Estate Development Financing

⁶² Su-seok Choe (2011). A Study on the Cause for Insolvency of Real Estate PF since the Global Financial Crisis and Its Revitalization Scheme

③ Strengthening Risk Management System and Regulatory Measures

Shin (2019) emphasized the need for systematic management of risk exposures in real estate PF according to his research.⁶³ To enhance the management of risk exposures in real estate PF in Korea, the government must implement stronger risk management systems and regulatory measures. Firstly, the government should conduct regular stress tests for proactive risk management and maintain an operational early warning system to promptly detect any abnormal signals in the PF market. To facilitate quick government response, a unified inter-agency monitoring system should be established among relevant authorities such as “Financial Services Commission”, “Ministry of Economy and Finance”, “Bank of Korea”, and “Ministry of Land, Infrastructure, and Transport”. Additionally, a unified monitoring indicator covering the entire financial industry, including banks, securities firms, and insurance companies, should be introduced.⁶⁴

Secondly, developed regulations are crucial to manage risk exposures in real estate PF effectively. Quantitative measures could involve reducing the limit of real estate debt guarantees provided by securities companies in relation to their own capital, from the current 100% to a range of 80-90%. Also, setting a target growth rate for risk exposures, such as nominal GDP growth + alpha⁶⁵, can also be considered to regulate the growth of these exposures in the market. On the qualitative side, thorough analysis of underlying assets should be conducted by taking into consideration factors like the developer's track record, investment demand, and expected sales rate, and adjusting risk weights accordingly. By combining both quantitative and qualitative regulations, the government can more effectively manage risk exposures in the real estate PF market.

(2) Activating Risk-sharing Structures

The key to project finance lies in the diversification of risk, which can effectively manage a range of risk factors. Project structures that allow PF participants to evenly distribute business risks must be prioritized. The detailed plan for this is outlined as follows.

⁶³ Yong-sang Shin (2019). The Changes in Real Estate Market Conditions and the Management of Real Estate Finance Risk by Securities Firms

⁶⁴ Byung-guk Lee. (2022. September 16) Standardizing the monitoring indicators for real estate PF to stabilize an otherwise volatile market. Herald Economics. <http://news.heraldcorp.com/view.php?ud=20220916000381>

⁶⁵ Yong-sang Shin (2021). The Trend of Increasing Scale of Risk Exposure in Domestic Real Estate Finance and Policy Response Direction.

① Increasing Participation of Financial Investor (FI) in PF Market

Lee and Choi (2015) emphasized the active market participation through mezzanine investment by financial companies in their research. The challenges faced by financial institutions as financial investors (FIs) in the Korean project financing (PF) market can be addressed through practical measures. To make investment more appealing to financial institutions, the government should consider relaxing investment vehicle requirements and lowering taxes on capital gains. Moreover, revising the principle of separating industrial and financial capital to provide more flexibility in share ownership can also be explored. Additionally, to further incentivize FIs' investment in the PF market, the government can establish a supportive regulatory framework and provide incentives such as tax credits or subsidies.

By implementing these measures, the government can create a favorable environment for financial institutions as financial investors (FIs) to diversify risk and stabilize the real estate finance market. Encouraging FIs' participation in principal investment (PI) or mezzanine financing will help distribute risk more evenly among project financing participants and increase stability in the market. An increased investment by financial institutions in the PF market can also result in a shift from a focus on short-term profits to long-term profit allocation, improving the overall structure of the Korean real estate market.⁶⁶

② Revitalizing PFV by Improving the System with Tax Benefits

Ahn and Choi (2008) highlighted the significance of project finance vehicles (PFV) as a way to manage risk in the Korean real estate development market in their study.⁶⁷ The implementation of Project Financing Vehicles (PFV) in the Korean real estate market holds importance as it reduces dependence on general contractors and often involves partnerships between financial institutions and the public sector to finance and execute development projects. To revitalize this approach in Korea, relevant legislation must be introduced to resolve existing problems. This can be done by reinstating tax privileges for PFV and incorporating three crucial elements: First, the establishment of a government body responsible for managing and overseeing PFV is essential.⁶⁸ Second, the government must provide clear guidelines for large-scale urban development projects to ensure proper supervision. Third,

⁶⁶ Sam-su Lee and Jong-suk Choi (2015). A Study on the Application of the Mezzanine Financing method in the Urban Regeneration Projects - Focused on case study of Japan

⁶⁷ Yong-un Ahn and Min-seob Choi (2021). A Study on Real Estate Development Finance Risk Management Plan – Focusing on PFV

⁶⁸ Sung-soo Koo (2011). Application of tax benefits and problems of Project Financing Vehicles (PFV)

the selection process for private sector participants should be transparent and fair through appropriate legislation.⁶⁹

The revitalization of PFV in the Korean real estate market has several potential benefits. Firstly, a system can be put in place to manage risk by involving financial institutions and the public sector in real estate development projects. Secondly, partnerships with credible investment entities can increase transparency and credibility of future projects' funding sources. Finally, the issue of double taxation on corporate taxes for future projects can be addressed. As a result, the revitalization of PFV is expected to improve the overall stability of the Korean project financing market.

③ Inducing Development Partnerships with Landowners

Lee and Shin (2011) suggested a development strategy through collaboration with land owners in their study. They emphasized the need to reduce the initial land acquisition cost for developers and suggested incentivizing land owners to join the development partnerships by offering tax benefits.⁷⁰ The Umbrella Partnership Real Estate Investment Trust (UPREITs) utilized in the United States employs this particular strategy.⁷¹ The main feature of this structure is that property owners can avoid paying taxes on the sale of their property and instead pay taxes on the future sale of the units in the REIT. This allows property owners to enhance their liquidity, diversify investments and minimize tax impact.

Korea has also offered a taxation deferral system similar to that provided by UPREITs. According to the Tax Exemption Restriction Act, capital gains tax could be deferred when real estate owned by a corporation was invested in kind through a REIT's public offering.⁷² However, this exemption from taxation for in-kind investors ended on December 31, 2022, due to concerns that it would unduly benefit entities with real estate holdings. Through the amendment of this law, the Korean government should attempt to come up with a way to ensure the full-fledged reintroduction of this tax exemption because it remains one of the most effective ways to entice land-owning entities to participate in development partnerships. Such a move would be expected not only to lower the burden of land acquisition costs for developers, but also contribute to activating REITs in development market in Korea moving forward.

⁶⁹ Ji-eun Ha. (2022. March 16) The unguided urban development perpetuates its brutality... Will the incoming government examine the PFV policy? Invest Chosun. <http://www.investchosun.com/m/article.html?contid=2022031580206>

⁷⁰ Note: Developing financial plans through partnership with an investment trust can lead to the formation of a partnership, with the landowner participating as a Limited Partnership (LP) and the developer participating as a General Partnership (GP). In Korea, the development method through LLC has not become as widespread as in the United States, so it is not covered here.

⁷¹ Hyun-seok Lee and Jong-chil Shin (2011), A Study on Improvement Plans for Project Financing by the Change of Real Estate Market

⁷² Article 97-8 of the Restriction of Special Taxation Act (Special Taxation for Investors in Kind of Public Real Estate Investment Companies)

(3) Improving the Capacity of Developers

The current state of the Korea's real estate PF market has been criticized for being too accommodating towards developers, which has negatively impacted the market's performance. To address this issue, the following three measures are suggested to increase the responsiveness of developers:

① Strengthening Entry Requirements for Developers

Kim (2011) emphasized the need for stricter registration requirements for developers in his research. To improve the financial stability of developers in the Korean real estate project financing market, it is important to eliminate small-scale developers and establish a foundation for robust, large-scale developers. To achieve this goal, the Real Estate Development Business Act in Korea should be revised to assess the financial health of developers at the start of the project financing process. During the registration process for real estate development, the financial stability, ability to complete projects, and track record of the developer should be thoroughly reviewed and verified, and qualifications should be strictly enforced.⁷³

By strengthening the barriers to market entry, the risk of projects led by financially unstable developers can be prevented. Additionally, these measures are expected to increase public trust in developers who meet the qualifications, and enable them to secure financing through their own credit lines.

② Establishing a Minimum Capital Requirement for Borrowers

Cho (2016) stated in his research that the expansion of developer's equity capital is necessary to enhance PF market in Korea.⁷⁴ In the United States, the typical developer equity as a percentage of total project cost is between 20-30%, while land acquisition costs make up approximately 15% of the total project cost. In contrast, in Korea, developer equity only accounts for about 4% of the total project cost, and land acquisition costs are approximately 30%. Given the higher land acquisition costs in Korea, it is recommended to increase the developer equity requirement from the existing practice of 4% to at least 10%~20%.⁷⁵ This would provide a stable source of initial financing and ensure that construction can

⁷³ Geun-yeong Kim (2011). A Study on the Problem of a Pre-construction Sale System in Apartment House

⁷⁴ Jae-young Cho (2016). A study on the Measure of Securing Stability of the Project Finance

⁷⁵ Bok-hui Jeong (2016). A Study on Debt Preservation and Risk Improvement Plans in Real Estate Project Financing

be safely completed, regardless of pre-sale method. At the same time, a clear standardization of capital recognition for developers should be fixed among PF participants to avoid confusion.

By strengthening the minimum capital requirements for developers and standardizing the scope of capital recognition as mentioned above, this will further enhance the stability and reliability of the Korea's real estate PF market in the long run.

③ Supporting Developers to Create Their Own Credit

Shin (2015) highlighted the importance of enabling developers to generate their own credit in her research. Developers need to draw on their own lines of credit through the cultivation and incentivization of support for fiscally healthy developers. To this end, measures must be developed that will prioritize the fiscal health of developers, such as by providing incentives based on project performance.⁷⁶ In order for developers to be able to generate their own credit, the capital position of the aforementioned firms must be strengthened. This can be done by expanding the scale of standalone developers but given the current market downturn, may be better served by alliances created through the establishment of a network among developers.⁷⁷

Another important aspect is to promote the creation of portfolios across different areas of business, particularly in high-risk development sectors. The ultimate objective should be to develop integrated real estate management companies that cover all aspects of real estate management, from development to ownership, operation, leasing, and marketing, and offer systematic support.⁷⁸ By nurturing these companies, it is expected that they will become capable of generating their own credit in the Korean PF market in the long run.

(4) Transforming the Project Evaluation System

The success of real estate projects is dependent on accurate predictions of their feasibility. It's crucial to establish a fair and professional evaluation system to help PF participants make their proper decisions. To achieve this goal, the following steps should be taken:

⁷⁶ Kyoung-hee Shin (2015), Study of Analysis of Real Estate Project Financing Issues and Activated through Improvement of a System

⁷⁷ Hyun-seok Lee and Jong-chil Shin (2011), A Study on Improvement Plans for Project Financing by the Change of Real Estate Market

⁷⁸ Hyun-seok Lee and Jong-chil Shin (2011), A Study on Improvement Plans for Project Financing by the Change of Real Estate Market

① Improving Evaluation Practices of Private Evaluation Agencies

Shin (2015) highlighted the need for a change in the evaluation practices of real estate development projects in her research. The evaluation system currently in place needs to be improved in a way that strengthens project feasibility evaluations and the ability of developers to undertake and complete projects. To align with the goal of PF, the primary focus should be on the feasibility of a project when making decisions. Thus, creating a comprehensive set of guidelines for evaluating project feasibility from various perspectives is a top priority.⁷⁹ The success of each project depends largely on the ability of the developer to execute it effectively. To ensure this, it is crucial to assess the developer's ability to complete the project as a critical evaluation item. This would objectively evaluate their capability to raise funds and cultivate expertise as the primary entity of the project.⁸⁰

Improving the evaluation practices of private evaluation agencies will increase their credibility and usefulness in decision-making in the PF market, making the overall real estate finance market more effective and efficient.

② Establishing Public Evaluation Agencies for a Dual Evaluation System

The Ministry of Land, Infrastructure, and Transport held a public hearing on “Improving the Evaluation System for Real Estate Development Projects” in 2013 and proposed establishing a public institution for project evaluation system.⁸¹ There is a need for the implementation of a dual evaluation system consisting of independent project feasibility evaluation agencies, distinct from existing credit rating agencies and accounting firms. While private sector evaluation agencies are currently responsible for evaluating project feasibility, government oversight is crucial to ensure the validity of these evaluations. By doing so, it can create a system in which the validity of evaluations prepared by a private evaluation agency is verified by a public organization based on standardized evaluation items. The results of these evaluations can then be provided to the entity that requested them.

The implementation of a dual evaluation system would increase public confidence in the project feasibility evaluations conducted by private sector agencies and provide more objective information to real estate project financing participants.

⁷⁹ Kyoung-hee Shin (2015), Study of Analysis of Real Estate Project Financing Issues and Activated through Improvement of a System

⁸⁰ Korea Research Institute for Human Settlements (2013). Public Hearing Materials for the Introduction of Real Estate Development Project Evaluation System

⁸¹ Unknown. (2013, May 07) Pushing for the creation of a public organization to assume responsibility for evaluating real estate development projects. Housing Herald. <http://www.housingherald.co.kr/news/articleView.html?idxno=8789>

③ Activating a Project Grading and Disclosure System

Lee (2013) proposed the need for the introduction of a grading and disclosure system for projects in his research. In order for the private funding market to function effectively, it is important that all relevant stakeholders have access to accurate and reliable information.⁸² To encourage the effective disclosure of information, each project can be periodically graded based on profit structure, marketability, sustainability, and risk factors, and the methods through which such changes are reflected can be reviewed. For the successful establishment of such a system, a special law is required to independently regulate the details of project valuation through the legislative process.⁸³

The introduction of such a grading and disclosure system would help identify financially troubled projects early on and support the growth of promising projects. It would also provide objective information to the real estate project financing market and contribute to a diversification of risks among participants.⁸⁴

⁸² Guk-hyeong Lee and Yeong-gi Moon (2013). Risk Sharing Plan for Real Estate PF Participants

⁸³ Kyoung-hee Shin (2015), Study of Analysis of Real Estate Project Financing Issues and Activated through Improvement of a System

⁸⁴ Hyun-seok Lee and Jong-chil Shin (2011), A Study on Improvement Plans for Project Financing by the Change of Real Estate Market

III. Analysis of Improvement Plans Through a Quantitative Approach

1. Designing an Analysis Model

1) Overview

The quantitative approach section of the thesis aims to understand the various perspectives and priorities of different groups of participants involved in real estate projects. This will be achieved through a survey that gathers data on the importance of 12 improvement plans identified in the previous section. The survey data will then be analyzed using the Analytic Hierarchy Process (AHP) tool to calculate a composite weight for each improvement plan and determine the priorities of each group of participants. This analysis will provide a better understanding of the diverse perspectives and priorities among different groups in PF market.

2) Designing a Model: Analytic Hierarchy Process (AHP)

(1) Analytic Hierarchy Process (AHP)

The Analytic Hierarchy Process (AHP) is a decision-making tool used in various fields that facilitates the ranking of important factors by considering the opinions of expert raters.⁸⁵

Developed by Professor Thomas Saaty of the University of Pennsylvania in the 1970s, AHP combines both quantitative and qualitative approaches by incorporating statistical analysis based on expert decisions. This combination makes it similar to human cognition and has received positive reviews for its ability to identify, analyze, and restructure complex problems and produce quantitative results by converting relative weights or preferences into ratio scales.⁸⁶

⁸⁵ Jin-su Kim (2022). A Dissertation That Ends in Just One Volume. Seoul: Glider.

⁸⁶ Sang-hyeok Seo (2011). Study on the Location Selection of Cosmetics Specialty Stores Using AHP

The AHP process involves creating a pairwise comparison matrix from the survey data. For each item in the survey, the values obtained are input into the matrix, which is then squared and the sum of each row is divided by the sum of all rows to calculate the eigenvector. The eigenvector must total to one, which represents the relative weight for each item.

Moreover, to verify that logical consistency is maintained across expert responses, the Consistency Ratio (CR) is calculated using the Consistency Index (CI) and Random Index (RI). The formula for CI and CR is as follows.

$$CI = \frac{\lambda_{max} - n}{n - 1}, \quad CR = \frac{CI}{RI} \times 100(\%)$$

The formula for CI and CR in the AHP process uses "n" to represent the number of items being analyzed through the survey, which is also the number of rows and columns in the pairwise comparison matrix. λ_{max} is calculated based on the pairwise comparison matrix and eigenvector value. If the figures in the pairwise comparison matrix approach the "n" value, it indicates higher consistency. The Random Index (RI) is calculated as the average value of the CI from a comparison matrix made up of random numbers between 1 to 9. Professor Thomas Saaty provides the RI value in [Table 9].

Table 9: Random Index: RI

n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RI	0	0	0.52	0.89	1.11	1.25	1.35	1.4	1.45	1.49	1.52	1.54	1.56	1.58	1.59

The Consistency Ratio (CR) measures the consistency of the expert responses in the survey. A small CR value indicates a high level of consistency in the decision-making process, while a larger value suggests inconsistency. A CR value of 0.1 or less is considered logically consistent, while a value of 0.2 or less is considered acceptable. Results with a CR value above 0.2 are considered inconsistent and should be eliminated from further evaluation.

Based on these principles, the AHP analysis procedure consists of the following steps.

Table 10: AHP Analysis Procedure

Category	Contents
1. Precise Definition of the Problem	A Precise Definition of the Problem Based on Experts' Knowledge and Experience
2. Hierarchical Structuring	A Process That Assigns a Hierarchical Structure to the Problems and Determines Higher-Order Problems and Lower-Order Problems Rooted in Corresponding Higher-Order Problems
3. Calculating Weights	A Method Used to Calculate Weights Based on Ratio Scales in Terms of Importance Among Higher-Order Problems and Lower-Order Problems in Relation to Cross-Comparison Questionnaires
4. Measuring Consistency	A Procedure Used to Obtain Objective and Comprehensive Results by Measuring a Consistency Ratio (CR) Based on the Questionnaires to Determine Weights
5. Determining Priorities	A Procedure to Determine Hierarchical Order Among the Problems by Using the Decision-Making Results Derived from the Above Procedures

(2) A Review of Prior Research Using AHP

A study by Lee and Kim (2021) applied AHP analysis to examine the factors affecting the profitability of private rental housing real-estate investment trusts (REITs). They identified higher-order problems in the following order of importance: policy factors, geographic factors, individual factors, and the macro economy. Furthermore, lower-order problems were ranked in the order of land location, tax policy, loan policy, and rental policy. Based on these findings, the authors suggested that private rental housing REITs focus on fundamental values that promote public investment, and that the government implement policies centered around consistent rental policies, city station areas, and stable real estate. Also, they recommended amending the profit structure of REITs to encourage the pursuit of profits.⁸⁷

Kwak and Kim (2011) used AHP analysis to analyze the risk factors in PF projects as previously studied. They structured the risk factors into four categories: finance, business, developers, and general contractors, and found 14 subcategories. The study showed that general contractors and financial institutions had different perspectives on the most important risk factors, with general contractors considering general contractor and developer risk the most crucial, and financial institutions considering financial and business risk the most important.⁸⁸

⁸⁷ Su-jeong Lee and Ho-cheol Kim (2021). Analysis of Important Profitability Factors of Private Rental Housing REITs Using AHP. Journal of the Korean Urban Management Association

⁸⁸ Soo-hwan Kwak and Han-seong Kim (2011). The Weights of Risk Factors in Project Financing Business Regional Industry Review

Prior research has demonstrated the usefulness of AHP analysis in a wide range of academic fields and practices. AHP has been applied in real-estate related studies to address important problems and support decision making. The current study employs AHP analysis to provide key insights into improving the Korean PF market by determining the hierarchical order of measures to enhance it. This study aims to bring about fundamental changes in the Korean PF market through the application of AHP analysis.

3) Hierarchical Structure

The AHP method will be used to evaluate the relative importance of 12 improvement proposals developed in Chapter II. These proposals are grouped into 4 main categories, each having 3 subcategories.

Table 11: Hierarchical Structure of 12 Proposals

Major Classification	1	2	3	4
	Enhancing the Institutional and Policy Framework	Activating Risk-sharing Structures	Improving the Capacity of Developers	Transforming the Project Evaluation System
Minor Classification	1-1. Moving towards a Post-sale Financing System	2-1. Increasing Participation of Financial Investor (FI) in PF Market	3-1. Strengthening Entry Requirements for Developers	4-1. Improving Evaluation Practices of Private Evaluation Agencies
	1-2. Limiting Credit Enhancement Measures of General Contractors	2-2. Revitalizing PFV by Improving the System with Tax Benefits	3-2. Establishing a Minimum Capital Requirement for Borrowers	4-2. Establishing Public Evaluation Agencies for a Dual Evaluation System
	1-3. Strengthening Risk Management System and Regulatory Measures	2-3. Inducing Development Partnerships with Landowners	3-3. Supporting Developers to Create Their Own Credit	4-3. Activating a Project Grading and Disclosure System

2. Importance Analysis

1) Survey Analysis

These experts were divided into four industry categories: developers, general contractors, financial institutions, and Other Groups (institutions offering advisory services such as credit rating agencies, accounting firms, law firms, consulting firms, and real estate brokerage agents). The experts were selected from each of these categories, with a total of 15 experts per industry. A preliminary survey was conducted prior to AHP analysis to gain a better understanding of current perspectives on the Korean PF market. The results of the survey are summarized below.

(1) Characteristics of the Questionnaire Respondents

The 60 respondents consisted of 15 developers (25%), 15 general contractors (25%), 15 financial institutions (25%), and 15 representatives from advisory services. The age distribution of the respondents was as follows: 29 (48.3%) were in their 30s, 17 (28.3%) were in their 40s, and 9 (15%) were in their 50s. Over half of the respondents, 31 (51.7%), had 9 or more years of continuous work experience and were deemed to have sufficient expertise.

Table 12: General Characteristics of Respondents

Item	Category	Frequency	%
Affiliation	Developers	15	25.0
	General Contractors	15	25.0
	Financial Institutions	15	25.0
	Other groups	15	25.0
Age Group	20s	3	5.0
	30s	29	48.3
	40s	17	28.3
	50s	9	15.0
	Over 60	2	3.3
Work Experience	1-2 years	5	8.3
	3-4 years	1	1.7
	5-6 years	7	11.7
	7-8 years	16	26.7
	More than 9 years	31	51.7
Total		60	100.0

(2) Perception of the PF Market

Most of the respondents, 35.0%, expect the Korean real estate PF market to recover within 2 to 3 years. 25.0% expect a recovery within 1 to 2 years, while 20.0% expect it to take more than 3 years. This suggests that over 55% of the respondents believe the market will remain stagnant for more than two years.

When asked about their level of willingness to participate in the PF market, 50% of the respondents reported being “somewhat willing”, 35.0% were “moderately willing”, and 15.0% were “not at all willing.” The overall perception of the market is negative, with participants viewing it as difficult to invest in.

Table 13: PF Participants' Market Awareness as of the End of 2022

Survey Question		Frequency	%
Expected Recovery Time Frame for Korea's Real Estate PF Market Moving Forward	Less than 6 months	3	5.0
	6 months to 1 year	9	15.0
	1 to 2 years	15	25.0
	Within 2 to 3 years	21	35.0
	More than 3 years	12	20.0
Willingness to Participate in the Real Estate PF Market at the Current Point in Time	Not willing at all	9	15.0
	Somewhat willing	30	50.0
	Moderately willing	21	35.0
	Strongly willing	0	0.0
	Very strongly willing	0	0.0
Total		60	100.0

It is noted that more than half of the general contractors and financial institutions expect the PF market to take at least two years to recover, which suggests a negative outlook on the market. This, in turn, indicates that there may be challenges in increasing participants' willingness to participate in the PF market. The results from the preliminary survey show that the crisis consciousness regarding the current state of the PF market is similar across the different groups of respondents.

Table 14: Comparison of Participants' Perception Differences

Expected Recovery Time Frame for the Korean Real Estate PF Market Moving Forward								
Category	Developers		General Contractors		Financial Institutions		Other Groups	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Less than 6 months	0	0	0	0	0	0	3	20.0
6 months to 1 year	2	13.3	1	6.7	4	26.7	2	13.3
1 to 2 years	6	40.0	4	26.7	2	13.3	3	20.0
Within 2 to 3 years	6	40.0	6	40.0	6	40.0	3	20.0
More than 3 years	1	6.7	4	26.7	3	20.0	4	26.7
Total	15	100.0	15	100.0	15	100.0	15	100.0

Willingness to Participate in the Real Estate PF Market at the Current Point in Time								
Category	Developers		General Contractors		Financial Institutions		Other Groups	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Not willing at all	1	6.7	2	13.3	1	6.7	5	33.3
Somewhat willing	5	33.3	9	60.0	9	60.0	7	46.7
Moderately willing	9	60.0	4	26.7	5	33.3	3	20.0
Strongly willing	0	0.0	0	0.0	0	0.0	0	0.0
Very strongly willing	0	0.0	0	0.0	0	0.0	0	0.0
Total	15	100.0	15	100.0	15	100.0	15	100.0

2) Logical Consistency Analysis

The study used AHP methodology and considered a survey to be valid if it had a Consistency Index (CI) of 0.2 or less, as a CI of 0.1 or less is deemed logically consistent. The questionnaire used in the study was found to be valid, with a CI of 0.2 or less. [Table 15] shows the number and weight of valid survey questions for each item based on a CI of 0.1 or less, or 0.2 or less.

The responses of all 60 respondents remained logically consistent even when a CI of 0.2 was applied as the basis for valid questionnaires. The number of survey questions with a CI of 0.2 or less ranged from a minimum of 54 to a maximum of 57.

Table 15: Logical Consistency Analysis Among All Respondents

Item		All Respondents			
		CR less than 0.1		CR less than 0.2	
		Number	Weighting	Number	Weighting
Major Classification	Enhancing the Institutional and Policy Framework	46	0.335	57	0.321
	Activating Risk-sharing Structures		0.251		0.261
	Improving the Capacity of Developers		0.261		0.264
	Transforming the Project Evaluation System		0.154		0.155
Enhancing the Institutional and Policy Framework	Moving towards a Post-sale Financing System	49	0.235	57	0.226
	Limiting Credit Enhancement Measures of General Contractors		0.392		0.390
	Strengthening Risk Management System and Regulatory Measures		0.372		0.384
Activating Risk-sharing Structures	Increasing Participation of Financial Investor (FI) in PF Market	44	0.437	54	0.407
	Revitalizing PFV by Improving the System with Tax Benefits		0.259		0.266
	Inducing Development Partnerships with Landowners		0.303		0.327
Improving the Capacity of Developers	Strengthening Entry Requirements for Developers	47	0.283	55	0.279
	Establishing a Minimum Capital Requirement for Borrowers		0.399		0.390
	Supporting Developers to Create Their Own Credit		0.318		0.331
Transforming the Project Evaluation System	Improving Evaluation Practices of Private Evaluation Agencies	49	0.445	54	0.452
	Establishing Public Evaluation Agencies for a Dual Evaluation System		0.229		0.224
	Activating a Project Grading and Disclosure System		0.326		0.324

3) Analysis of the Relative Importance of Improvement Measures

(1) Analysis of Major Classification Evaluation Criteria

The analysis showed that “Enhancing the Institutional and Policy Framework” was crucial, with a score of 0.321, which indicates a widespread recognition among the respondents that changes in policies and institutions are crucial. “Improving the Capacity of Developers” (0.264) and “Activating Risk-sharing Structures” (0.261) were also important, with a small margin between them. “Transforming the Project Evaluation System” scored the lowest at 0.155, indicating low awareness of issues with current practices.

The results of the priority comparison analysis by stakeholder are as follows.

- **Developers:** This group of developers identified “Activating Risk-sharing Structures” as the most important factor, with a score of 0.315. Given the current state of the Korean real estate development market in 2022, this highlights the high level of awareness that developers have of the risks involved. According to an interview with Mr. Han, who has worked for development company, developers have a strong desire to mitigate these risks by attracting active investment and establishing partnerships with other stakeholders, particularly financial institutions.
- **General Contractors & Other Groups:** “Enhancing the Institutional and Policy Framework” (0.386 and 0.300 each) is given top priority for both. In particular, the general contractor group has taken on a multitude of guarantee obligations as the primary stakeholder as part of efforts to promote credit enhancement in the Korean PF market. This trend highlights the need for policy changes to address the structural problems in the market and reduce the burden on general contractors.
- **Financial Institutions:** Financial Institutions consider “Improving the Capacity of Developers” (0.315) to be of greater importance than “Enhancing the Institutional and Policy Framework” (0.304). Mr. Koo, a representative of a securities company, stated that financial institutions believe the fiscal soundness of developers to be one of the primary factors contributing to the crisis in the Korean real estate development market in 2022. As a result, they consider improving the financial stability of developers to be their foremost priority.

Table 16: Importance and Priority of “Major Classification Criteria”

Category	Developers		General Contractors		Financial Institutions		Other Groups		Total Groups	
	Weighting	Rank	Weighting	Rank	Weighting	Rank	Weighting	Rank	Weighting	Rank
Enhancing the Institutional and Policy Framework	0.289	2	0.386	1	0.304	2	0.300	1	0.321	1
Activating Risk-sharing Structures	0.315	1	0.200	3	0.246	3	0.282	2	0.261	3
Improving the Capacity of Developers	0.210	3	0.279	2	0.315	1	0.257	3	0.264	2
Transforming the Project Evaluation System	0.186	4	0.134	4	0.135	4	0.162	4	0.155	4

(2) Analysis of Minor Classification Evaluation Criteria

① Enhancing the Institutional and Policy Framework

The results of the “Enhancing the Institutional and Policy Framework” study highlight the importance of addressing the issue of credit enhancement measures taken by general contractors. It was identified as the top priority with a score of 0.390, signaling the need for immediate government intervention. The second highest priority was “Strengthening Risk Management System and Regulatory Measures” (0.384). The least prioritized aspect was “Moving towards a Post-sale Financing System”, with a score of 0.226, revealing a lack of awareness among Korean PF market participants about the benefits of a post-sale financing system and a preference for traditional presale financing.

The results of the priority comparison analysis by stakeholder are as follows.

- **Developers and Other Groups:** “Strengthening Risk Management System and Regulatory Measures” (0.384) is the top priority for the groups (0.454 and 0.384 each). Many developers hold the view that the current crisis in the PF market is due to the growing risk exposure of financial institutions. As per an interview with Mr. Shin, a representative from a major developer, it was criticized that securities firms, among financial companies, are responsible for the instability in the PF market. They have aggressively increased their investments in real estate PF in recent years, taking advantage of the thriving real estate market, to enhance their profitability, resulting in increasing risk exposures in the market.
- **General Contractors and Financial Institutions:** “Reducing Credit Enhancement Measures for General Contractors” as the most important factor (0.445 and 0.413 each). Excessive credit enhancement in the PF market has led to increased insolvency risk for general contractors, leading them to adopt a more conservative approach in the future. An interview with Mr. Kang, from a medium-sized General Contractor, emphasized the need to address the prevalent practice of overreliance on credit enhancements in the Korean PF market to secure the long-term stability and integrity of the market. Financial institutions, who have started to take on some of the PF market risks, seem to have reached a consensus on the negative aspects of past practices.

Table 17: Importance of Each Factor in “Enhancing the Institutional and Policy Framework”

Category	Developers		General Contractors		Financial Institutions		Other Groups		Total Groups	
	Weighting	Rank	Weighting	Rank	Weighting	Rank	Weighting	Rank	Weighting	Rank
Moving towards a Post-sale Financing System	0.181	3	0.208	3	0.234	3	0.280	3	0.226	3
Limiting Credit Enhancement Measures of General Contractors	0.365	2	0.445	1	0.413	1	0.337	2	0.390	1
Strengthening Risk Management System and Regulatory Measures	0.454	1	0.347	2	0.353	2	0.384	1	0.384	2

② Activating Risk-sharing Structures

The ranking of measures to establish a risk diversification structure in the Korean PF market showed that “Increasing Participation of Financial Investor (FI) in PF Market” (0.407) was the most important factor. This emphasizes the significance of financial institutions' role in risk-sharing through investments in principal or mezzanine financing. The second most important factor was “Inducing Development Partnerships with Landowners” (0.327), while “Revitalizing PFV by Improving the System with Tax Benefits” (0.266) was found to be the least prioritized.

The results of the comparative analysis of priorities by stakeholder are as follows.

- Developers, General Contractors, and Other Groups:** Financial institutions have identified “Increasing Participation of Financial Investor (FI) in PF Market” as the most important factor, with scores of 0.377, 0.449, and 0.440. They play a crucial role as investors in projects where developers struggle to secure funding and help to keep the project moving forward. With the recent rise in land and raw material prices, stakeholders in the project finance market have high expectations for financial institutions to support developers and alleviate their financial burden as the primary driving force behind these projects, as stated by Ms. H, who has worked for a general contractor.
- Financial Institutions:** Financial institutions place a higher emphasis on “Inducing Development Partnerships with Landowners” (0.377) as the most crucial factor. This is due to their aim to reduce the expenses associated with acquiring land for development purposes. While they do recognize the significance of “Increasing Participation of Financial Investor (FI) in PF Market,” this factor is of lesser importance to them as they are not inclined to invest in PI or mezzanine in the current market circumstances, as stated in an interview with Mr. Cho, an experienced professional from a securities firm.

Table 18: Importance of Each Factor in “Activating Risk-sharing Structures”

Category	Developers		General Contractors		Financial Institutions		Other Groups		Total Groups	
	Weighting	Rank	Weighting	Rank	Weighting	Rank	Weighting	Rank	Weighting	Rank
Increasing Participation of Financial Investor (FI) in PF Market	0.377	1	0.449	1	0.367	2	0.440	1	0.407	1
Revitalizing PFV by Improving the System with Tax Benefits	0.296	3	0.271	3	0.242	3	0.254	3	0.266	3
Inducing Development Partnerships with Landowners	0.327	2	0.280	2	0.390	1	0.306	2	0.327	2

③ Improving the Capacity of Developers

The results of the survey on “Improving the Capacity of Developers” reveal that “Establishing a Minimum Capital Requirement for Borrowers” was the most significant factor for all stakeholders except for developers, and was ranked first overall. This is a result of the common use of high leverage by developers and the perception among PF stakeholders (except for developers) that this issue needs to be addressed. The second-highest priority was “Supporting Developers to Create Their Own Credit”, followed by “Strengthening Entry Requirements for Developers” in third place.

The results of the comparative analysis of priorities by stakeholder are as follows.

- **General Contractors, Financial Institutions, and Other Groups:** “Establishing a Minimum Capital Requirement for Borrowers” was considered the most important factor by General Contractors, Financial Institutions, and other groups (with scores of 0.478, 0.408, and 0.433, respectively). General Contractors expressed strong criticism of the prevalent practice among developers of promoting high Loan-to-Value (LTV) ratios with minimal equity. According to an interview with Ms. Cha, a professional in a law firm, many believed that the proportion of developer equity as a share of financing should be increased to at least 10% to 20%.
- **Developers:** Developers ranked “Supporting Developers to Create Their Own Credit” as their most significant priority, with a score of 0.461. To improve the overall financial stability of the industry, they believe that positive incentives should be used to increase accountability, rather than relying solely on negative consequences. As stated by Mr. Choi, a development company employee, the government should take measures to support and strengthen the development industry. Meanwhile, “Strengthening Entry Requirements for Developers” also received a high score of 0.319, reflecting the views of the mostly large and established developers participating in the survey, who advocate for more stringent entry requirements to prevent indiscriminate market entry by new developers.

Table 19: Importance of Each Factor in “Improving the Capacity of Developers”

Category	Developers		General Contractors		Financial Institutions		Other Groups		Total Groups	
	Weighting	Rank	Weighting	Rank	Weighting	Rank	Weighting	Rank	Weighting	Rank
Strengthening Entry Requirements for Developers	0.319	2	0.284	2	0.271	3	0.246	3	0.279	3
Establishing a Minimum Capital Requirement for Borrowers	0.220	3	0.478	1	0.408	1	0.433	1	0.390	1
Supporting Developers to Create Their Own Credit	0.461	1	0.238	3	0.321	2	0.321	2	0.331	2

④ Transforming the Project Evaluation System

The results of “Transforming the Project Evaluation System” showed that “Improving Evaluation Practices of Private Evaluation Agencies” was considered the most crucial factor (0.452). Participants viewed the improvement of evaluation practices as crucial to increasing transparency and fairness in the market. “Activating a Project Grading and Disclosure System” was ranked second (0.324), while the least preferred factor was “Establishing Public Evaluation Agencies for a Dual Evaluation System” (0.224). The lower preference for the establishment of public evaluation agencies suggests that the market does not desire direct government intervention in the project evaluation process.

The results of the comparative analysis of priorities by stakeholder are as follows.

- **Developers, General Contractors, and Financial Institutions:** These groups all consider “Improving Evaluation Practices of Private Evaluation Agencies” to be the most important factor in Transforming the Project Evaluation System (0.452). These groups believe that the current practice of evaluating the creditworthiness of general contractors should be improved, and the introduction of an evaluation system that places greater emphasis on evaluating the feasibility of the project itself should be prioritized. Mr. Kim, who has worked for a general contractor, emphasized that such efforts could be the first step in improving the Korean PF market.
- **Other Groups:** The most pressing priority for "Other Groups" with regards to Transforming the Project Evaluation System is the activation of a "Project Grading and Disclosure System". The Korean project evaluation market is plagued by the limited access to important information like project presales rates, LTV and collateral terms. To overcome this, stakeholders need a system that offers accurate market information. Mr. Bae from an accounting firm highlights the importance of establishing a public disclosure system that is accessible to all market participants, which is crucial in preventing failure in PF.

Table 20: Importance of Each Factor in “Transforming the Project Evaluation System”

Category	Developers		General Contractors		Financial Institutions		Other Groups		Total Groups	
	Weighting	Rank	Weighting	Rank	Weighting	Rank	Weighting	Rank	Weighting	Rank
Improving Evaluation Practices of Private Evaluation Agencies	0.451	1	0.517	1	0.471	1	0.354	2	0.452	1
Establishing Public Evaluation Agencies for a Dual Evaluation System	0.243	3	0.216	3	0.206	3	0.235	3	0.224	3
Activating a Project Grading and Disclosure System	0.306	2	0.268	2	0.324	2	0.411	1	0.324	2

4) Comprehensive Importance and Priority Analysis

The results of the comprehensive analysis of the evaluation criteria are presented in [Table 21]. The weight of the evaluation criteria is calculated by multiplying the weight of the main classification criteria by the weight of the sub-classification criteria, to determine the overall priority of importance. Based on all the responses, “Limiting Credit Enhancement Measures of General Contractors” (0.125) was ranked as the most significant improvement measure among the top 3 items. This was followed by “Strengthening Risk Management System and Regulatory Measures” (0.123) and “Increasing Participation of Financial Investor (FI) in PF Market” (0.106).

First, it is time for Korea to advance its PF market by moving away from an excessive reliance on general contractors. The weighted rankings of groups related to “Limiting Credit Enhancement Measures of General Contractors” showed that this is a priority, ranking first among general contractors, second among financial institutions, third among developers, and fourth among other groups. There is a general consensus that reducing dependence on general contractors is the key to improving existing PF lending practices. General contractors, in particular, consider this a priority as it directly impacts them and believe that diversifying risk among PF participants is crucial for the long-term stability of the PF market.

Second, it's crucial to emphasize the importance of mitigating excessive risk exposures in the Korea's PF market. “Strengthening Risk Management System and Regulatory Measures”, which was ranked second in the overall composite weight, was first among developers (0.131), second among general contractors (0.134), third among financial institutions (0.107), and second among other groups (0.115). Respondents from various groups expressed concerns about the rapid increase in risk exposure in the real estate PF market, highlighting the need for effective risk management to maintain financial stability. To address this, they emphasized the need for reconstruction of the risk management system and the implementation of regulations to ensure responsible and measured investment by financial institutions in terms of both quantity and quality.

Third, it is important to encourage the active participation of financial institutions in the Korean PF market. This was reflected in the rankings as “Increasing Participation of Financial Investor (FI) in PF Market” was ranked third in overall composite weight, second among developers (0.119), fourth among general contractors (0.090), sixth among financial institutions (0.090), and first among other groups (0.124). Despite the current challenges posed by high interest rates and market risk, many market participants believe that financial institutions can play a crucial role in mitigating risks and promoting stability in the Korean real estate PF market. This can be achieved through principal investments and mezzanine financing, which would require the proactive involvement of financial institutions.

Table 21: Overall Weight and Priority by Participating Group

Category	Developers		General Contractors		Financial Institutions		Other Groups		Total Groups	
	Weighting	Rank	Weighting	Rank	Weighting	Rank	Weighting	Rank	Weighting	Rank
Limiting Credit Enhancement Measures of General Contractors	0.105	3	0.172	1	0.125	2	0.101	4	0.125	1
Strengthening Risk Management System and Regulatory Measures	0.131	1	0.134	2	0.107	3	0.115	2	0.123	2
Increasing Participation of Financial Investor (FI) in PF Market	0.119	2	0.09	4	0.09	6	0.124	1	0.106	3
Establishing a Minimum Capital Requirement for Borrowers	0.046	11	0.134	3	0.129	1	0.111	3	0.103	4
Supporting Developers to Create Their Own Credit	0.097	5	0.066	8	0.101	4	0.082	7	0.087	5
Inducing Development Partnerships with Landowners	0.103	4	0.056	9	0.096	5	0.086	5	0.085	6
Strengthening Entry Requirements for Developers	0.067	8	0.079	6	0.085	7	0.063	10	0.074	7
Moving towards a Post-sale Financing System	0.052	10	0.08	5	0.071	8	0.084	6	0.072	8
Improving Evaluation Practices of Private Evaluation Agencies	0.084	7	0.069	7	0.064	9	0.057	11	0.07	9
Revitalizing PFV by Improving the System with Tax Benefits	0.093	6	0.054	10	0.06	10	0.072	8	0.069	10
Activating a Project Grading and Disclosure System	0.057	9	0.036	11	0.044	11	0.066	9	0.05	11
Establishing Public Evaluation Agencies for a Dual Evaluation System	0.045	12	0.029	12	0.028	12	0.038	12	0.035	12

Figure 12: Overall Weight of Total Respondents

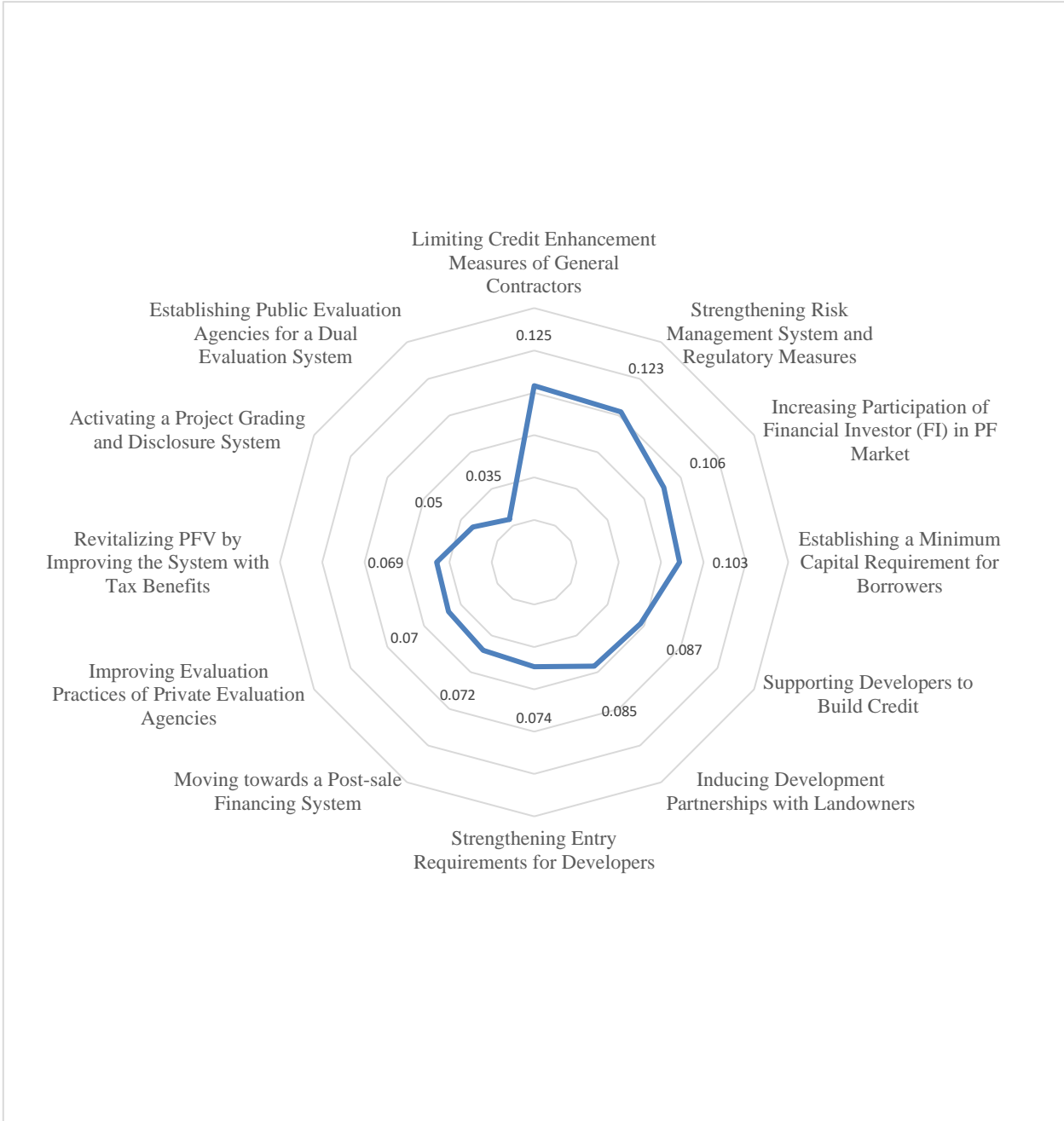


Figure 14: Overall Weight of Developers



Figure 13: Overall Weight of General Contractors

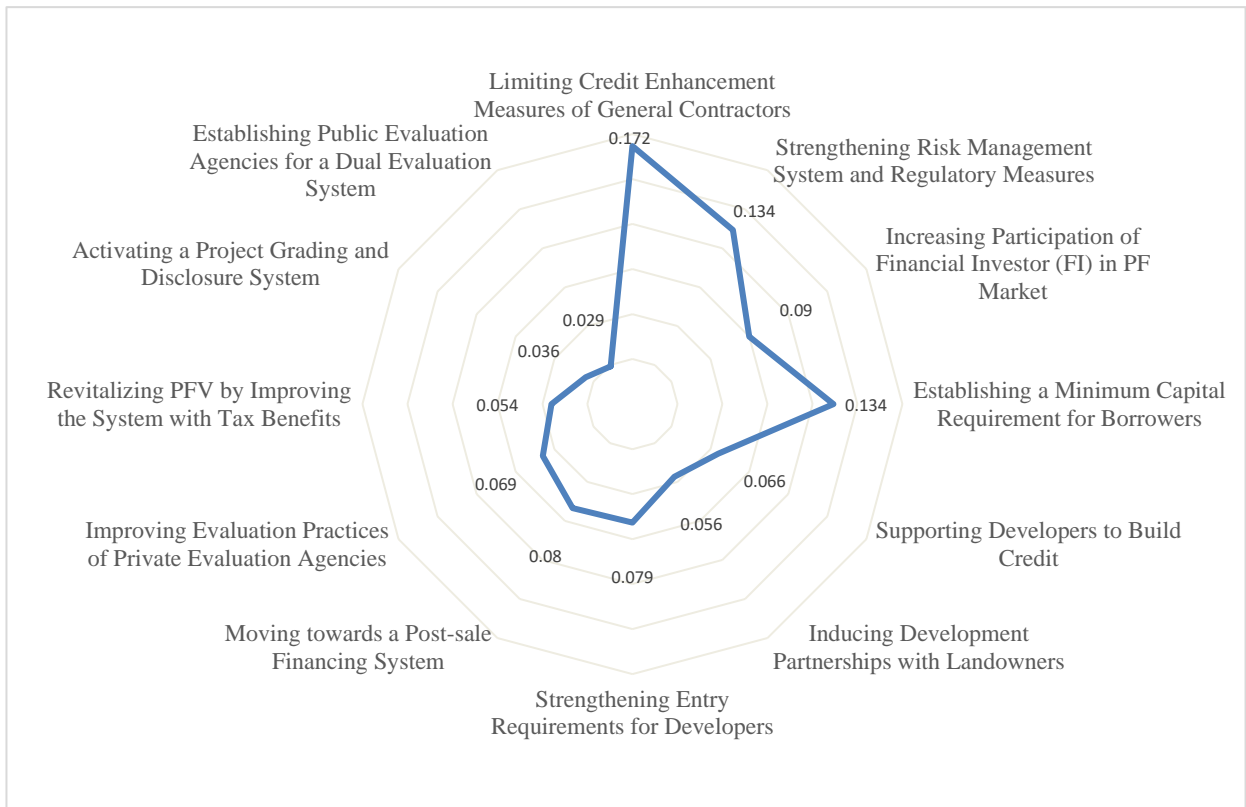


Figure 15: Overall Weight of Financial Institutions

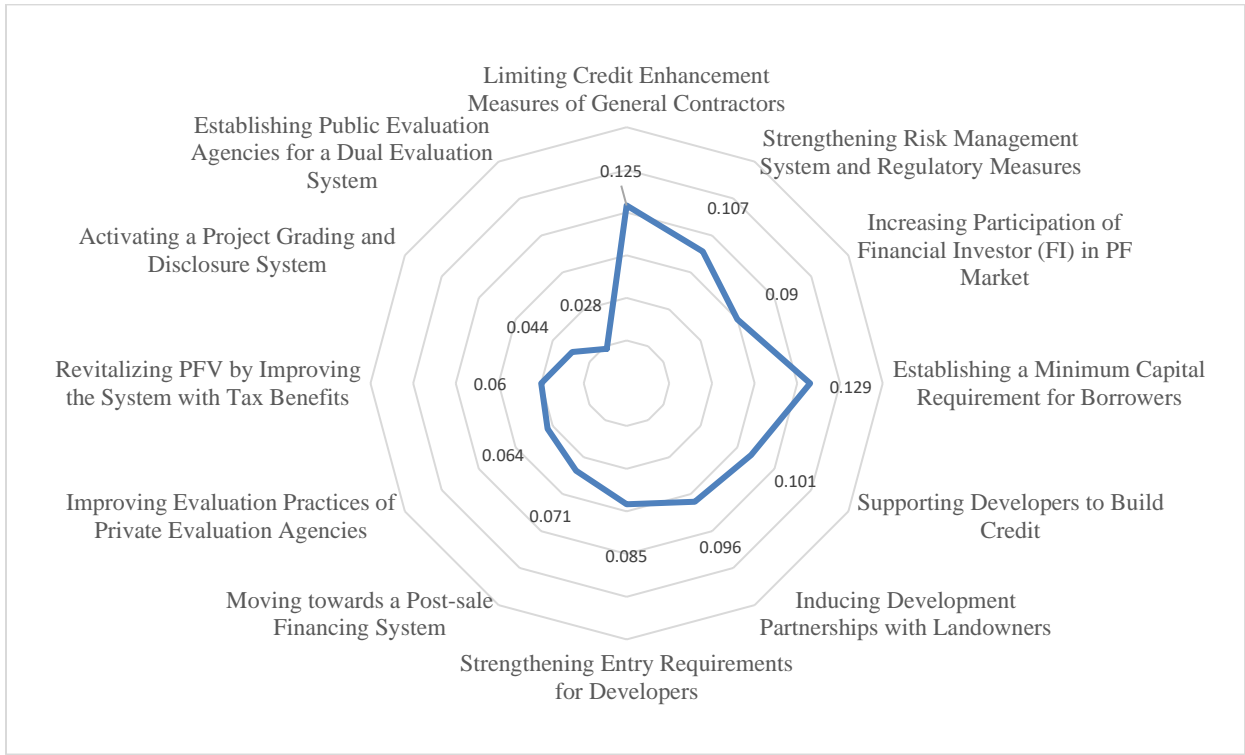
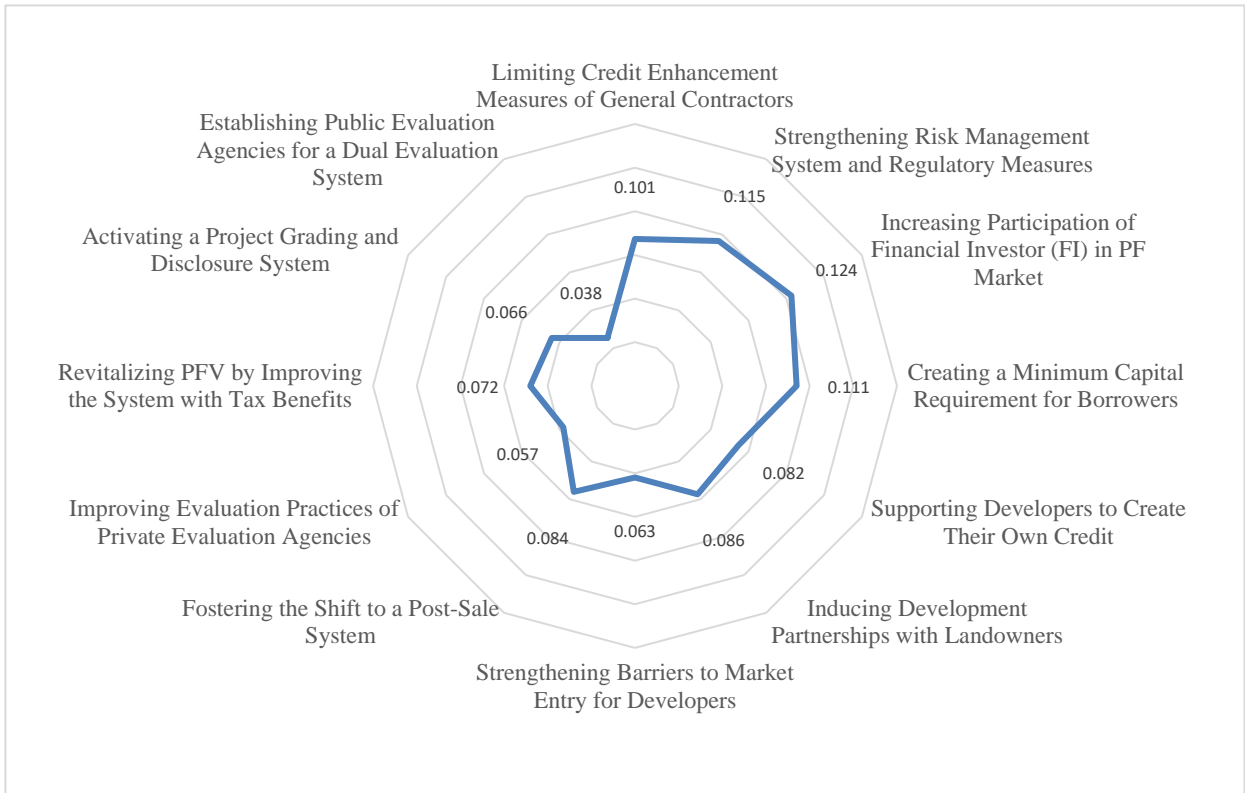


Figure 16: Overall Weight of Other Groups



IV. Conclusion

1. Summary & Implications

The purpose of this study was to uncover the reasons behind the decline of Korea's real estate PF market and to provide suggestions for its improvement. To achieve this, the study consisted of two parts: Literature Review and Case Studies conducted with a qualitative approach. The results were then analyzed quantitatively using AHP analysis to prioritize the improvement plans.

The qualitative research focused on four key areas: “Policy”, “Risk-sharing Structures”, “Developers”, and “Project Evaluation System”. Based on these findings, the following improvement plans were suggested: 1) Strengthening the Institutional and Policy Framework; 2) Activating Risk-sharing Structures; 3) Enhancing the Capacity of Developers; and 4) Transforming the Project Evaluation System.

As a result of AHP analysis that involved breaking down the aforementioned 4 major categories of improvement plans into 12 minor sub-categories, the overall results revealed that “Enhancing the Institutional and Policy Framework” and “Improving the Capacity of Developers” were ranked 1st and 2nd, respectively in terms of major classifications. Within the sub-categories, “Restricting Credit Enhancement Measures for General Contractors” was ranked the highest, followed by “Enhancing Risk Management Systems and Regulatory Measures” and “Increasing the Involvement of Financial Investors in the PF Market”.

The results of the study showed that each stakeholder entity has different priorities and considerations when it comes to PF market. Previous studies that analyzed the risk factors in the Korean project finance market through AHP distinguished between general contractors and financial institutions and identified the differences in priorities based on the respective stakeholder group. Specifically, the study by Kwak and Kim found that general contractors viewed risks associated with general contractors and developers as the most significant, while financial institutions considered financial risks and project risks to be the critical factors.⁸⁹ Thus, it is important to keep in mind that each stakeholder in the PF market has their own unique goals and perspectives. Understanding the needs of each group is crucial when developing measures to improve the market.

⁸⁹ Soo-hwan Kwak and Han-seong Kim (2011). The Weights of Risk Factors in Project Financing Business Regional Industry Review

The findings of this study have significant implications for the future of the Korea's real estate PF market.

First, according to the results of the major categories, the results emphasize the need for the strengthening of the institutional and policy framework, which was identified as the most important priority by stakeholders in the PF market. There is a clear requirement for the policy framework to be improved to advance the Korean PF market.

Second, based on the findings of the sub-categories, it is imperative that Korea should work towards improving its PF market by reducing its reliance on general contractors and by emphasizing the significance of reducing excessive risk exposure in the Korean PF market. In addition, it is crucial to stimulate financial institutions' active engagement in the Korean PF market through investments such as principal investment or mezzanine financing.

Lastly, it is evident that stakeholders have varying perceptions of the importance of different factors affecting the PF market. This highlights the importance of finding a balance between the needs and expectations of different stakeholders through further research and policy-making efforts. This study provides valuable data through a quantitative approach and lays the foundation for additional research using qualitative methods to formulate a more comprehensive policy improvement plan.

2. Directions for Future Research

The study aimed to identify the causes and directions for improvement in response to the contraction of the Korean PF market, utilizing a mixed qualitative and quantitative approach and comparing the opinions of various stakeholder groups in PF market. Despite its contributions, this study has several limitations and suggests the following areas for future research.

First, the focus of this study was limited to the residential development in the Korea's PF market and does not accurately reflect the conditions of other segments, such as offices, shopping malls, and hotels. To obtain a comprehensive understanding of the real estate PF market, future studies should encompass a broader range of development projects.

Second, while most Korean developers are facing financial difficulties due to weak capitalization, this study only analyzed major developers. Further research is necessary to assess a more diverse range of developers and gain a more comprehensive understanding of the Korean PF market.

Lastly, the results of the AHP analysis showed disparities in the relative importance of various factors among stakeholders. To address these differences and provide a consensus-based direction for improvement, additional research is required to understand the reasons behind these disparities. Qualitative methods such as focus group interviews and Delphi surveys among experts from developers, general contractors, and financial institutions could be used to explore policy proposals that can address these differences and provide a consensus-based direction for improvement among all stakeholders.

References

- Pillai, R. (2017). Project Finance: Concepts, Techniques, and Practices. John Wiley & Sons.
- Seok-hun Lee (2019). Trend and Risk Analysis of the Real Estate PF Securitization Market in the Domestic Securities Industry
- Eun-sung Kim and Jae-jun Kim (2008). A Study on the Composition of PFV (Project Financing Vehicles) Used in Large-scale Development Projects
- Eun-yeong Choi (2011). Current Status of Real Estate PF Loans and Improvement Plans
- Guk-hyeong Lee and Yeong-gi Moon (2013). Risk Sharing Plan for Real Estate PF Participants
- EBEST Investment & Securities (2020). Developer and friends
- Jeong-joo Kim (2022). Diagnosis of the Causes of the "Real Estate PF Crisis" and Policy Countermeasures
- Hyun-seok Lee, Jong-chil Shin, and Sung-kyun Park (2011). A Study on Improvement Plans for Project Financing Due to Changes in the Real Estate Market
- Yong-un Ahn and Min-seob Choi (2021). A Study on Real Estate Development Finance Risk Management Plan – Focusing on PFV
- Hsu, C. H., and Fan, J. P. (2017). A model of crowdfunding success: Evidence from Reward-based Campaigns. International Journal of Management
- Jin-su Lee (2018). Comparison of long-term trends in land prices by major countries
- Kyoung-hee Shin (2015). Study of Analysis of Real Estate Project Financing Issues and Activated through Improvement of a System
- Pil-kyu Kim (2022). A Study on the Characteristics and Implications of the Domestic Short-Term Securities Market
- In-hyeok Lee, Son Eun-kyung, and Choi hyun-woo (2010). Hana Finance Info. - Analysis of Real Estate PF Evaluation Models in the United States and Japan
- Yoon & Yang LLC (2022). Seminar on Responding to General contractors in Insolvent PF Workplaces
- Yul-ri Kang (2014). Jipyong LLC - Construction Real Estate Newsletter
- Seok-hoon Lee and Geun-hyeok Jang (2019). Trend and Risk Analysis of the Real Estate PF Securitization Market in the Domestic Securities Industry
- Jeong-joo Kim (2022). Construction & Economy Research Institute of Korea - Diagnosis of the Causes of the "Real Estate PF Crisis" and Policy Countermeasures

- Seung-ho Lee. (2021, December 20) Korean house prices rose 24% in the third quarter, ranking first among 56 major countries. Joongang Ilbo. <https://www.joongang.co.kr/article/25033625#home>
- Bank of Korea (2022). Financial Stability Report
- Information Memorandum of Project A, B, and C
- Bong-cheol and Soo-won Eum (2012). A Study on Failure Factors of Real Estate Project Financing
- Byung-guk Lee. (2022, September 16) Standardizing the monitoring indicators for real estate PF to stabilize an otherwise volatile market. Herald Economics. <http://news.heraldcorp.com/view.php?ud=20220916000381>
- Financial Services Commission (2019). Measures to Improve Management of Risk Exposure in Project Finance
- Jong-deok Park (2009). The Participation and Role of Financial Investors in Real Estate Development Financing
- Restriction of Special Taxation Act
- Se-jin Jeon. (2020, September 03) Elimination of the PFV tax benefits, a fatal blow to the profitability of the business. DealSite. <https://dealsite.co.kr/articles/64845>
- Bok-hui Jeong (2016). A Study on Debt Preservation and Risk Improvement Plans in Real Estate Project Financing
- Hyeon-a Seo (2022). A study on Financing Problems and Improvements in Housing Sale System – Focusing on Real Estate Project Financing
- Su-hong Lim, Ho-gwan Jang, and Sang-yeop Lee (2020). A Study on the Scope of the Recognized Equity Capital of Developer in Real Estate Project Finance Loan Screening
- Hee-nam Jung and Jae-hwan Kim (2013). Real Estate Development Project Assessment System: Introduction and Policy Tasks for the Earlier Introduction of Assessment Schemes.
- Sung-joon Hong (2008). A Study on The Project Financing Application Plan for After Sale in Lots System: Focus on Example of the J Village Reconstruction
- Su-seok Choe (2011). A Study on the Cause for Insolvency of Real Estate PF since the Global Financial Crisis and Its Revitalization Scheme
- Yong-sang Shin (2019). The Changes in Real Estate Market Conditions and the Management of Real Estate Finance Risk by Securities Firms
- Yong-sang Shin (2021). The Trend of Increasing Scale of Risk Exposure in Domestic Real Estate Finance and Policy Response Direction.
- Sam-su Lee and Jong-suk Choi (2015). A Study on the Application of the Mezzanine Financing method in the Urban Regeneration Projects - Focused on case study of Japan
- Sung-soo Koo (2011). Application of tax benefits and problems of Project Financing Vehicles (PFV)

- Ji-eun Ha. (2022. March 16) The unguided urban development perpetuates its brutality... Will the incoming government examine the PFV policy? Invest Chosun.
<http://www.investchosun.com/m/article.html?contid=2022031580206>
- Geun-yeong Kim (2011). A Study on the Problem of a Pre-construction Sale System in Apartment House
- Jae-young Cho (2016). A study on the Measure of Securing Stability of the Project Finance
- Korea Research Institute for Human Settlements (2013). Public Hearing Materials for the Introduction of Real Estate Development Project Evaluation System
- Unknown. (2013. May 07) Pushing for the creation of a public organization to assume responsibility for evaluating real estate development projects. Housing Herald.
<http://www.housingherald.co.kr/news/articleView.html?idxno=8789>
- Jin-su Kim (2022). A Dissertation That Ends in Just One Volume. Seoul: Glider
- Sang-hyeok Seo (2011). Study on the Location Selection of Cosmetics Specialty Stores Using AHP
- Su-jeong Lee and Ho-cheol Kim (2021). Analysis of Important Profitability Factors of Private Rental Housing REITs Using AHP. Journal of the Korean Urban Management Association
- Soo-hwan Kwak and Han-seong Kim (2011). The Weights of Risk Factors in Project Financing Business Regional Industry Review