

**THE MULTIPLE CASE ANALYSIS OF BOARD
INTERLOCK DEVELOPMENT AND STRATEGIES IN
FINNISH FAMILY BUSINESSES**

**Jyväskylä University
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**Author: Zihao Zeng
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Supervisor: Juha Kansikas**



JYVÄSKYLÄN YLIOPISTO
UNIVERSITY OF JYVÄSKYLÄ

ABSTRACT

Author Zihao Zeng	
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Abstract	
<p>This master's thesis employed a qualitative research method, consisting of a systematic review and multiple-case analysis. Firstly, the study conducted a systematic review to examine the current theoretical landscape of board interlocks in family businesses. Then, five small-to-medium-sized Finnish mechanical manufacturing family businesses were then selected as research cases, and the multiple-case analysis was conducted to summarize five different basic models: Traditional Internal Development (TID), External Resource Balance (ERB), Complete External Control (CEC), External Customer-Oriented (ECO), and Internal Self-Growth (ISG). Subsequently, the study compared the advantages, disadvantages, and conditions of applicability for these five models. Finally, the research discussed the analysis of board interlocks from two perspectives: macro-level theories (corporate elites, capitalist economies, and corporate governance) and micro-level functions (marketing, financial, production, technology, customer, and management).</p> <p>The first contribution of this research is to expand the practical functions and theoretical framework of board interlocks with data from actual cases. It compares the significance of different board interlocks for related family businesses through two appointment methods: internal and external appointments. Secondly, this study provided guidance for future development planning of small-to-medium-sized family businesses based on their specific conditions and advantages. Importantly, the research enhanced the theoretical basis of board interlocks in Finnish small-to-medium-sized family businesses by comparing macro-level theories and micro-level functions.</p>	
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LIST OF ACRONYMS

FB	Family Business
BI	Board Interlock
FBBI	Family Business Board Interlock
FFBBI	Finnish Family Business Board Interlock
SME	Small and medium-sized enterprises
R&D	Research and Development
ERB	External Resource Balance
TID	Traditional Internal Development
CEC	Complete External Control
ECO	External Customer-Oriented
ISG	Internal Self-Growth

1 INTRODUCTION

“Corporate elites, capitalist economies and corporate governance are the most prominent themes and areas of research in board interlock. theoretical frameworks are the important dominant research directions in board interlock at present.”

Smith & Sarabi (2020)

To maintain long-term competitiveness in a family business, it is crucial to establish an effective governance structure and ensure active participation of family members (Kansikas & Nemilentsev, 2010). Additionally, collaboration with external professionals is essential for family businesses to acquire new knowledge and skills, which form the core competitive advantage for their development (Kansikas & Nemilentsev, 2010). While business advisors and consulting firms can assist in addressing short-term challenges, incorporating external professionals into the board of directors helps family businesses expand their scale and enhance the learning of professional skills among family members, particularly when facing long-term uncertainty (Laakkonen et al., 2011). Therefore, to truly create unique value in a family business, it is necessary to establish an effective governance structure and actively introduce external professionals to the board to support the development of the family enterprise.

Board interlock refers to a form in which a member of the board of directors of one company serves on the board of directors of another company at the same time (Mizruchi, 1996). For most companies, the term "corporate elite" refers to an informal group of individuals who hold high-level management positions or serve as board members in powerful corporations (Oehmichen, 2018). When they serve as owners or board members of other companies, they have the ability to significantly shape the strategic direction of those companies (Oehmichen, 2018). 'Capitalist economy' refers to the interdependence and competition between firms that leads to firms relying on board interlock to cope with uncertainty and keep them afloat (Smith & Sarabi, 2020). 'Corporate governance' can accelerate information sharing and build trust between firms in the form of board interlock to better govern and manage the firms involved (Smith & Sarabi, 2020). In these three theoretical areas, the "corporate elite" focuses on the shareholders and individuals who serve as board interlocks; "capitalist economy" focuses on the competition or complementarity between businesses; and "corporate governance"

focuses on the specific functions of board interlocks within the internal governance processes of relevant companies (Smith & Sarabi, 2020). The current theoretical system of board interlock is still very incomplete and lacks integration with any system of analysis (Smith & Sarabi, 2020). In the context of board interlock in family firms, 'corporate elite' refers to the different ways in which appointments are made and their strategic implications (Oehmichen, 2018); 'capitalist economy' refers to the way in which families may establish collaborative mechanisms to reduce the impact of uncertainty in order to enhance control or supply chain stability (Barrese et al., 2007); 'corporate governance' refers to the way in which families establish information sharing channels in order to reduce external risk. 'Corporate governance' refers to the creation of information sharing channels by families to reduce external risks (Bazerman & Schoorman, 1983). Therefore, from the main research areas of long-term strategic development in family businesses and the alignment with the board of directors, it is evident that board interlocks serve as a critical approach to addressing the corresponding challenges in the long-term development process of family businesses. It enables family enterprises to attract external talent, access appropriate developmental resources, and acquire professional knowledge. These aspects align perfectly with the requirements for long-term development in Kansikas & Nemilentsev (2010). In other words, the theoretical role of board interlocks provides an implementation pathway for the long-term development strategies outlined by Kansikas & Nemilentsev (2010) for family businesses.

The board interlocks of family businesses in most regions and countries are similar. However, in Europe, interlocks in different countries have different characteristics. The main way in Spain is that the family business uses family members to expand the business and influence the business in the form of interlocking (Salvaj et al., 2008, p. 251). The Netherlands mainly marks the degree of effect of different interlockers in the form of a scorecard (Braam & Borghans, 2014). Interlocking boards in Belgium are detrimental to the profits of individual firms or branches but have no effect on the group as a whole (Valeeva, 2022). Most of these studies are not related to family businesses, and according to the search in the Scopus database, it can be found that there are currently only 17 studies that combine family business and board interlock (Alghami & Hussin, 2021). Therefore, research on board interlocks in Finnish family businesses is currently extremely scarce. The most important corporate interests of family businesses in Finland are the long-term stability of development and the ethical value of corporate development (Shahgholian, 2016). FFBBIs have in fact had a long and stable development in Finland because board interlocks require a high level of long-

term corporate stability and integrity and transparency (Gulati & Westphal, 1999). The long-term stability of the enterprise can ensure the sustainable development of the supply chain; the integrity and transparency of the enterprise can ensure that the interests of shareholders are not be harmed (Gulati & Westphal, 1999). For Finnish family business, good board interlocks not only help companies to stabilize their supply chains, but also help companies to obtain financing, loans and IPO opportunities from more sources (Perrow, 1993). However, there is a lack of research on FFBBIs, and there are no clear criteria for classifying and classifying board interlocks in Finnish family business. For Finnish family business, board interlocks are related to almost all industries, but the most prominent and important industry is the Finnish machinery manufacturing industry. With manufacturing as the core, board interlocks can be radiated to almost all industries, such as logistics, finance, sales services, etc.

- **Research Object and Research Questions**

Family business refers to a business organization where one or more family members have a significant ownership interest and actively participate in its operation and management (Akhter et al., 2022). These businesses can vary in size and span multiple generations (Akhter et al., 2022). Family businesses are classified into three categories: family-owned and family-managed, family-owned but not family-managed, and family-managed but not family-owned (Chua et al., 1999). The currently accepted definition focuses on family-owned and family-managed businesses (Chua et al., 1999). The objectives of studying family business include assessing the size, ownership and management structure, industry relevance, and generational continuity (Sharma, 2004).

The size of a business is determined by factors such as the number of employees, annual sales, and assets. Small businesses typically have around 50 employees, with annual sales and assets under \$500,000. Medium-sized businesses have 50 to 250 employees, with annual sales and assets ranging from \$500,000 to \$5 million. Large companies have over 250 employees and annual operating revenue exceeding \$5 million. The size assessment criteria may vary across industries, with manufacturing relying on production capacity and employee count, while the financial sector considers financial statements and employee numbers (Zahra, 2003; Gustavsson & Amador Regalado, 2020). However, the demand for board interlocks may vary across enterprises of different scales and types. For

SMEs, board interlock plays a crucial role in shaping corporate structure, developing direction, and strategy, particularly when they hold a controlling stake in a joint venture (Veglio et al., 2020). During the process of SMEs' development, factors such as geographical location, resources, funding, and talent can serve as critical constraints. By obtaining suitable board interlocks, SMEs can form resource alliances and long-term development strategies. Additionally, for small and medium-sized enterprises, board interlock serves as a defensive mechanism, helping them reduce information asymmetry and fend off hostile takeovers (Galavotti, 2021). Furthermore, once board interlock becomes a standard practice, other SMEs also emulate the related enterprises, replicating their development models (Galavotti, 2021). From the characteristics of SMEs, it can be observed that research on SMEs can explore the ways in which board interlocks shape the board structure and development strategies of relevant enterprises. For large-scale enterprises, the board structure is relatively stable, and the functions of board interlocks may lean more towards internal governance and functional supplementation.

The development of family business in Finland has evolved over time. Historically, Finnish family businesses were primarily agricultural, but with industrialization, they expanded into manufacturing, trade, and services (Ali-Yrkkö et al., 2007). Later, the focus shifted to the financial sector and related real sectors, followed by globalization leading to international expansion and entry into new industries (Ali-Yrkkö et al., 2007). Presently, Finnish family businesses emphasize sustainable development, corporate social responsibility, and innovation, particularly in industries such as forestry and wood products, manufacturing, retail and wholesale trade, and services (Martínez-Olvera. 2022).

The observation angle and case chosen for this study is the machinery manufacturing industry in Finland. The reasons for choosing to manufacture are diverse: 1) Manufacturing is a very comprehensive industry that can cover the manufacture of equipment in various fields (e.g., medical equipment, telecommunication equipment, agricultural equipment, and energy equipment) (Martínez-Olvera, 2022). 2) The high growth of manufacturing can easily involve the financial sector and the retail sector (Martínez-Olvera. 2022), 3) Although manufacturing in Finland has not developed as fast as the technology and digital industries, it has been a long-established pillar industry in Finland (Ali-Yrkkö et al., 2007).

Board interlocks play a significant role in family businesses, facilitating the introduction of external expertise, access to resources, and professional knowledge. The types of board interlocks are determined internally within family businesses, involving internal family members and possibly external professionals, but the final decision rests with the internal decision-making level of the family. However, there is a lack of data analysis on family businesses with board interlocks in the manufacturing industry. This study aims to explore resource alliances in small and medium-sized Finnish family enterprises in the machinery manufacturing industry, examine the role of different professionals as board members, and reveal the internal development needs of these businesses. It seeks to understand the various forms and strategic significance of board interlocks in different family businesses. The research questions focus on macro-level strategies (capitalist economy, corporate elite, corporate governance) and micro-level practical applications of board interlocks, highlighting their effects on family boards. Based on the information, the research questions of this study are:

What are the main forms of board interlocks in small and medium-sized Finnish family business in the mechanical manufacturing industry? Are there any differences or consistencies in the board interlocks constructed by different enterprises? What is the strategic significance of developing different board interlocks mechanisms for Finnish family business (From the macro theoretical strategies and the micro functional strategies)?

- **Research progress**

As shown in the Table (1) below, to investigate this issue, this study needs to first conduct a systematic review to identify the main forms of board interlocks strategy that have emerged in previous experiences. Then, based on relevant research on board interlocks, the development trajectory and strategic intent of family business board interlocks can be identified. Thirdly, the keywords and research focus of FFBBIs can be inferred based on the logic of FBBIs' development. Finally, this study selects different Finnish small and medium-sized family businesses and compare them using the FFBBIs keywords and a multiple case analysis approach to discover the strategic differences and characteristics that arise when these businesses use board interlocks.

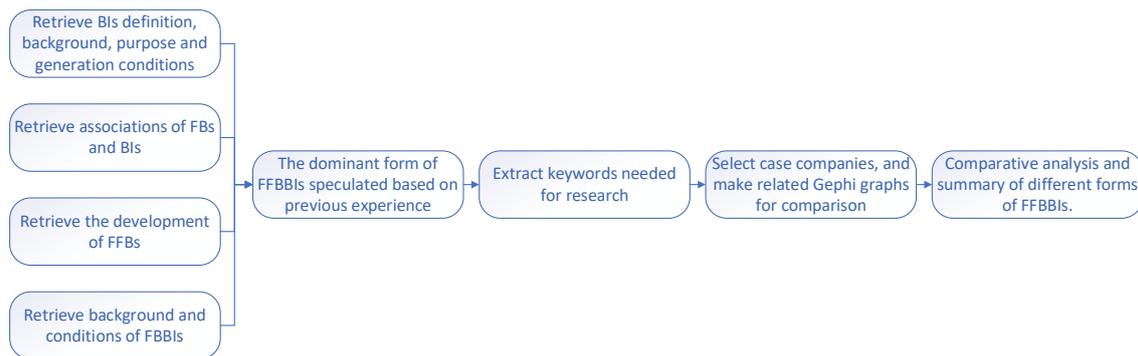


Table 1: The specific process of the research

The first part of the article primarily introduces the need and elements for long-term stable development in family businesses, leading to the importance of board interlock for the long-term development of family businesses. It then analyzes the role and development process of board interlock in small and medium-sized enterprises. Following that, the study presents the development of family business board interlock in different regions and countries, with a specific focus on the development status of small and medium-sized family businesses in Finland. Finally, based on this foundational information, the research questions are proposed. The research questions consider the main research areas of board interlock in family businesses in current theory and the practical role of board interlock in Finnish family businesses.

The second part of the article mainly provides the specific background of the study. Firstly, it discusses the reasons and context for the emergence of the board interlock concept and how the research domain of board interlock has extended beyond the "capitalist economy" to other areas. It then analyzes the current status of board interlock in family businesses and the reasons behind these conditions, refining the key keywords of family business board interlock (appointment methods, industry structure, and shareholding patterns). Finally, the article explores the main roles of these three areas in family business board interlock.

The third part of the article expounds on two main research methods: systematic review and multiple case analysis. Firstly, the rationale and specific roles of systematic review are presented. The study then conducts a systematic review by searching appropriate articles and data according to different categories. Thirdly, the rationale and role of using multiple case analysis are described, along with the criteria and process for selecting cases. The study selects suitable cases and categorizes them using different colors based on industry and appointment methods. Lastly, this section systematically explains the effectiveness and reliability of the research.

The fourth part of the article first summarizes the conclusions of the systematic review and multiple case analysis. Then, through case descriptions, the article summarizes appropriate theoretical models for different cases and elaborates on the specific role of these theories based on publicly available information and some valid annual reports. If relevant public information is lacking, the article makes inferences based on the available information. Thirdly, this part compares the advantages and disadvantages of different theoretical models and further categorizes the involved industries into different types based on functional diversity.

The fifth part of the article focuses on the validation of large-scale cases. Since the earlier sections mainly involve SMEs, the analysis of large-scale cases helps determine whether these basic models can be applied to large family businesses. During the validation process, this part also retrieves third-party publicly available information to test the validity of the final model.

The sixth part of the article is divided into three sections: answering research questions, theoretical significance and practical implications of the research, and limitations and future directions of the study. In the section on answering research questions, the article addresses the details of the three research questions and separately discusses the macro theoretical comparison and micro functional comparison in the third question. In the section on theoretical significance of the research, the article discusses the contributions of systematic review and multiple case analysis in three different research domains. Regarding the limitations of the research, the article also highlights the current bottlenecks in the research and identifies major areas for future investigation.

Finally, in the seventh part, the article summarizes the research findings and practical significance of the study on board interlock in Finnish family businesses using two different research methods.

Therefore, the main objective of this study is to explore the main forms of FFBBIs. In terms of theoretical development, the systematic review conducted in this study can summarize the historical relationship and regional differences between family businesses and board interlocks. Meanwhile, the multiple case analysis can summarize and compare the conditions and purposes of different board interlocks strategies horizontally. It can also coordinate the forms of board interlocks of relevant enterprises to discover which industries board interlocks have the most significant impact on manufacturing.

In terms of family businesses, the systematic review conducted in this study can help local enterprises discover the main forms of local board interlocks strategies and the affected conditions through research on family business board in-

terlocks. Meanwhile, the multiple case analysis can help Finnish family businesses locate their suitable board interlocks strategies based on relevant conditions and local characteristics.

To ensure transparency in my research, I acknowledge the use of artificial intelligence (AI) software and tools in this article. These software and websites primarily include Grammarly, ChatGPT, and Elephas, which are utilized to enhance the wording, grammar structure, and paragraph organization in the article. Therefore, to ensure the absence of factual errors and inaccurate descriptions in my content, I have also invested additional time and effort into reviewing and verifying the modified content for grammar and descriptive errors. Additionally, I have employed AI detection software from Quill.org to ensure that the content of my paper is the result of my own efforts. Hence, while AI software aids in improving grammar and wording, it does not replace or diminish my academic contribution.

2 BACKGROUND

The purpose of this chapter is to present the main content of the literature review. Firstly, the first subsection of this chapter discusses the definition of board interlocks and how they are connected to "capitalist economy," "corporate elite," and "corporate governance" in terms of their development history. The second subsection primarily addresses the current development patterns and main functions of board interlocks in family businesses. It also highlights significant differences in the forms of board interlocks guided by the appointment methods of family business shareholders. The third subsection elaborates on the development characteristics of family businesses in Finland. The fourth subsection focuses on the main research areas of board interlocks in family businesses, specifically the industrial structure and ownership patterns. By combining the content of these four subsections, one can clearly identify the theoretical and functional characteristics of board interlocks in family businesses and understand their potential effects on Finnish family businesses.

2.1 Birth and Definition of Concept

Prior to the 1990s, the birth of 'board interlock' concept was mainly based on the financial needs of related entities in the field or on the cooperation monopoly system between large enterprises (Mizruchi & Stearns, 1988). However, board interlocks have undergone many changes now, especially for different fields and systems. A 1981 study of 456 Fortune 500 manufacturing companies showed that more than 70% of the companies had at least one senior employee serving on the board of directors of financial institutions (Mizruchi, 1996). Most interlocks of enterprises are interlocks between manufacturing or industrial and financial companies (Mizruchi, 1996). In addition to financial and financial needs, board interlock is an important tool and guarantee for dealing with trust security between resource-based enterprises (Mizruchi, 1996). Mizruchi & Stearns (1988) believed that important resource-based companies generally use board interlock to help both companies determine the stability of resource supply. This is how Board interlocks formed a theoretical system in terms of 'corporate governance' and 'capitalist economy'.

Mizruchi (1996) historically defined interlocking boards as business forms in which one organization's board members simultaneously serve in another. The first period of rapid development of board interlock among enterprises was the 1950s. Due to the rapid development of business and the continuous expansion of the scale of different enterprises, the board of directors of large companies has developed into the form of internal directors as well as external directors. Inside directors are those shareholders who are primarily associated with the company (usually inside directors refer to the company's chief executive, senior executives, retirees, and family members). External share-holders refer to non-core organizations and individuals, which mainly include executives of other companies, financial institutions, etc. This internal and external interlocking mechanism is the first period of rapid development of board interlock. Since board interlock is related to resource dependence between firms during this period, profitability will increase with the increase of board interlocks, but after it increases to a certain extent, profitability will gradually decrease (Mizruchi & Stearns, 1988).

For different businesses and individuals, the motivations and purposes of board interlock are also diverse. First, board interlock can help organizations increase legitimacy, as syndication between businesses can help businesses increase their own creditworthiness and thus increase the likelihood that banks will increase lending. Second, board interlock is a tool that individuals use for career planning and financial compensation. Third, board interlock is driven by company information or by personal relationships between company managers (Mizruchi & Stearns, 1988). Therefore, since the strategy, structure, and performance of the enterprise are affected by the relationship with other companies under certain circumstances, the board interlock between enterprises increase the complexity of the board of directors of the enterprise. The increased complexity of corporate management and boards can help companies avoid risk-taking or activism to some extent, but it also leads to poorer operational efficiency, employee factions, and internal friction (Mizruchi & Stearns, 1988) (Heemskerk et al., 2016). The meaning of 'corporate elite' refers to certain professional individuals providing relevant companies with the experience and skills they need in the form of board interlock. Thus, the "enterprise elite" system of board interlocks is formed based on the above development process. It is not only a demand of enterprises for elites, but also a way for individuals to seek self-development.

- **From Resource Alliance to Corporate Governance**

Due to the failure of Keynesianism in the 1970s, banks began to shift from relationship-based financing to transaction-based financing. This indirectly led to a sharp reduction in the number of board interlocks at that time. During the 1980s, the financial sector in different countries loosened controls on capital, so capital was quickly concentrated in a few large banks. This directly led to the accelerated disappearance of the interlocking of banks, trusts, and insurance companies. In the 1990s, newly promulgated corporate governance norms in the United States prevented relevant directors from holding multiple directorships at the same time (Mizruchi, 1983). In the mid-2000s, the board interlocks of most American companies had broken down, but this did not affect the prevalence of managerialism. Corporate elites are increasingly turning to localized structural power and autonomy, and less reliance on collective resources (Heemskerk et al., 2016).

An overall analysis of the concept and details of board interlocks (as shown in Table 2) reveals that Mizruchi (1983) proposed the influence and development process of board interlocks in different industries, as well as the restrictive Brighton legislation against horizontal monopoly of board interlocks. However, Zajac (1988) argued that most of the functions of board interlocks were hypothetical, and there was no empirical evidence to prove that board interlocks could create a monopolistic situation among companies. According to relevant studies, this view is a survivorship bias, as companies that have already monopolized and those that have not formed a monopoly will not leave such obvious investigative evidence (Gulati & Westphal, 1999). Even so, most resource alliances based on Board interlocks will be labelled as monopolies. Therefore, the resource alliance of "capital economy" began to be greatly reduced, and the board interlock of "corporate governance" began to dominate.

Subsequently, Perrow (1993, p. 391) believed that the intersection of a company's board interlocks is not only the mutual holding of equity, but also the mutual restraint of managerial power. Meanwhile, Davis (1996) believed that the purpose of board interlocks is a complex system that can be a means for enterprise managers to seek high salaries, a strategic way for enterprise mergers, and a behavior of strategic defense. Davis (1996) considered board interlocks as an embedded social structure, and its ultimate goal is to improve the composition structure of the board of directors and equity incentive policies. It can be seen that Davis (1996) tends to believe that board interlocks are an embedded development model, and the way to improve companies is to change the direction and model of development by first improving the equity structure.

This point was further emphasized by Davis & Greve (1997) in the development strategy of enterprises: the strategic defense mechanism of enterprises (such as poison pills and golden parachutes) is an important result of improving the board structure. Therefore, Davis & Greve (1997) further proposed that structural embedding, director norms, and cultural embedding determine the speed and direction of the company's adaptation to the relevant fields. However, Mizruchi (1996) defined board interlock as a commercial form in which a board member of an organization concurrently serves in another company in the simplest way, because he believed that board interlocks not only have social embedding but also have important economic rationality, which is an important way for enterprises to balance their own development.

The theoretical development of board interlock has led to a reclassification of its main theoretical domains. According to Smith & Sarabi (2020), a systematic analysis revealed that current research on board interlock primarily falls within three main theoretical domains: Corporate elites, capitalist economies, and corporate governance. Although these three domains represent the mainstream directions of board interlock research, Smith & Sarabi (2020) argue that the most important studies should focus on the theoretical frameworks and the value of board interlock in different systems.

- **Advantages, disadvantages of Board interlock**

board interlocks have advantages and disadvantages for enterprises. The most obvious benefit is that board interlocks can help related enterprises to obtain key resources and financial needs (Davis & Greve, 1997). In addition, board interlocks can help enterprises stabilize the upstream and downstream supply chains and share more external risks (Davis & Greve, 1997). However, when the leverage effect of board interlocks is not strong enough, the relevant enterprises will waste limited resources and time (Mizruchi & Stearns, 1988). Meanwhile, if there are too many board interlocks in an enterprise, the structure of the directors will be more complicated, and the administrative efficiency of the enterprise will be greatly reduced (Mizruchi & Stearns, 1988).

Finally, Gulati & Westphal (1999) believed that board interlocks are an important way for top managers of enterprises to establish high credibility social networks between companies, which can build horizontal and vertical strategic

alliances. However, board interlocks have a dual nature. They can help companies obtain development channels, but they can also lead to illegal activities or loss of control over the board of directors. Therefore, it can be summarized that board interlock refers to a commercial form in which a board member of an organization concurrently serves in another company, and its execution may be based on social embedding or economic rationality. Its purposes can be divided into: 1) Help companies improve themselves by adjusting their board structure. 2) Stabilize the supply chain and cooperation mechanism. 3) Increase the legitimacy of companies. 4) Help companies formulate reasonable strategic plans.

Authors	Definitions	Key Words
Zajac (1988)	The functions of BIs are more hypothetical than actual. There is no evidence that BIs are deliberate monopolies formed through cooperation between competing firms.	monopoly uncertainty
Mizruchi & Stearns (1988)	BIs is a method for companies to obtain needed resources, increase the legitimacy of companies, promote political unity among companies, and help individuals with career planning. BIs can be driven by business needs or personal relationships.	Combine vertically, resource, legality, personal career
Perrow (1993, p. 391)	BIs connects and stabilizes the head enterprises and downstream enterprises in the supply chain, which greatly improves the administrative efficiency of enterprises and establishes a trust cooperation system. The intersection of BIs of enterprises is not only the mutual holding of equity, but also the mutual restraint of management power.	Stable supply chain, reputation system, management rights
Davis (1996)	The form of BIs can be a means for corporate managers to seek high salaries, a strategic method of corporate mergers and acquisitions, and behavior of strategic defense. BIs are embedded social structure, and changing the incentive structure of equity cannot reform the board of directors.	Personal Planning, Strategic M&A, Strategic Defense, Social Embeddedness
Mizruchi (1996)	Interlocking refers to a business formation in which a member of the board of directors of one organization also serves on another firm.	Board cross
Davis & Greve (1997)	The development of BIs in the 1980s led to a wave of acquisitions among companies, and thus derived corresponding defense mechanisms: poison pills and golden parachutes. However, this wide-ranging takeover between firms also complicates the social linkages between firms. Therefore, structural embeddedness, director norms and cultural embeddedness determine the speed and direction of an enterprise's adaptation to related fields.	Strategic defense, structural embeddedness, cultural embeddedness, director norms.

Gulati & Westphal (1999)	BIs is an important way for senior managers of enterprises to establish a social network with high credibility, and it can build horizontal and vertical strategic alliances. However, BIs have two sides. It may cause enterprises to commit crimes or lose control over the board of directors.	horizontal and vertical, Duality
Smith & Sarabi (2020)	Corporate elites, capitalist economies and corporate governance are the most prominent themes and areas of research in board interlock.	Corporate elites, capitalist economies, corporate governance

Table 2: Historical process and different aspects of board interlock definition.

2.2 Current status of the family business board interlocks

- **Theories and Functions**

The form of family business board interlock may be cooperation between companies out of interests or resource needs, or it may be a way for family companies and individuals to strengthen the family's control over the business through different appointment methods (Mizruchi, 1996). Enterprise-to-enterprise cooperation emphasizes the way of board interlocks to ensure the status of the family in related industries. This is similar to the principle of economic rationality in the family business and personal interlocks. The ways of the family business and personal interlocks are mainly divided into two ways: direct appointment within the family and introduction of external shareholders into the management. The former is based on the principle of social embeddedness, and the latter is based on the principle of economic rationality (Caiazza et al., 2022).

Chua et al. (2006) believed that the role of board interlock in family businesses is irreplaceable. First, using external interlockers or establishing a relevant trust community can help the family business discover the business's problems from the development of more similar businesses. However, Chua et al. (2006) believe that family businesses lack trust and security for external interlockers, which is also a security risk that family businesses may face in the future. Second, board interlock among family businesses may depend to some extent on geographical distribution. Research by Chua et al. (2006) shows that families living

in the same area are more likely to develop together in an interlocking manner. Because the shortening of geographic distance can help people build trust systems better. Third, external interlocking can help family businesses avoid power struggles and conflicts among family members. The study of Miller et al. (2003) found that most of the decline of family businesses is caused by the outbreak of conflicts within the family, and the establishment of a third-party interlocking system can help the leadership of the company to see the risk-inducing mechanism in advance and protect it.

The research of Barrese et al. (2007) found that board interlock can help the family business to maintain a relatively stable position in the stock market and economy and help the business to control the risk factors of the business well. Meanwhile, for family businesses, interlockers are a tool to strengthen family management (Galatasaray University, Turkey & Ataay, 2016). The internal chain mode of the family business is mainly divided into two modes: horizontal management and vertical management: horizontal management means that the enterprise can exchange management positions with different board interlock companies and learn related experiences better; vertical management refers to the absence of relevant resources, skills, and personnel, enterprises use board interlock to supplement the development gap of enterprises (Galatasaray University, Turkey & Ataay, 2016). Galatasaray University, Turkey & Ataay (2016) found that family businesses use horizontal interlocking more frequently than vertical board interlock because horizontal board interlock can help family members learn professional skills and experience more quickly and strengthen their control over the business. Therefore, family businesses can use board interlocks in two ways, horizontally and vertically, to ensure the stability of the enterprise's supply chain, provide channels for family members to learn, and strengthen the family's control over the enterprise.

Caiazza et al. (2022) found through empirical analysis that the affiliation relationship between enterprises and the embeddedness of industries is the key to family business board interlocks. Generally, the purpose of the combination of the family business and board interlock is to maintain the hegemony of the ruling class and increase the scarcity of business dependence on the family (Caiazza et al., 2022). Unlike non-family businesses, which are more inclined to use equity financing to achieve growth, family businesses are more inclined to establish links with banks, because this helps the family control the company by managing the family's dependent debt. Thus, whether it is cross-shareholding or ordinary shareholding, the purpose of establishing an interlocking network in a family

business is to expand and strengthen the influence of the family on the entire group.

- **Internal Appointments**

Therefore, through the above analysis, it can be found that the current family business uses board interlock in two ways: 1), The management of the family business strengthens the control over the related business by appointing different family members as the managers or shareholders of the related business (Philippines & Yu, 2022). 2), Family businesses help the family strengthen control over the business or help family members learn more knowledge and skills by introducing external managers or shareholders as interlockers (Jeong et al., 2022). The source of the first way is the social embeddedness of board interlock, which is dominated by interpersonal relationships of board appointments (Davis, 1996). The second method highlights economic rationality, and the appointment of such directors is often to ensure the normal completion of the company's economic mission (Bazerman & Schoorman, 1983).

On the one hand, the main advantage of the first way is obvious. Systematic appointment of family members to board positions that build management capacity can help family businesses build a management resources network. Compared with non-family enterprises, family enterprises are more inclined to appoint family insiders to prestigious enterprises, because this helps family members develop corresponding knowledge, skills, and reputation (Jeong et al., 2022). The family business board interlock alleviates gender or racial conflicts in some regions to a certain extent. For example, family businesses in India use interlocking to appoint some women within the family as managers (Tumbe, 2022).

On the other hand, although the family owner can control and protect different branches through board interlocks, this strategy may instead form a drag on the development of the family business during the dynamic development process. However, compared with non-family enterprises, family enterprises are more likely to lead the reform during the period of industrial transformation. Because the control of the board interlock of directors in non-family companies is more decentralized and independent, this is not conducive to the voting of the new board of directors in the company (Caiazza et al., 2022). Therefore, family members also have great risks in FBBI, and the biggest risk is that family members may conduct unethical behaviors out of personal or family interests. Second, too many family members may cause an imbalance of power in the enterprise

and thus limit its development of the enterprise. Third, the betrayal of family members can lead to huge losses of information and finances of the family business. Fourth, unlike the independence of non-family businesses, the losses caused by decision-making mistakes of family businesses may be much greater than those of non-family businesses (Cyr et al., 2023).

From a "capitalist economy" perspective, family businesses rely on cooperators and are deeply embedded in these relationships during their development (Roessler, 2005). For family members, it is crucial to help the family business maintain stable supply chains and funding channels (Roessler, 2005). In the process of business development, the family must not lose sight of long-term planning for the company, as it forms the basis for further cooperation between businesses (Roessler, 2005). Therefore, for family members within the family business, serving as board interlocks not only helps stabilize the development of the supply chain but also continuously improves the business model of the family enterprise (Davis, 1996).

Based on "corporate governance," family businesses may experience tensions, role conflicts, power struggles, and succession challenges among family members during their development (Aronoff & Ward, 2016, p. 12). To solve these complex problems, the best way is to use internal appointments to create interest ties between different family members and strengthen the expansion of the company's scale and business extension (Aronoff & Ward, 2016, p. 38). Therefore, one of the purposes of internal board interlocks in family businesses is to facilitate business expansion and innovation, potentially resolving internal conflicts within the family.

- **External Appointments**

The second way is to introduce external interlocks into the family business as members of the board of directors, which can help the company maintain a rational development model and a smooth transition. The biggest advantage of this approach is divided into two points: external and internal: 1), When the family business encounters the threat of external peer competition or equity disputes, the external introduction of board interlock can use their professional experience and technology to resolve the crisis. 2), When a family business encounters conflicts in the distribution of power within the family, the externally introduced board interlocks could serve as third-party witnesses to help the family smoothly transition the development and inheritance rights in business planning. However,

such interlocks may also bring corresponding crises to the enterprise: 1) The idealized experience and methods of newly appointed managers may not be suitable for the development and survival of the enterprise in reality, and the experience of such managers often lags behind (Rector, 2005). 2) The introduction of external interlocks may increase the third-party risk factors of the family business, such as data security, private information within the family, and so on.

Based on the theories of 'corporate governance' and 'corporate elite', it is an important value of board interlocks to introduce relevant personnel from outside the family to help related family businesses stabilize family power or get out of the 'development dilemma' (Chrisman et al., 2010). From the perspective of 'family governance', the 'development dilemma' of family businesses mainly includes: 1) opportunism caused by family agents' bounded rationality and information asymmetry; 2) The relationship between the board and performance is not clear enough to lead to higher agency costs. The best approach to address the first problem is interest alignment and proxy monitoring (Chrisman et al., 2010). An important way to coordinate interests is to formulate a reasonable development strategy or problem-solving method for the family business; agent supervision refers to the rational supervision of the family management by third-party personnel or institutions. Both of these aspects are covered by the functions of the board interlock. The best way to solve the second problem is to balance the development interests of the family and the business, and take the interests of the business as the focus of development (Chrisman et al., 2010). One of the functions of the board interlock is to stabilize the interests of the managers of the enterprise with "economic rationality".

From the perspective of "capitalist economy" of enterprise development, the source of sustainable competitive advantage of a family enterprise is based on the availability of strategic resources of the enterprise, these resources include human resource, social capital that the enterprise can utilize (reputation system of the family and suppliers, etc.) , patient capital (directed system of long-term cooperation) and survival capital (personal resources of family members) (Siebels & zu Knyphausen-Aufseß, 2012). Interestingly, the function of board interlock is also an important way to solve the above four aspects. First of all, board interlocks can provide external talents for family businesses, thereby promoting the enrichment of personal resources (professional knowledge, management experience and development channels) of family members in the business. Secondly, the introduction of an external board interlock for the family business itself is a

directional long-term strategic system, which is the key to stabilizing the external supplier and credit system.

In general, the differences in appointment methods are determined by the specific circumstances of the company. Different board interlocks play different roles in family businesses and their associated companies, and each role is accompanied by varying degrees of risk factors.

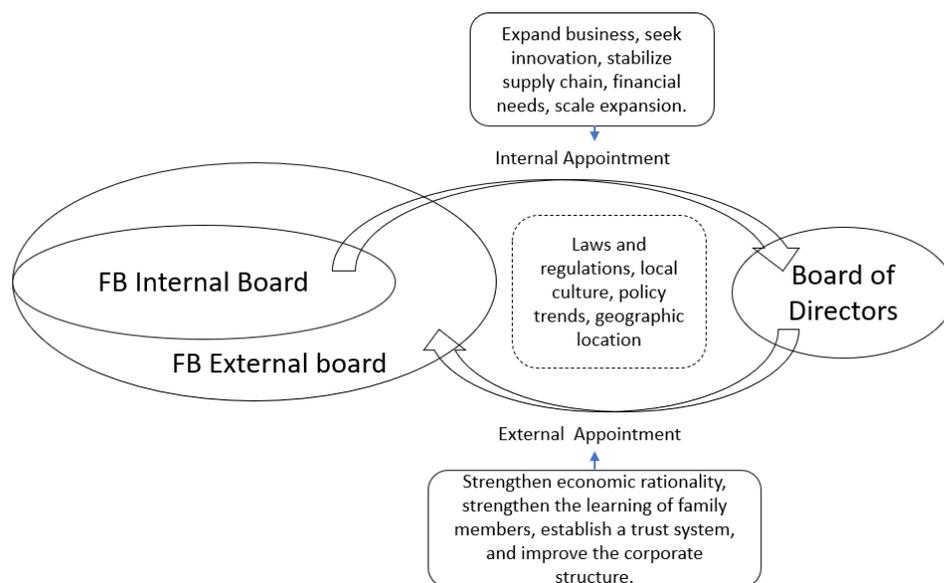


Figure 1: The current main forms and purposes for family business board interlock.

The analysis above reveals that the strategies of family business board interlocks can be mainly categorized into two types: internal appointment and external appointment, which can be determined by the 'Orbis' system and the appointment information of the company. The main purpose of internal appointment is to expand the family businesses' related business, promote innovation and reform, stabilize the upstream and downstream of the supply chain, seek financial support, and enlarge the scale of the enterprise. The main purpose of external appointment is to establish a trust system and enhance communication with the supply chain or partners. Meanwhile, family members can also learn more knowledge from the relevant personnel appointed externally, thus improving the industry structure from within. Whether it is internal or external appointment, they are subject to relevant laws and regulations in the region and local culture, and geographical location is also a major limiting factor (as shown in Figure 1).

2.3 Finnish family businesses

Family businesses in Finland are different in terms of values compared to other regions. First of all, most family business families in Finland are openly acknowledge their family's success and wealth, but they don't think of themselves as generous or charitable. Such values to some extent underline the pragmatism and honesty of most family businesses in Finland (Koiranen, 2002). Meanwhile, this kind of survey also denies the hypocritical tendency of Finnish family businesses, because companies in other countries and regions generally emphasize their charitable and religious nature in order to win strong social approval (Koiranen, 2002). Secondly, the research of Rautamäki & Römer-Paakkanen (2016) found that the next successors of Finnish family businesses are generally happy to develop in the family business for a long time, and they are also very obedient to their early appointments in the business, because most people feel that the atmosphere of the company is very warm and the interpersonal relationship is very harmonious. Therefore, most heirs of Finnish family businesses are willing to take over the business of the family business and develop the business better (Rautamäki & Römer-Paakkanen, 2016). This is very different from family businesses in other regions. For example, lots of family businesses in the United States in the early days would be involved in long-term legal disputes because of the legality of inheritance rights (Lane et al., 2006).

A few decades ago, individual entrepreneurs in Finland were the largest group of businesses, accounting for nearly half of the total volume (42%) (Littunen & Hyrsky, 2000). Of these, 70% were family businesses, and almost all were small and medium-sized enterprises (Littunen & Hyrsky, 2000). Currently, the proportion of family businesses in Finland is difficult to calculate, but they contribute more than 20% of GDP and 23% of employment (Finland-Fam-Bus, 2021). Littunen & Hyrsky (2000) believe that the main aspects affecting the development of Finnish small and medium-sized family businesses are the nature of the business, organizational characteristics, family financial expectations, and owner motivation. Virtanen & Heimonen (2011) found in their study of family businesses in eastern Finland that the main types of entrepreneurships in Finland are family business entrepreneurship and student entrepreneurship. Unlike these non-family businesses, Finnish family businesses do not rely on external risk capital for entrepreneurship, but rather on internal resources and retained earnings. However, as the business develops, these family businesses gradually seek external

funding. For Finnish small and medium-sized family businesses, innovation and risk-taking are important factors in their high-speed development (Sorama & Joensuu-Salo, 2022). However, most family businesses are conservative in their business intelligence development, so most family business board interlock forms are completed through internal appointments to achieve economies of scale.

Compared with other types of businesses, Finnish small and medium-sized family businesses have higher profit margins and self-sufficiency (Pihkala et al., 2022). Therefore, in the early stages of business development, Finnish family SMEs are not lacking in funding, profit, and self-sufficiency. The important transition is when the business begins to expand externally or seek outside funding (Sorama & Joensuu-Salo, 2022). In this dynamic process, Finnish family businesses can continue to increase their dependence on external supply chains and funding, and family members can use the company's resources, networks, and opportunities to develop new possibilities for business development (Sorama & Joensuu-Salo, 2022). From the above process, it can be seen that in the early stages of Finnish family business development, they focus more on reputation and opportunities, as they do not lack early profit margins and self-sufficiency. Meanwhile, the development direction of Finnish family businesses is more inclined to strengthen their dependence on and cooperation with external resources after the stable development period of the company. This study observes whether Finnish family businesses conform to this development model from the perspective of industry chains and appointment methods. Although this study is static in nature, it is also of great significance for observing current Finnish family-owned SMEs.

2.4 Industry Structure

- **Intra-industries**

The crudest generalization of intra-industrial is 'occurring or being in the industry'. For family businesses, intra-industrial refers to alliances of family businesses in the same category and the corresponding upstream and downstream of the industry. Whether family businesses are in a vulnerable period or in a strong strategic position, resource alliances of similar firms must be considered (Eisenhardt & Schoonhoven, 1996). If a family business is in a weak position, resource alliances help related family businesses to supplement the firm's scarce resources;

if a family business is in a strong position, resource alliances can help related family businesses to increase the bargaining power of scarce resources (Eisenhardt & Schoonhoven, 1996).

An important condition for forming resource alliances of family businesses is board interlocks because board interlocks can help the corresponding firms to establish a community of interest. Important strategic resources required by firms are often provided by the corresponding resource providers or technology providers (Kogut & Zander, 1992). For a family business upstream and downstream, a stable supply relationship is an important foundation for the firm's growth from external environmental threats. Meanwhile, new ways of cooperation are often not easy to establish, but board interlocks can not only strengthen the relationship of interest but also help family businesses to use family members embedded within the supply chain to gain access to relevant resources or knowledge (Ingram & Roberts, 2000). Therefore, intra-industrial is an important indicator to be considered in this study. Meanwhile, Gephi can analyze the weights and densities of different industrial board interlocks by this indicator, and thus further analyze the main types of FFBBIs.

- **Financial**

Benton (2019) found by analyzing the finances of different firms that the need for financial interlocking increases when the firm's profitability, and ability to repay debt decreases. Mizruchi (1996) found in the 1980s that the number of finance-related board interlocks was increasing until around 2000 when the number of board interlocks only started to decrease continuously due to increasingly strict standards of financial regulation (Heemskerk et al., 2016). For family businesses, financial board interlocks mean broader access to capital and more consistent financial performance (Watkins-Fassler et al., 2016). However, finance is not a universal stabilizer either, as the link between performance and board interlocks depends largely on whether the governance of the firm is sound (Watkins-Fassler et al., 2016). Boards of directors in family businesses tend to be less large than in non-family firms, so good corporate performance is more demanding for the decision-makers in family businesses. In family businesses, the degree of demand for Financial is determined based on the return on corporate assets compared to intra-industrial demand for family businesses' resources and technology (Pombo & Gutiérrez, 2011). For family businesses, financial board interlocks are an important tool for transforming, expanding, going public, seeking

partnerships, and scaling (Bertoni & Randone, 2006). Therefore, financial investment board interlocks are one of the indicators that this research focuses on. I would observe the specific role of these board interlocks in related companies through different cases and appointment methods.

2.5 Shareholding Method

- **Common Shareholdings**

Common shareholders are individuals, organizations, and institutions that hold common stock in a business (Roose & Graham, 1955, p. 126). Holders of common stock are granted the right to vote on the board of directors of the relevant enterprise, to participate in the formulation of corporate policy, and to vote on issues related to the enterprise (Roose & Graham, 1955, p. 129) (Hansmann, 1988). Meanwhile, holders of common shares can also have the right to receive dividends. In a bankruptcy situation, common shareholders are usually the last to receive any proceeds from the liquidation. The company will pay debt holders first, preferred stockholders if there is a balance, and common stockholders last (Roose & Graham, 1955, p. 128). The scope of common stock is extremely wide which includes not only the original stock at the beginning of the company's establishment, but also the new stock issued later (Roose & Graham, 1955, p. 128). Friedman (1957, p. 221) believed that it is far from enough that consumption and savings are only related to current income. Individual consumption behavior is based on their expectations of permanent income levels. Similarly, corporate shareholders' confidence in the company also comes from their expectations of future permanent income. Vilaseca (2002) empirically found that the more common shares held by family members in family businesses, the less commitment the company will get; the more common shares held by shareholders outside the family, the more commitment the company will get. In the F-PEC scale (The Family Influence on Power, Experience, and Culture), which evaluates the influence of the family on the enterprise, the two most important evaluation indicators in the cultural component are the overlap of family and enterprise values and the family enterprise commitment (Astrachan et al., 2002). Therefore, family members' holdings of corporate common stock and shareholders outside the family's one-way holdings of related family businesses can roughly determine the number of commitments family businesses have obtained and the opportunities for companies to develop in different industries. For family businesses, every board interlocks holding common shares is an affirmation of the future development of

the specific family businesses. Meanwhile, the number and total amount of family business board interlocks holding common stock is one of the important indicators to evaluate corporate culture and even corporate vitality.

The concept of common shareholding includes three main types of shareholdings: direct, indirect, and joint (Fama, 1970). Direct shareholding refers to the direct purchase of shares in a company and the ownership and voting rights of those shares; indirect shareholding refers to the ownership of shares in a company by shareholders through investment funds, insurance companies, pension funds, etc., and the income and voting rights of the corresponding shares; common shareholding refers to the ownership of shares in the same company by two or more investors, but without mutual ownership (Fama, 1970). Among them, indirect shareholding patterns can be divided into father-son-grandson and connecting affiliates (Flath, 1992). For the father-son-grandson model, it is mainly manifested in the form that firm A holds more than half of the shares of firm C through subsidiary B, so firm A indirectly controls firm C (Flath, 1992). For the connecting affiliates model, it is mainly manifested that firm A does not hold more than 50% of shares in firm C, but firm A's subsidiary B and firm A jointly hold more than 50% of shares in firm C, so firm A indirectly controls firm C (Flath, 1992) (As shown in Figure 2). The analysis of indirect shareholding reveals that indirect shareholding, a one-way shareholding, can better control the interests and needs of family businesses compared to the two-way shareholding of cross-shareholding. However, unrestricted one-way shareholding may also harm downstream companies due to uncontrolled demand for benefits. Considering the future development plans of the relevant family businesses and the already formed industry chain ecology, indirect shareholding can visualize the different industrial categories of downstream companies.

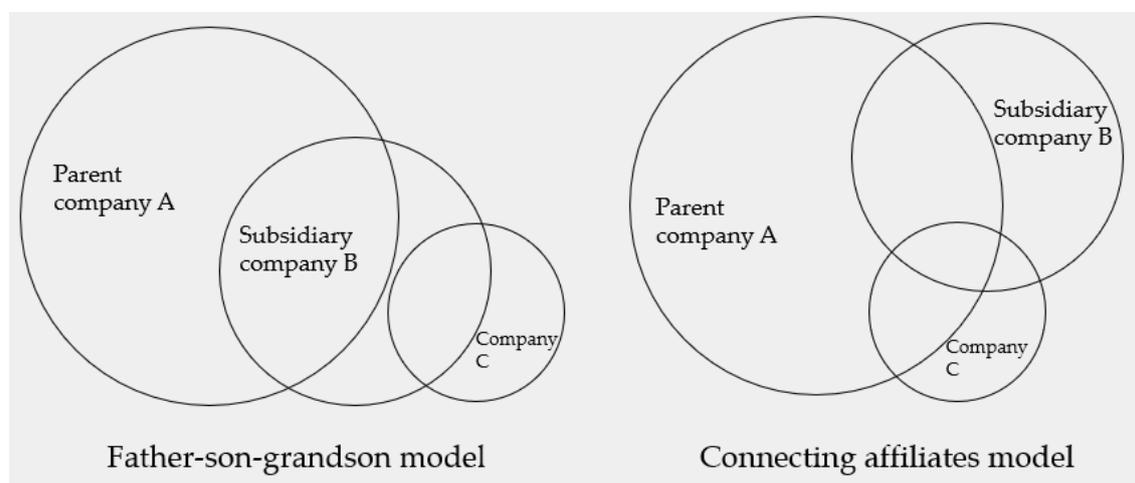


Figure 2: Main forms of indirect shareholding.

The important indicators for judging the affiliation and joint relationship of enterprises need to be checked in the official data description of Orbis. If the relevant data is not explained in detail, then this research confirms the specific situation with the public information and financial reports of the enterprise.

- **Cross-shareholding**

External unification is challenging to sustain, and failure to unify can lead to fragmentation (Salvaj et al., 2008, p. 68). Cross-shareholding within family businesses is based on the common desire of different organizations, so cross-shareholding is very demanding in terms of the quality and intentions of the firms involved (Salvaj et al., 2008, p. 68). The role of cross-shareholding for family businesses is very diverse, the most important of which can help the family to maintain control of the business (Boyd & Solarino, 2016). In addition to this, cross-shareholdings can also enhance cooperation between firms (especially financial and supply chain related firms) as well as reduce the external risks that family businesses face (threats such as market competition, regulatory policies, etc.) (Boyd & Solarino, 2016). Therefore, cross-shareholding is one of the important forms of board interlocks for family businesses. It not only helps related family businesses to access relevant resources but also shares unknown risks that the firm may face.

Cross-shareholding refers to the phenomenon that different firms participate in each other's shares for a particular purpose (Miyajima, 1994). The main purposes of cross-shareholding include: 1) building a trust system by establishing long-term strategic partnerships between companies; 2) allowing for business cooperation and resource sharing between companies; 3) using third-party shareholding to prevent hostile takeovers and mergers by other companies, thus protecting the independence and stability of the company's operations (Miyajima, 1994). However, the risks associated with cross-shareholding are also very high. If two companies are competitors, cross-shareholding may lead to conflicts of interest (Miyajima, 1994). If trust is called into question, the effectiveness of cross-shareholding may decrease significantly (Miyajima, 1994). If there is too much fluctuation in equity ownership, cross-shareholding may indirectly affect the interests of the holding company (Miyajima, 1994). The basic forms of cross-shareholding can be divided into five main types: simple, ring, network, radial, and

deformed radial. Simple cross-holding refers to two firms holding shares of each other; ring cross-holding refers to three or more firms becoming shareholders of each other; network cross-holding refers to multiple firms holding shares of each other; radial cross-holding refers to a core firm holding shares of each other; and deformed cross-holding refers to a core firm holding shares of each other. Radial cross-shareholding refers to the way in which a core firm owns shares of each other with multiple other firms, and these firms also hold shares of each other (Li et al., 2021). The main focus of this research is to focus on the related family business as the core, so as to observe the relationship between companies in other industries and related family business cross-shareholdings. The pattern of cross-shareholdings in the study may include all five different forms, but the core of the research is dominated by radial and deformed radial cross-shareholding forms.

3 DATA AND METHODOLOGY

The main data of this research are collected from 'perheyritys.fi', 'the Orbis Europe', and the official websites of related companies. The research focuses on the current distribution of FFBBIs in different industries and the 'concentration density' of related industries. Figure (1) shows the main forms and reasons for family business interlocks in North America and Southern Europe. Due to the comprehensive impact of globalization, historical events and legal formulations in different countries have been interrelated since the beginning of the last century. Therefore, the research results in North America and Southern Europe are very likely to have commonalities and similarities with the board interlocks of family businesses in the Nordic region. For example, the 2008 economic crisis suffered by the United States also prompted the introduction of new laws in Europe in the same year to restrict the development of board interlock in Europe, which also led to a sharp reduction in the number of board interlocks in most European companies (Philippines & Yu, 2022). Similarly, the Clayton Act introduced in the United States in 1914 had the same effect. The difference is that Finnish family businesses also have unique corporate cultures and characteristics, which is likely to cause a huge difference between the analysis and summary of board interlocks and other countries and regions. For example, Finnish companies are much more accepting and inclusive of women in management than companies in other countries in the same industry (Miettinen & Koironen, 2022).

The essence of qualitative research is to observe the phenomenon itself, not just the relationship between variables (Eisenhardt & Graebner, 2007). Therefore, after analyzing the relevant context, the approach of multi-case analysis is to observe different kinds of data in the cases and to do a more in-depth investigation of the relevant data. The questions in qualitative research are generally open-ended questions, so the data collected are also mostly unstructured or semi-structured data (Eisenhardt & Graebner, 2007). In this study, although the board interlocks of the case firms are fixed industries, the location of the board interlocks such as customers, intra industry, etc. requires triangulation to check the public information of the relevant firms (Triangulation. 2014). Therefore, the data in this study is mainly semi-structured as the analysis framework.

Therefore, this research consisted by two parts. For the part of the background and review, this research searches keywords through the "Google Scholar" database and filter relevant articles in a systematic review manner. The

main database for background retrieval in the early days came from "Google Scholar", and after summarizing all relevant articles and data, this research further searches for historical details and data of different family business board interlocks in Finland based on the existing framework and theoretical system (Siddaway et al., 2019). For the second part, these retrieved keywords and the flowchart can serve as the main criteria for comparing consistency and differences in multiple case analysis. The third step of this research is to find out current FFBBIs and the positions of relevant personnel through relevant data materials and current information such as 'perheyritys.fi' and 'Orbis Europe' database. Finally, this study uses 'Gehpi' as a data analysis software to make visual pictures, so as to observe the density information of FFBBIs details (Bastian et al., 2009).

3.1 Systematic Review

A systematic review is more than just a list of research evidence and historical traceability, it is also an important way to establish connections between different studies and branches (Siddaway et al., 2019). Starting from the horizontal concept, it can be found that family business and board interlocks in Finland are two completely different concepts and systems that are difficult to relate. However, due to the different interests and needs of enterprises, they may have had many intersections in the development process. Due to the lack of research on Finnish family board interlocks (Alghami & Hussin, 2021), from the perspective of the vertical time axis, a systematic review can help articles establish relevant theoretical frameworks from different periods of family business in other countries. Previous companies' studies and frameworks can be made before collecting basic data on Finnish family businesses, which helps this research to establish the observation angles.

The main core of a systematic review is to connect a small number of studies that are separated from each other, and then evaluate or expand the basis and models of related theories through analysis. The background part of the theoretical system of this study is to sort out related articles and data by trying to contact 'family business (FB)', 'Finland family business (FFB)', and 'board interlocks (BI)' (as shown in Figure (1)). The data used in this research background and review part mainly come from 'Google Scholar'. The retrieval method in the research is

mainly determined according to the research questions and assumptions, and the main keywords to be retrieved in the research are FB, FFB, and BI (as shown in Figure 3). During the search process, I found that the search results of 'Finland (Fin)' and 'Family Business (FB)' are different from 'FFB'. This difference is not only reflected in the quantity, but also in the content of the articles. The search results of 'FFB' mainly refer to the definition, management style, business form and development trend of Finnish family businesses; the search results of 'Fin' and 'FB' mainly refer to the comparison between Finnish family businesses and family businesses in other countries and international positioning. Both contents are crucial to this study. As this study focuses on SMEs, searching for SMEs (SME) and Finnish family businesses (FFB) is a key starting point in the search process. Similarly, the interaction between Finland (Fin), family businesses (FB), board interlock (BI), and SMEs (SME) is also an important search step.

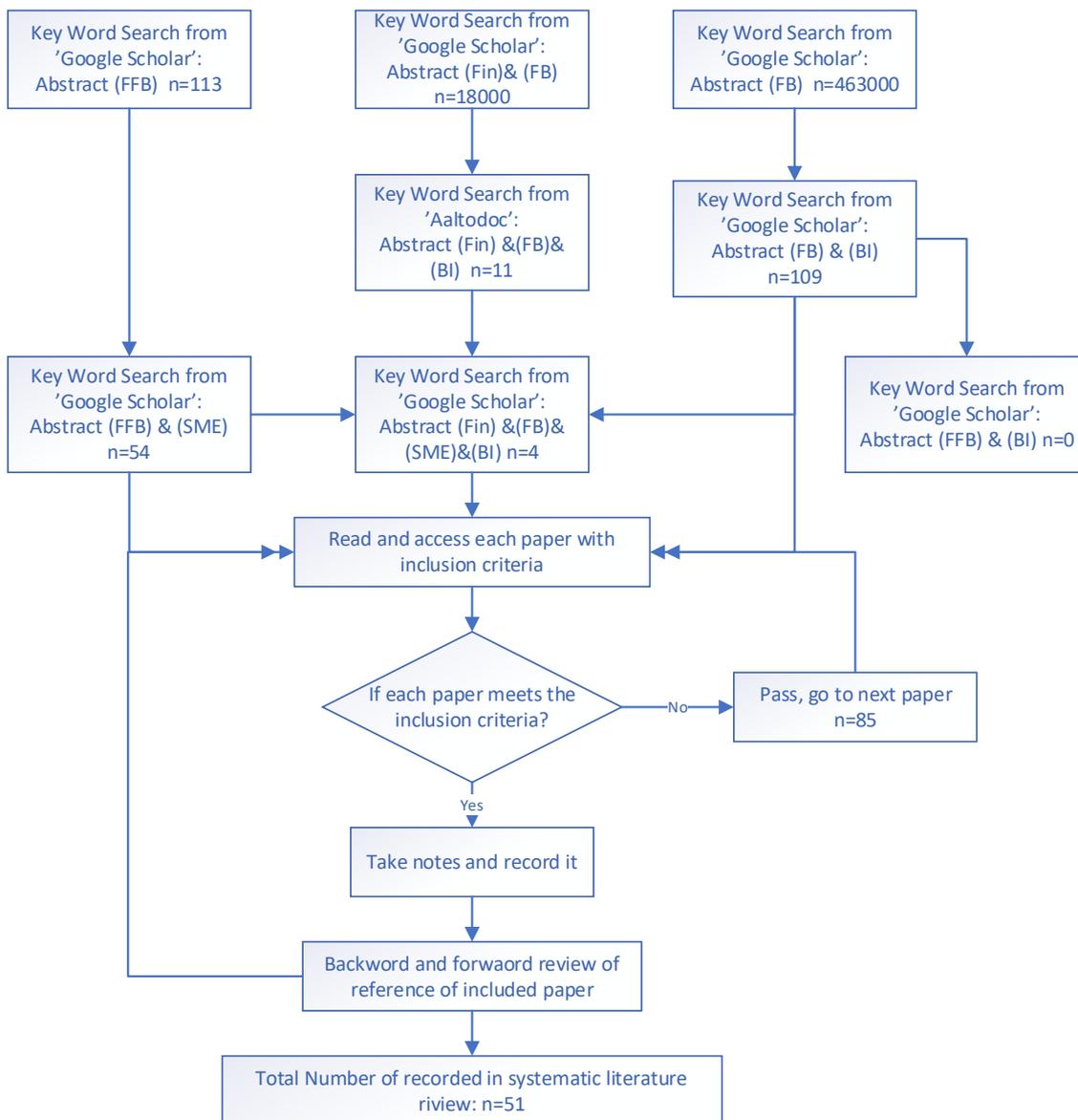


Figure 3: Systematic review of FB, FFB, and BI.

The retrieving progress of the systematic review show that there are 18 relevant articles on family businesses (FB), most of which are about FB classification, definition, industry classification, board shareholding methods, and evaluation standards. Three of these articles also touch on the relationship and transition of board interlocks (BIs). Regarding BIs, there are approximately 15 articles, most of which are about the definition of board interlock, formation conditions, development history, and main categories. 5 of these articles also mention the development and relationship with FB. There are about 6 articles about Finnish family businesses (FFB), which mainly cover the definition of FFB, dynamic development process, differences between FFB in other regions due to various reasons,

and main characteristics. Finally, there are 12 articles about family business board interlocks (FBBI), which mainly cover the philosophical basis of FBBI (social embeddedness and economic rationality), appointment methods (internal and external appointments), main features (regional and cultural), and the role and operating mechanism of board interlock in family business (management and shareholding methods), etc (As shown in Appendix A).

3.2 Multiple-cases method and Density Analysis (Gephi)

Cases are the basis for induction and theory development (Eisenhardt & Graebner, 2007). New theories and models can be developed by identifying patterns of constructive relationships within and across cases (Eisenhardt & Graebner, 2007). In terms of the structure of the analysis, single-case analysis focuses on the in-depth analysis of a single case and elaborates on the complexity of the details; multi-case analysis focuses on the diversity of cases, the variability of models, the differences between cases, and the reproducibility of the results (Eisenhardt, 1989). In terms of the purpose of the study, single-case analysis focuses on the specificity of the case and the influencing factors; multi-case analysis focuses on the pervasiveness of the phenomenon and the associated formative factors (Eisenhardt & Graebner, 2007). The most important research question of this study is: What are the main forms of board interlocks in small and medium-sized Finnish family business in the mechanical manufacturing industry? To address 'main forms' in the question, it reveals that the main body of the study needs to select several suitable cases from a large number of cases for analysis and comparison. Therefore, a multi-case analysis is more appropriate for this research topic, which includes not only the analysis of the differences between cases, but also the purpose of discovering emerging theories and models.

In order to identify consistency and differences between cases, a good cross-case study should select corresponding dimensions and keywords to limit the object groups being studied and find similarities and differences between them (Eisenhardt, 1989). This study first determined that the research scope was SMEs in the Finnish mechanical manufacturing industry, and then used background's basic analysis to identify tendencies and strategies in FBBI's research (as shown in Figure 1). Next, the keywords and business strategies summarized from the

background were used to select Finnish family businesses and Gephi was used to plot the current status of their board interlocks. Finally, this study can compare and identify whether there is consistency and differences in the status of relevant FFBBIs. Eisenhardt (1989) argued that the characteristics of multiple case studies are determined by the characteristics of the cases, and that this method does not have a standard format to dictate its analytical path. Therefore, this method requires particular attention to the limitations of the analysed cases and specific data. The reason for using multiple case studies in this study is that there is currently a lack of strategic analysis of FFBBIs. Comparing and summarizing the commonalities and differences among relevant companies through multiple case studies is beneficial for identifying the main forms and characteristics of FFBBIs strategies.

After a systematic review and analysis (as shown in Figure 6), the study collects current data on family businesses in Finland and details of their interlocks within these data. First, this paper identifies Finnish family businesses and basic information that need to be studied according to 'perheyryitys.fi'. Then, this research classifies different types and classifications of family businesses according to the manufacturing industry. The research mainly uses the 'Orbis Europe' data source for further search. Since the board interlock research related to Finnish family businesses is currently difficult to trace historically, this research mainly focuses on the types of board interlock involved in current Finnish family businesses and the associated reasons. Therefore, the first step of the multiple cases analysis is to collect data on family business board interlock and related companies in the manufacturing industry. Then, the article filters some data that does not meet the standards and requirements. In the second step, from the collected data, the research can summarize the way the company appoints family members in different board interlocks. In the third step, the research discovers the purpose of different appointment methods based on relevant summaries.

In the process of retrieving FFBBIs, this research mainly uses the full name of the family businesses to search for related companies, and the information on the board members of related companies also uses the 'Orbis Europe' database as the main source. The first important corporate information is the basic information of family members in FFBBIs. The names and birthdays of family members can infer the mainstream development direction of the Finnish family business and the relevant heir information. Other business information associated with a family member can be found by retrieving the specific information of the

relevant family member. The second important data that needs to be retrieved is the main industry and business information of the associated enterprise. This research searches for the main business information of related companies by visiting their official websites and some valid reports. If the business of the enterprise is not clearly marked or the number of employees of the enterprise is 0, then the information would be considered invalid. If the information on the relevant responsible person of the enterprise is incomplete, and the information on employment or shareholding is incomplete, then the relevant information can be deemed invalid. Since the specific enterprises are mainly from Finland, the industry definitions and codes of enterprises mainly come from NACE (standard European nomenclature of productive economic activities) (EUROPA - Competition - List of NACE Codes, n.d.) (As shown in Appendix C). Finally, the research collates and analyzes the positions or status of relevant FFBBIs in different companies. board interlocks may hold the following positions in different companies: Chairman (C), Original Member (OM), Regular Member (RM), Duty Member (DM), and Trader (T), Board Member (BM), Vice Chairman (VC), Duty Chairman (DC). Meanwhile, these different positions can be organized into different types: Member of the board or committee (MBC), Shareholder (S), and Management position (MGM).

The information retrieved about the family business should include whether there are subsidiaries (Sub, Sub-Sub), parent companies (Par) or others (O), whether the family members are already working in these businesses, and so on. For internally appointed board interlocks, this information is important because it reveals the layout of the family business and the family's control over the industry. However, for externally appointed board interlocks, this information is not important because there is no subordination between the external board interlock and the target company.

In addition to the above data, this study collects information on the current Chairman of the family business and related generations. Typically, the heirs of a family business help the family expand its business scope and channels. The purpose of doing so is to help family businesses achieve related business goals, successfully complete the succession of family businesses, help companies achieve internationalization, share the risks of family businesses, and help family businesses establish a reliable supply chain system (Calabrò et al., 2021). The future planning and development goals of the enterprise can be speculated through the shareholding, employment, and industry information of different heirs. The 'Orbis Europe' database can retrieve the shareholding method and employment

information of the relevant heirs, and the shareholding method is the main function of a shareholder in the company. The advantage of cross-shareholding is that it can help companies prevent hostile takeovers and establish stable trade links. But cross-shareholding also means that the company may face unknown risks because any changes in related companies will also affect the direct benefits of shareholders (Miyajima, 1994). The advantage of common shareholding is that the relevant shareholders can enjoy a free model, and the relevant shareholders can enjoy the right to participate in the company's decision-making, profit distribution, pre-emptive stock options, and remaining asset distribution (Vilaseca, 2002). Therefore, the shareholding method of FFBBIs is also an important reference variable.

3.3 Company Selection

The sample of companies in this article mainly comes from 'Orbis Europe' and 'perheyritys.fi'. The first step in retrieving the sample of companies is to locate the target companies using the filtering interface of companies in Orbis, specifying the location as 'Finland'. The number of active companies in Finland is 2,597,731. Then, the filtering conditions are set to select small and medium-sized enterprises with a number of employees between 20 and 250 (family businesses with less than 30 employees rarely have two or more shareholders, and a number of employees not exceeding 250 can limit the size of the company without being too large). This filtering step reveals (as shown in Figure 4) that there are 1,905 companies that meet the conditions.

Thirdly, the main categories of the mechanical manufacturing industry are selected through the industries classification interface in Orbis: Manufacture of electrical equipment, Manufacture of computer, electronic and optical products, Manufacture of machinery and equipment, Manufacture of motor vehicles, trailers and semi-trailers, Manufacture of other transport equipment. It is found that there are 127 companies that meet the filtering criteria. Fourthly, searching 'perheyritys.fi' reveals that there are 23 mechanical manufacturing companies that meet the criteria.

By comparing the search results of the two systems, Orbis Europe and perheyritys.fi, and checking the annual financial reports of these companies, it is de-

terminated that there are 11 companies that meet the criteria. The public information of the companies involved in this study includes the company's official website, financial statements, 'Orbis' system, corporate governance reports, and sustainability reports. From these public information, it is possible to confirm whether the subject is a family business or not, and the shareholding structure of the company can be seen in the reports. If relevant public information is lacking, the article makes inferences based on the available information. In addition, if a company has subsidiaries or parent companies, the public information of these companies may be consolidated. The consolidated public information make it easier to retrieve the business ties between the internal board interlocks within the family members. The business descriptions in the different reports reveal the supply or financial relationships between the target firm and other firms, which helps the study to identify the main forms of composition of the external board interlocks of the family business. Finally, by examining the shareholder information in Orbis, it is determined that there are 5 companies that meet the criteria for the board of directors and related conditions.

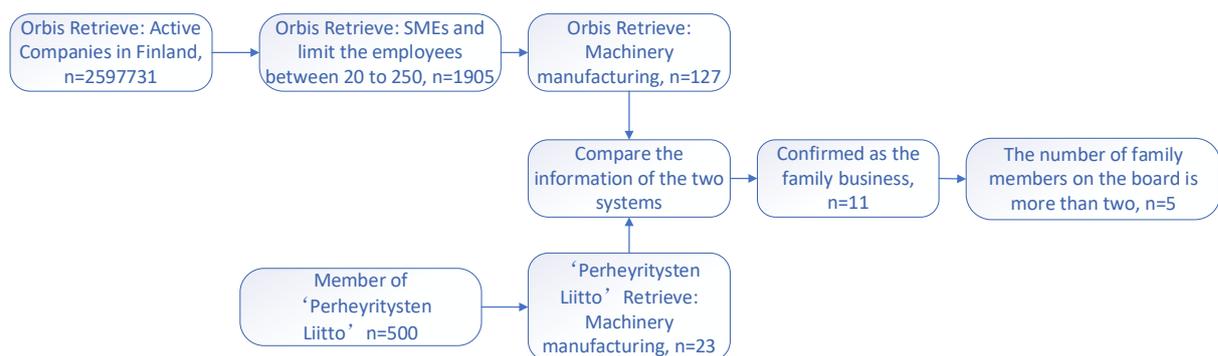


Figure 4: The selection process of sample enterprises

After screening and filtering, five companies have been identified as the main analysis targets for this study. First, these five companies are coded for convenience of reference (as shown in Table 3). Second, during the search process, it was found that these five companies are all involved in different equipment manufacturing industries. Although data from different industrial classifications have more differences, there are also limitations due to the broad scope. Third, the basic data of these five mechanical manufacturing companies show that all companies meet the conditions for employee numbers, but the operating revenue of Company 2 slightly exceeds 50 million euros. In the search process, Orbis system defaults Company 2 as a medium-sized enterprise, and for the manufacturing industry, employee numbers can better indicate the size of the enterprise.

Fourth, the data of the companies are all concentrated in 2021, as the latest data for 2022 has not yet been uploaded to the Orbis system.

Code	Target company	Number of employees for 2021	Operating revenue (Turnover) for 2021 (million/year)
1	Ensto Finland Oy	160	\$ 40.6 m
2	Botnia Marin Oy Ab	247	\$ 58.9 m
3	LUMIKKO OY	20	\$ 4.57 m
4	KYTOLA INSTRUMENTS OY	83	\$ 12.5 m
5	OY NARKO GROUP AB	217	\$ 57.7 m

Table 3: Screening results and target companies.

3.4 Classification of industries and examples

During the process of retrieving information on all companies, the NACE codes of different companies are also presented in the Orbis system. By organizing and summarizing these NACE codes and basic information of board interlocks -related companies, they can be classified into different industry categories and types according to the classification method in the 'List of NACE codes' (Appendix B and Appendix C).

In the manufacturing industry and related intra-industry trade, different companies complement each other rather than replace each other (Lee & Lee, 1993). Meanwhile, intra-industry mainly refers to the trade or complementarity between products of the same type and nature in the same country or region (Lee & Lee, 1993). Therefore, only upstream raw material suppliers and companies involved in mechanical manufacturing are included in the intra-industry classification of the manufacturing industry among all board interlocks -related companies of these five companies. According to normal classification, the construction industry should not be included in the intra-industry system of the manufacturing industry. However, after analyzing the official websites and business descriptions of all construction-related companies, these companies are all equip-

ment installation or equipment processing enterprises, and their business involves improvement and processing of related machinery. Therefore, in these cases, the construction industry should be classified under the intra-industry system of the manufacturing industry.

Litchfield (1956) believes that general administrative management should provide services and improve efficiency through communication, feedback, and adaptation. Such services mainly include the planning of policies, resources, and execution methods by relevant departments or companies (Litchfield, 1956). Therefore, I collectively refer to this type of service as General management services. In the 'other' category, the industries designed by companies mainly include enterprises that supply daily goods, food and health-related enterprises, rental housing enterprises, and art and entertainment-related enterprises. Interestingly, there are many food-related enterprises in the external appointments of the fourth company. After analyzing the official websites and financial reports of these related enterprises, they are all customers of the No.4 company. Therefore, in the data analysis process, specific cases are also analyzed and summarized.

Wholesale and retail are often interactive or conflicting. For manufacturers, the dynamic efficiency of the wholesale and retail industries also determines the dynamic returns of related manufacturing industries (Nakamura, 2008). Concentrating funds on developing young manufacturing enterprises can help them grow quickly and obtain external financial support, and similarly, the manufacturing industry can provide more stable expected returns for the financial industry (Cetorelli & Gambera, 1999). In the process of organizing relevant data, financial and investment enterprises are a relatively large category, so I classify them all as Financial services. Business consultants' participation in R&D projects can provide objective advice and help the project develop (Ajmal et al., 2009). At the same time, the R&D and professional consulting of companies are also a way to help them develop faster (Ajmal et al., 2009). Therefore, I classify the professional and scientific activities of enterprises as Consulting and Research.

Finally, companies related to Information and communication are mainly classified as Technical Services, as they provide external technical support that enterprises need; Agriculture, forestry, and fishing appeared in the external appointments of board interlocks during the retrieval process (which can be confirmed as a customer relationship through valid information analysis), so it can be directly named Agriculture.

This study creates Gephi graphs of FFBBIs from two different perspectives: industrial structure and affiliation of the enterprises (shareholding information and financial reports of the enterprise). For the Gephi graph of industrial structure, the "nodes" in the Figures mainly represent individuals and companies. When the "nodes" represent individuals, it mainly refers to internal or external appointments within the family businesses, and the size of the node remains the same. When the "nodes" represent companies, their size also represents the size of the company: small nodes represent small businesses, medium nodes represent medium-sized businesses, and large nodes represent large businesses. In addition, the color of the node also represents different meanings. For individual "nodes", there are only two colors to represent the appointment method of family businesses (orange represents external appointments, and dark brown represents internal appointments) (as shown in Table 4). For company "nodes", different colors represent their relationship with the target company (black) and the industries involved (gray represents intra-industries, golden yellow represents financial services, green represents retailing and after-sales service, purple represents technical services, pink represents general management services, light blue represents consulting and research, red represents agriculture, and blue represents others) (as shown in Table 4). The meaning of the "edges" mainly has two types: the relationship between individuals and companies, and the relationship between companies. For the relationship between individuals and companies, when the arrow of the edge points from an individual to a company, it indicates that the individual is the chairman (C) of the company or completely controls the company; if there is no arrow pointing from the company to the individual, it indicates that the individual is a shareholder or holds other management positions in the company. For the relationship between companies, when the edge points from one company to another, it indicates that the latter is a subsidiary of the former.

Industries	representative color	Appointment	representative color
Agriculture	Red	Internal	Brown
Consulting and Research	Light Blue	External	Orange
General management services	Pink	Target Unit	Black
Financial Services	Yellow		
Intra-industries	Grey		
Retailing and after-sales service	Green		
Technical Services	Purple		
Other	Blue		

Table 4: Classification of business types.

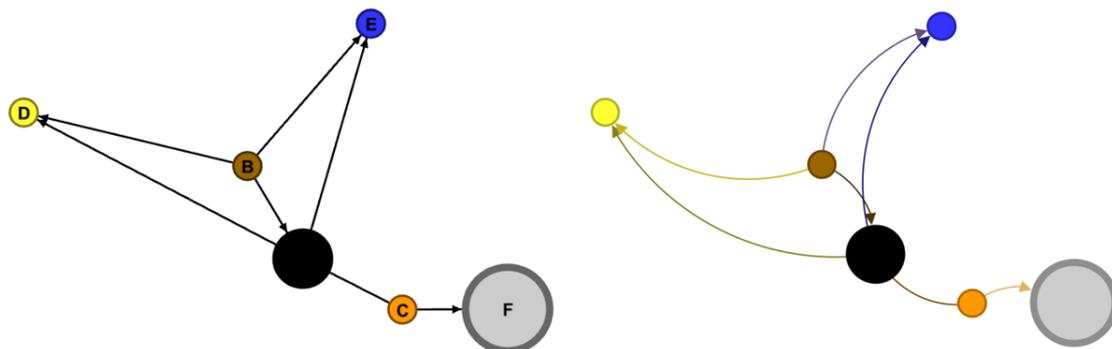


Figure 5: An example of a relationship diagram between businesses and individuals.

The left side of Figure (5) shows the details of the Gephi drawing, while the right side shows the final result. From the drawing of the Figure, it can be seen that the target enterprise (represented by the black node) has an internally appointed individual B and an externally appointed individual C. B is either the chairman of the target enterprise's board of directors or its largest shareholder, and B also directly controls two small enterprises, D (financial services) and E (other). C is an external shareholder of the target enterprise and is also the chairman of the board of directors of enterprise F. The relationships between the enterprises indicate that D and E are both subsidiaries of the target enterprise.

3.5 Validity and Reliability

In terms of the theoretical validity of this study, it begins by exploring the existing research on family businesses and their long-term development strategies and identifying the relevant theoretical frameworks. Subsequently, through the literature review, it is found that the theories regarding the long-term development of family businesses and the role of board interlocks are largely consistent. Therefore, this study investigates the concept and evolutionary history of board interlocks and examines their practical implications in family businesses. By combining these theories and analyses, the study systematically identifies the main research areas and directions of board interlocks in current family businesses, as well as their substantive relationship with long-term development strategies.

Regarding the alignment between the data and theory in this study, the main target businesses are determined by selecting small and medium-sized family businesses in the mechanical manufacturing sector in Finland. SMEs are chosen because they are in the early stages of business development, allowing for a closer observation of their future planning and basic development models. The selection process is primarily based on "Orbis Europe" and "perheyritys.fi," and follows the criteria for SMEs. However, SME criteria alone are not sufficient, as the number of family members on the board is also an important indicator. If there are too few family members on the board, it may be challenging to observe any development models. Finally, the latest board structures and public information are used to confirm that the target businesses are indeed family businesses. This ensures the accuracy of the research data.

The study highlights the two different appointment methods within the board because they effectively demonstrate how family businesses utilize board interlocks as a long-term development strategy. The study verifies the substantial business collaborations between the target businesses and the board interlocking companies, as well as the primary modes of their collaborations, by incorporating public information and some annual reports. If relevant public information is lacking, the article makes inferences based on the available information. This information helps identify the theoretical models for different cases based on current actual data, which can provide structural evidence for the accuracy and applicability of previous theories on family business board interlocks.

Additionally, the study pays attention to the shareholding patterns of different shareholders and specific positions within the board, as these pieces of information can reveal the level of control power and openness exerted by the family in the relevant businesses.

It should be noted that the visualization in Gephi is based on the actual data currently available in Orbis. However, the theoretical framework and development models are formulated based on the combination of the available information and public data. Nevertheless, the completeness of some companies' annual reports and public information is limited, so the related theoretical frameworks can only be depicted through inference. For instance, the information for 'Ensto Finland Oy' and 'Ponsse' can be directly retrieved from their sustainability reports and annual reports to analyze their business collaborations. However, for other companies, the theoretical models can only be speculated based on data from third-party websites such as 'Asiakastieto' and 'Finder.fi'. Therefore, the validity of the company data has limitations, and future research can address these limitations by employing methods such as interviews and questionnaires.

4 RESULTS AND ANALYSIS

This section first summarizes the results of the systematic review, and this summary is logically analyzed based on the results of Figure (3). The purpose of the systematic review is to support the feasibility and pioneering role of the research by classifying and analyzing board interlocks. Therefore, the structure of the systematic review is the main logic that connects the research question and the multi-case analysis. Firstly, the results of the systematic review have been analyzed and classified in the "Background" section, but the overall data analysis is not sufficient to cover the logic of the multiple case analysis. Therefore, the main data of the multi-case analysis is summarized and sorted out based on the specific data of the enterprise. Secondly, the main purpose of systematic review is to further analyze and summarize the logic of the "Background" section, in order to obtain a more comprehensive overall conclusion from current theoretical studies on board interlocks.

Through the progressing of multiple cases analysis, the data for these five cases can be more visually structured in the mapping process with Gephi by filtering the data from industry classification and industry grouping. The second part of this section focuses on the elaboration and analysis of the specific data for these cases, some of which are analysed in conjunction with the publicly available information. Subsequently, this study names the different structural features based on the specific data and relevant theories. Finally, this study compares the different structures and analyse the consistency and differences between these structures. For the five different cases, the analysis of consistency in terms of industries and appointments reveal the overall trends and patterns in the Finnish SMEs machinery manufacturing industry; the analysis of differences in terms of industries and appointment methods reveal the strengths and weaknesses of the different development models in the SMEs machinery manufacturing industry from Finnish family businesses. During the process of retrieving background materials and public data of these family-owned SMEs, it was found that almost all board interlocks among these companies have actual business relations with the target company. Therefore, the analysis of this section does not need to be concerned about board interlocks that have no actual business or those that arise from industry experience.

4.1 Systematic review result

Based on the background's analysis, it can be seen that the forms of family business board interlocks can be divided into internal board interlocks as well as external board interlocks (Philippines & Yu, 2022). Caiazza et al. (2022) compared family businesses and non-family businesses in Italy through model variable statistics and divided the main forms of board interlocks into interlocks in intra-industry, interlocks in banking and finance, common shareholding interlocks, and cross-shareholding interlocks. After a preliminary search of FFBBIs, it can be found that the main methods of board interlocks are also these four aspects. However, Caiazza et al. (2022) did not elaborate on the situation and comparison of internal appointments of family members and the introduction of external appointments by family businesses. Therefore, based on the above summary, the form of board interlock in family enterprises can be divided into two main methods: internal appointment and external appointment, and they are mainly distributed in two different industries, intra industry and finance (as shown in Figure 6). Caiazza et al. (2022) empirically proved that no matter what kind of board interlocks are appointed, they are easy to influence each other throughout the process (as shown in Figure 6).

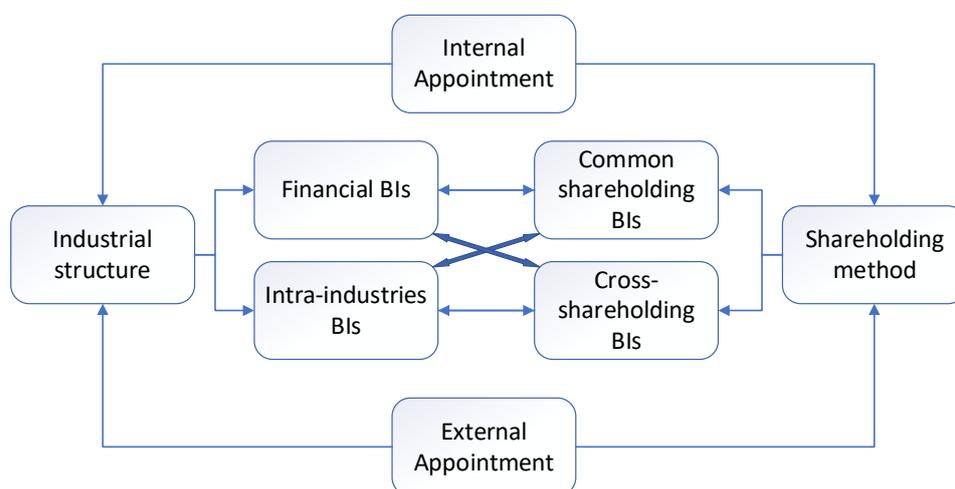


Figure 6: Main Analysis Frame of FFBBIs.

According to the display in Figure (6) and the summary of background, it can be found that the current board interlocks theory can prove that the main structure of internal appointments and external appointments of family businesses is mainly based on the difference in industry and shareholding methods.

The purposes corresponding to these two structures are also different for family businesses (Flath, 1992) (Miyajima, 1994). The needs of family businesses for board interlocks in the financial category are also diverse, and their main needs include the need for external financing channels, the need for the development of the family's own financial services industry, and the need to ensure family control. The adjustment of the industrial structure is mainly aimed at the industrial chain required by family businesses, the upstream and downstream of the supply chain or financial needs. The different shareholding methods correspond to the two main forms of joint shareholding and cross-shareholding.

Similarly, there is also some relationship between Intra-industries board interlocks and shareholding methods: when there is a subordinate relationship between the upstream and downstream of the supply chain and related family businesses, the main form of Intra-industries board interlocks in family businesses is common shareholdings board interlocks (Caiazza et al., 2022); When there is cooperation or competition between downstream and related family businesses, the main form of Intra-industries board interlocks in family business is cross-shareholding (Caiazza et al., 2022). On the contrary, according to the above summary, it can be found that common shareholding is not only the most common form of financial board interlocks in family businesses, but also the most common form of Intra industrial board interlocks (Caiazza et al., 2022). This common form may be formed by many reasons, it may be the bonus period of the industry, the strategic planning needs of the enterprise, or even the political marriage of the family and so on. Similarly, cross-shareholding is also a common form of financial board interlocks in family businesses, as well as a common form of Intra industrial board interlocks. Its main purpose may be corporate cooperation, establishing a reputation system, stabilizing supply relationships, and so on (Caiazza et al., 2022).

The functions and values embodied by board interlocks differ significantly depending on the appointment method. In the context of "capitalist economy," internal appointments primarily serve to help family businesses stabilize their supply chains and expand their scale and operations (Barrese et al., 2007). On the other hand, external appointments primarily contribute to building a strong reputation system for the family and developing long-term strategic plans for the business (Chrisman et al., 2010). From a "corporate governance" perspective, internal appointments play a key role in reconciling internal conflicts within the family and ensuring the stability of the enterprise's development (Aronoff &

Ward, 2016, p. 38). External appointments, on the other hand, help facilitate interest coordination within the family business and provide a third-party oversight function (Chrisman et al., 2010). In the context of "corporate elite," there is no specific theoretical analysis or revelation regarding the primary function of internal appointments. However, external appointments primarily serve to acquire external expertise and experience, guiding the enterprise towards rational development (Caiazza et al., 2022).

Based on the analysis above, it can be observed that financial strategic interlocks have different primary functions in internal appointments compared to external appointments. For internal appointments, the main function of financial interlocks is to assist the family in controlling the business (Philippines & Yu., 2022). On the other hand, for external appointments, the primary function of financial interlocks is to access additional sources of funding. Similarly, intra-industry strategic interlocks primarily aim to ensure a stable supply chain in internal appointments, while in external appointments, their main function is to strengthen external collaborations (stable supply chain) and prevent malicious competition (Caiazza et al., 2022).

Through the above analysis, it can be found (as shown in Figure 6) that the current research on board interlock only focus on the two main areas: finance and intra-industry. The specific analysis needs to be analyzed through the integrity of the Gephi graph (in the next chapter). Based on the graph structure of Gephi, we can know that the graph is composed of nodes and edges, where the size and colors of nodes can represent the size of companies and the edges' arrow pointing directions can represent the affiliation between firms and control of firms by individuals.

4.2 Case Data Analysis

- **Case 1: Ensto Finland Oy**

The case of 'Ensto Finland Oy' (as shown in Figure 7) primarily consists of three family members appointed internally and three non-family members appointed externally, with a family member serving as the chairman of the board of directors. From the subsidiary relationship of the target enterprise, it can be

seen that the enterprise belongs to another large financial service category enterprise, and the chairman of the board of directors of this internal large financial enterprise is also a family member of the target enterprise. Meanwhile, the other three small enterprises of the family members as board interlocks are also controlled by this internal large financial enterprise. Therefore, it can be seen from the above analysis that the internal appointment of the large financial enterprise is the core enterprise of the family enterprise.

In details, 'Ensto Invest Oy' serves as the parent company of the target enterprise and also controls several subsidiary companies, such as EM group and Inasis Oy. 'Ms. Marjo Tuuli Irene Miettinen' is the chairperson of the board and a family member. Additionally, there are two other family members and three non-family members on the board, all holding positions as ordinary members. It is interesting to note that all three family members in this company are women, which distinguishes it from the other four cases. Among the three non-family members, 'Mr. Panu Henrik Routila' is the most significant shareholder, as he serves as a board member in 12 companies, many of which he holds the position of chairman. Importantly, there is significant business cooperation between most of these companies and the target enterprise.

From the industry structure perspective, the main types of enterprises for the external appointment of directors are intra-industries, financial services, technical support, consulting and research, and agriculture. Among them, intra-industries are the main board interlocks of the target enterprise, because these four intra-industry enterprises not only include two large enterprises but also two medium-sized enterprises with a similar scale to the target enterprise. Therefore, through the layout, it can be found that although the target company has a large number of external board interlocks, its dominant power is still held by the family and the financial enterprises controlled by the family.

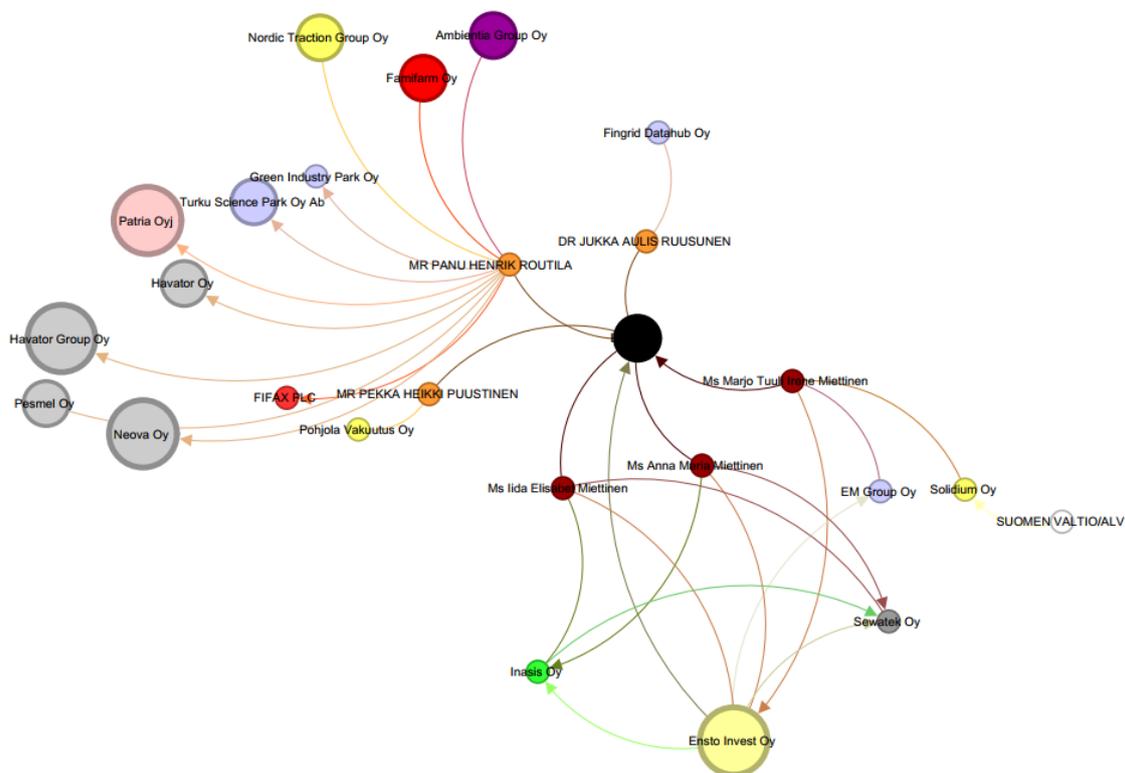


Figure 7: No. 1 Enterprise: Ensto Finland Oy

- **Case 2: Botnia Marin Ab**

Company 2 Oy (Botnia Marin Ab) is a medium-sized yacht manufacturer that only has internally appointed family members and no external appointed shareholders (as shown in Figure 8). Like Company 1 (Ensto Finland oy), the target company is also a subsidiary of a financial enterprise within the family, but unlike Company 1, it does not rely on external resources or customers acquired through board interlocks. The internal appointments of board interlocks in the target company mainly include the necessary raw material supply, technical support, and retail industry. The development of this type of enterprise mainly relies on external orders and the expansion of its own retail business. In terms of company size, there is only a small-scale wholesale and retail company, but after checking Orbis, its turnover is considerable. From the structure of board interlock, intra-industry, wholesale and retail, and financial investment are the main industries.

In terms of specifics, 'JOBROMA Holding Ab' serves as the parent company of the target enterprise. Mr. Johan Fredrik Maximilian Carpelan is the chairman

of the board and a family member. Meanwhile, other family members hold positions as ordinary members on the board of the target enterprise. The succession approach of the company follows a traditional family-operated model, as Mr. Johan Fredrik Maximilian Carpelan holds the position of chairman in both the target enterprise and several subsidiary companies. Furthermore, the successor, Mr. Robert Maximilian Carpelan, is involved in the most significant three companies, namely JOBROMA Holding Ab, Oy Botnia Marin Ab, and Oy Targa Center Ab. These companies operate in the finance, manufacturing, and wholesale/retail sectors, which represent the core board interlocks of the target enterprise.

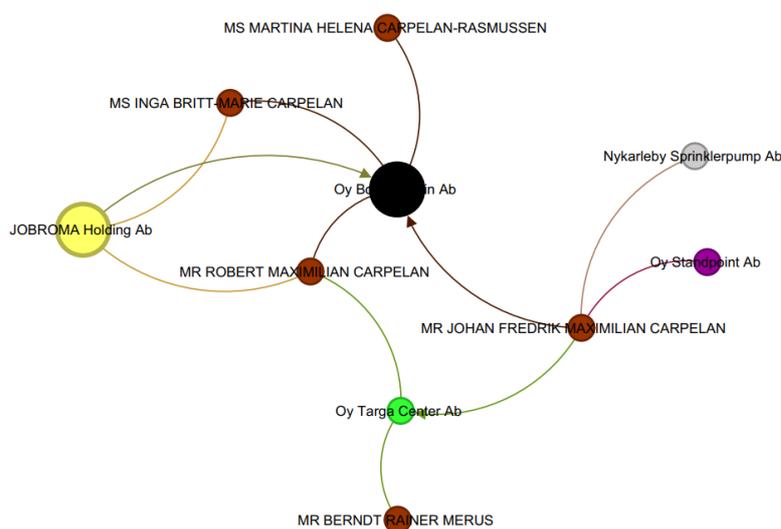


Figure 8: No. 2 Enterprise: Botnia Marin Ab

- **Case 3: Lumikko Oy**

The target company in the third case is a small sized manufacturer of household cooling and ventilation equipment, and the number of internally and externally appointed directors is balanced. However, from Figure (9), it can be seen that the chairman of the board of directors of this company is an external appointment, and the size of external board interlock companies is generally larger than that of internal ones; the number of external board interlock companies is generally more than that of internal ones. From the internal appointment board interlocks of the family business, it can be seen that the main industrial structure is intra-industry and consulting and research, and they are all small companies. The internal structure only focuses on the production and supply of upstream and downstream industries and process improvement. In contrast, the external structure's industrial distribution is significantly more robust, mainly consisting of

seven financial enterprises (one large enterprise and six small enterprises), three small consulting and research enterprises, and one large retail service enterprise.

In terms of specifics, 'Lumikko Oy' has a primary subsidiary called 'Lumikko Huoltopalvelut Oy'. Meanwhile, the two main family members, 'Mr. Anssi Kalevi Latvala' and 'Mr. Lauri Petteri Latvala', hold positions as ordinary members on the board. However, the chairman of the board is a non-family member, 'Mr. Juha Untamo Saarinen'. This is quite different from the other four companies, as it is less common for non-family members to chair the board of a family enterprise. Furthermore, 'Mr. Juha Untamo Saarinen' serves on the boards of 14 companies, with four of them being chairman positions. Among these companies, most of them have business collaborations with the target enterprise, while some are potential collaboration partners appearing in the board interlocks.

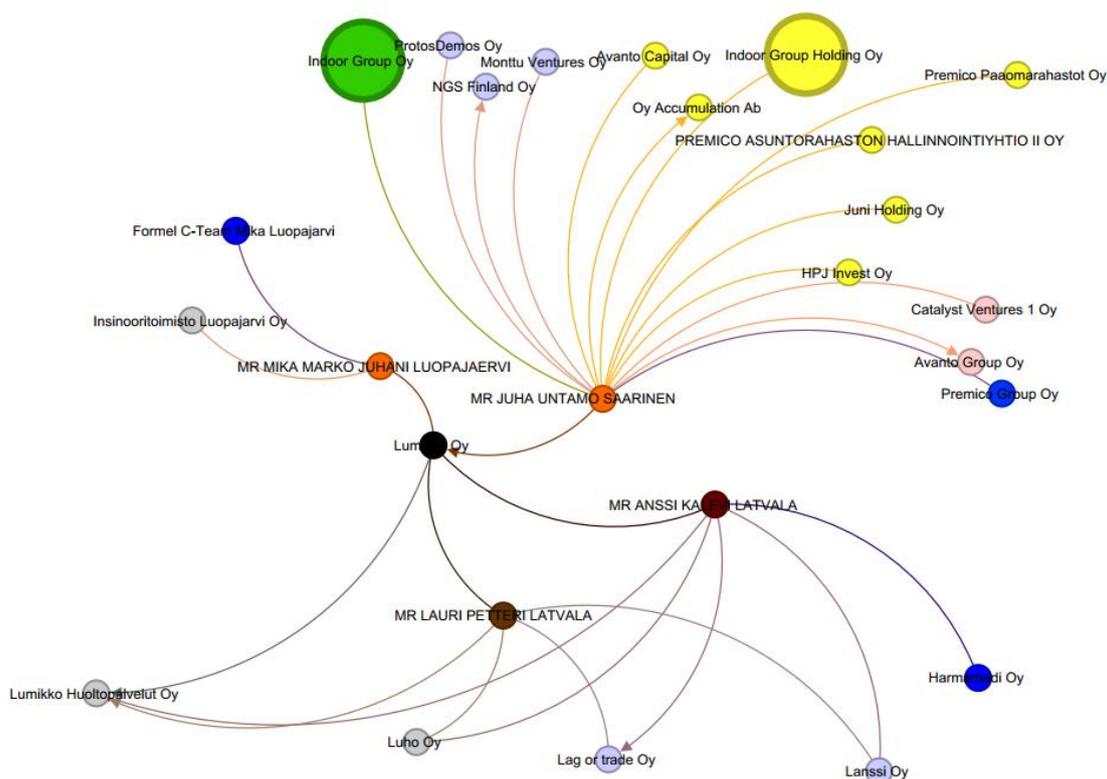


Figure 9: Enterprise No. 3: Lumikko Oy

- **Case 4: Kytola Instruments Oy**

The fourth case study is about a medium-sized equipment manufacturing family business, where the internal board interlock serves as the chairman of the board and holds a dominant position in the company (as shown in Figure

10). From the internal appointment structure, it can be seen that the target enterprise has a small catering subsidiary, a small retail subsidiary, and an intra-industry subsidiary. The external board interlock in this case is particularly noteworthy. Although there is only one individual, this person is the chairman of the board of six catering companies, including one large enterprise, three medium-sized enterprises, and two small enterprises.

In terms of specifics, 'Kytola Instruments Oy' has two primary subsidiaries: 'OK-Vise Oy' and 'Muuramen Ollila Oy', both of which are intra-industry related enterprises. Mr. Risto Tapani Kytölä serves as the chairman of the board for the target enterprise and its subsidiaries, and he is also a family member. The other family members on the board hold positions as ordinary members. There is only one non-family member, Mr. Ari Ilkka Juhani Taivalsaari, who serves on the boards of seven companies. Interestingly, five of these companies are in the restaurant industry and they are all customers of the target enterprise.

The internal board interlock structure of the target enterprise is quite different from the external board interlock structure. Internal board interlock mainly includes a small wholesale and retail enterprise and a small intra industry-related enterprise. Compared with the size and number of external board interlocks, internal board interlocks appear comparatively weak.

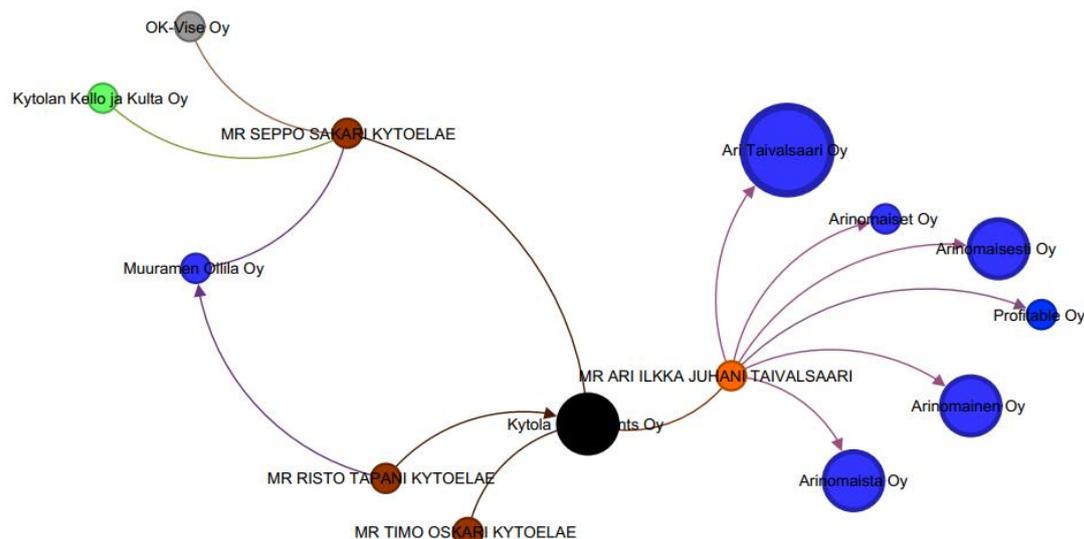


Figure 10: Enterprise No. 4: Kytola Instruments Oy

- **Case 5: Oy Narko Group Ab**

The fifth case is about a manufacturing company that produces vehicle bodies, and the company only has internal board interlocks and without any external ones. Interestingly, it was discovered through shareholder information of related companies that the two chairpersons of the board are husband and wife, and another director has a parent-child relationship with them. This is a traditional family business, whose industrial structure and development direction are in line with most Finnish manufacturing companies. Firstly, the target company has seven subsidiaries, all controlled by family members (the chairpersons of the board are the internal board interlocks) (As Shown in Figure 11). Secondly, among these seven companies, four small businesses are wholesale and retail types, two are intra-industry types (one medium-sized and one small), and one is a small-scale General management service company.

In terms of specifics, 'Oy Narko Group Ab' has six subsidiaries, with only one being an intra-industry enterprise, 'Oy Narko Ab', one being a management company, 'Oy Gevesta Ab', and the rest being wholesale and retail businesses. 'Mr. Hannu Ilmari Louhi' serves as the chairman of the board for the target enterprise and he is also the chairman of the boards for three retail subsidiaries. 'Ms. Anne Christine Gullström-Louhi' is an ordinary member of the target enterprise's board, and she is also the chairman of the board for the manufacturing subsidiary. 'Mr. Mikael Johannes Louhi' is the next-generation successor of the target enterprise and he is also the chairman of the boards for four board interlocking companies. It can be observed that these three family members hold the position of chairman in different companies. While the decision-making power of the target enterprise lies with 'Mr. Hannu Ilmari Louhi', the decision-making power of the majority of the related subsidiaries is held by the other two family members.

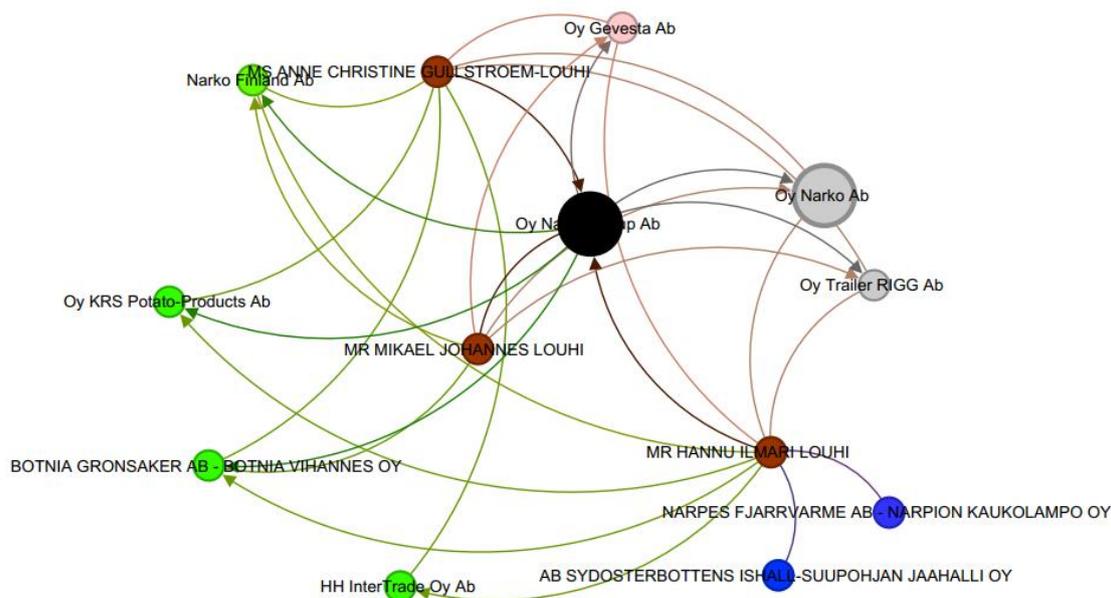


Figure 11: Enterprise No. 5: Oy Narko Group Ab

4.3 Result of public information

When conducting the search for the five target companies, it was found that Ensto's sustainability report provides detailed information on Ensto's other business activities and its relationships with partner companies (Ensto, 2021). In the information about these partner companies, it can be determined whether the internal and external board interlocks in Ensto have experiential and potential mechanisms or actual functional associations within the target companies. Additionally, information on the positions and business types of relevant individuals in the target companies was verified through third-party websites such as 'MarketScreen.' While most of the valid information in these sources can be confirmed through Orbis, the third-party websites not only validate the currency of the information in Orbis but also demonstrate the interrelationships between some companies.

Public information about 'Botnia Marin Oy' is relatively difficult to confirm, but its structure, along with 'Narko Group,' only follows the pattern of internal board interlocks. Thus, it can be confirmed through Orbis that the related companies with board interlocks are subsidiaries and parent companies of the target companies. Although financial reports for these two companies are lacking, their official websites provide detailed descriptions of the business connections and

cooperation mechanisms among the most parent and subsidiary companies. In cases where the exact service recipients of certain companies cannot be fully determined, this study will speculate on whether the connection is experiential or functional based on the specific business and corporate affiliations. For example, during the search on the official website of 'Narko Group,' it is evident that their main business involves not only manufacturing but also the multi-channel sales of various products. Additionally, third-party websites like 'Asiakastieto' were used to determine the primary shareholders and customer information for these two companies.

The public information about 'Lumikko Oy' primarily comes from its official website, specifically the description of the company's history. In Lumikko's corporate history, several companies have provided financial support and engaged in business collaborations at different stages and to varying degrees. The website information also elucidates the main ways in which Lumikko has developed collaborations with other companies and transformed its business. However, due to the lack of relevant annual reports for 'Lumikko Oy,' the mechanisms of cooperation between companies are largely speculative judgments. Currently, the companies that can be identified as having specific business collaborations with Lumikko include, in addition to internal board interlocks, Indoor Group, NGS Finland Oy, and other potential experiential or speculative judgments regarding the business relationships with other companies.

Similarly, the public information about 'Kytola Instruments Oy' primarily comes from its official website, 'Asiakastieto,' and 'Finder.fi.' Information from 'Orbis' and 'Asiakastieto' reveals that Mr. Ari Ilkka Juhani Taivalaari is the main external appointed shareholder, and the companies he has invested in, apart from Kytola Instruments Oy, are mainly in the food services industry. From the official website, it can be inferred that Kytola Instruments Oy's service model primarily includes retail and business collaborations, suggesting that Mr. Ari Ilkka Juhani Taivalaari plays a key role in facilitating collaborations between Kytola Instruments Oy and his other businesses. The public information from 'Finder.fi' indicates that Mr. Ari Ilkka Juhani Taivalaari does not have work experience in the mechanical manufacturing industry, which increases the likelihood of actual functional associations.

4.4 Definition of cases models

The qualitative category requires a lower level of abstraction from the theory, as qualitative is a study that explores the phenomenon itself in depth (Eisenhardt & Graebner, 2007). Therefore, this part of the analysis focuses on the materialization of abstract data about the cases' family businesses.

Therefore, this section focuses on the functionalities of the five different cases of board interlocks, with specific data from the five cases. In addition to this, the analysis of the main body also refers to the public information of the relevant companies and their annual financial reports, which helps the research to guarantee the reliability of the research (Triangulation, 2014). From these information and documents, we determine: the affiliation of the companies, the business transactions between the companies, the personnel changes between the companies, and the cooperation mechanisms between the companies. From the affiliation of companies, I can determine the business dominance of the relevant companies; from the business transactions between companies, I can see the market demand of the relevant companies; from the personnel changes between companies, we can observe the specific role of board interlocks; from the cooperation mechanism between companies, I can determine the development direction and business needs of the relevant companies.

- **Model of External Resource Balance**

Based on the related data from 'Ensto Oy', it can be seen that the functions of most board interlocks in enterprises can be found in their affiliations data (Figure 7) and financial reports. Through analysis and summarization, the main board interlocks of 'Ensto Finland Oy' and its parent company 'Ensto Oy' can be presented (as shown in Table 3). First of all, from the affiliation of the company, it can be seen that the target enterprise is fully controlled by the family, and its parent company's main function is control, management, and developing other small businesses.

From the financial report and cooperation mechanism of the company, it can be found that the function of external board interlocks is to cooperate with the 'Ensto Oy' and provide corresponding raw materials, funding, and technical support. From the personnel changes in the board of directors of 'Ensto Finland'

and 'Ensto Oy' (from Orbis), it can be seen that the core members of the family are very stable, and the probability of change is not high. From the 'Ensto Finland' relevant financial reports and public information, it can be seen that these four external intra-industry enterprises are suppliers of equipment for the target enterprise and vice versa. Meanwhile, the target enterprise is also a major supplier for two external agricultural enterprises. In addition, from the data in Figure (7), enterprises in the financial services, technical support, consulting, and research categories are important channels for the target enterprise to seek funds and professional advice. Therefore, the development of 'Ensto Finland Oy' is very balanced, as it takes into account both the family's internal control of the enterprise and its business expansion, as well as the external board interlocks' supply and cooperation of raw materials, technology, and funding.

For enterprises, the main purpose of board interlocks is to obtain stable external resources and provide a stable supply chain system (Perrow, 1993, p. 391). Economic rationality can enhance the role of external appointments in related family businesses, but their main purpose is still to strengthen the family's control over the enterprise (Caiazza et al., 2022). Obviously, the main development strategy of 'Ensto Finland Oy' is to seek support from external resources while maintaining internal control and self-growth. Therefore, I name this type of pattern as "the Model of External Resource Balance". The related family businesses have not lost control of the target enterprise, and have also introduced reasonable external resources to balance the development risks and shortcomings of the enterprise (as shown in table 5).

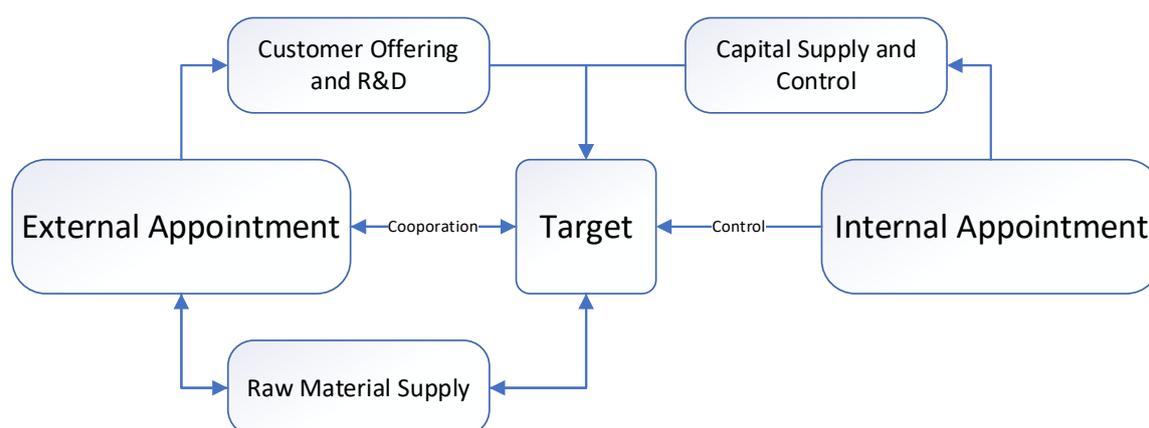


Table 5: Model of External Resource Balance (ERB)

- **Model of Traditional Internal Development**

From the available information about 'Botnia Marin Ab' and its parent company 'Jobroma Holding', it can be concluded that the board interlock structure of 'Botnia Marin Ab' is a case with only internal board interlock and no external board interlock. The main business of 'Botnia Marin Ab' is based on large-scale enterprise orders and small-scale retail. The primary function of intra-industry board interlock and technical service board interlock is to provide product processing services and equipment updates to the target enterprise. Although the target enterprise has a parent company that provides funding, the role of the parent company appears to be more focused on controlling 'Botnia Marin Ab', as indicated by the financial performance. Based on personnel changes (from Orbis), the positions of family members in the board of directors of 'Botnia Marin Ab' have been constantly changing, but the business has always remained under the control of the same family. Clearly, 'Botnia Marin Ab' is a family business that is very conservative in the application of board interlock. Whether in retail or technical support, 'Botnia Marin Ab' has not directly established subordinate relationships with related enterprises, but rather connects with them through family members as board interlock (except for the parent company Jobroma Holding). This makes 'Botnia Marin Ab' look like an "island" in the entire relationship, and although it is "isolated," the external risks are very small. From a functional point of view, the role of board interlocks for 'Botnia Marin Ab' is more like an assisting role (as shown in the Table 6).

Conservative family businesses can mainly be divided into conservative decision-making, traditional values, and family control desires for the development of the company (Lin, 2018). The composition of the board of directors of target company is limited to family members, and its business development is mainly dominated by the family's financial enterprise. The target company itself has almost no connection with external companies, and the company's business, personnel and development plans are all decided within the family. Therefore, target company can be considered as a more conservative family business. Based on the above analysis, this model can be named as "the Model of Traditional Internal Development."

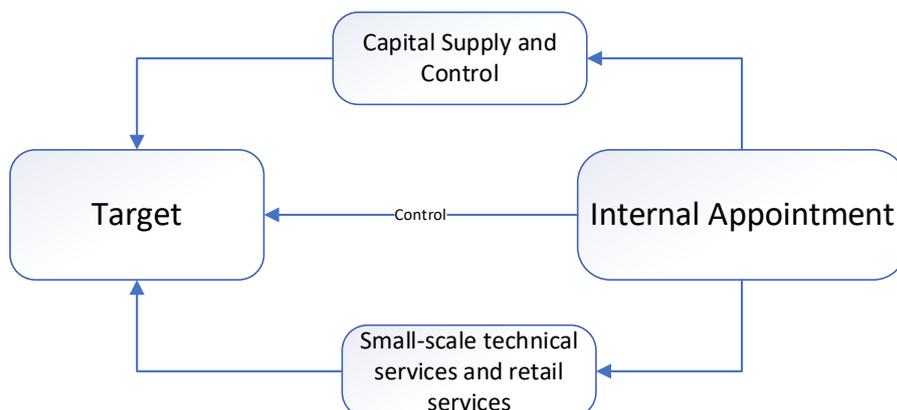


Table 6: Model of Traditional Internal Development (TID)

- **Model of Complete External Control**

Based on the board interlock structure (as shown in Figure 9), the internal board interlocks of 'Lumikko Oy' mainly consist of intra-industry and R&D, while the external board interlocks mainly consist of wholesale and retail, general management, R&D, and financial investment. However, public information about 'Lumikko Oy' reveals that not all external board interlocks are related to the target company. Although 'MR Juha Untamo Saarinen' serves as the board interlock for 14 companies, only 8 of them have business connections with the target company. These 8 companies also cover the main four types of industrial sectors, but the external financial investment board interlocks primarily provide funding rather than control over the company. Based on the business relationships of the company, 'Lumikko Oy' subsidiaries mainly develop related products or provide corresponding maintenance services, while the external board interlocks provide general management, retail services, and product development to the target company. Although the company can continuously obtain resources and funds from external sources, the family has completely lost control over the company (as shown in table 7).

Thus, external resources dominate the development and decision-making power of the entire enterprise. Chua et al. (2006) believe that external board interlocks of family business can help the relevant family avoid management and financial risks. External appointments are considered to help relevant families strengthen their control over the company (Jeong et al., 2022). However, the data and results presented in this case show that when external board interlock appointments become powerful enough, they can directly control the company's decision-making power and plan its future direction. Therefore, I call this type of

pattern that is completely dominated by external board interlocks "The Type of Complete External Control."

In addition, some of the external board interlocks of Lumikko involve financial investment companies and intra-industry enterprises that do not have direct business transactions with the target company. However, these companies still hold significant value as they can provide relevant development advice and expertise. Furthermore, they also serve as potential partners for the target company.

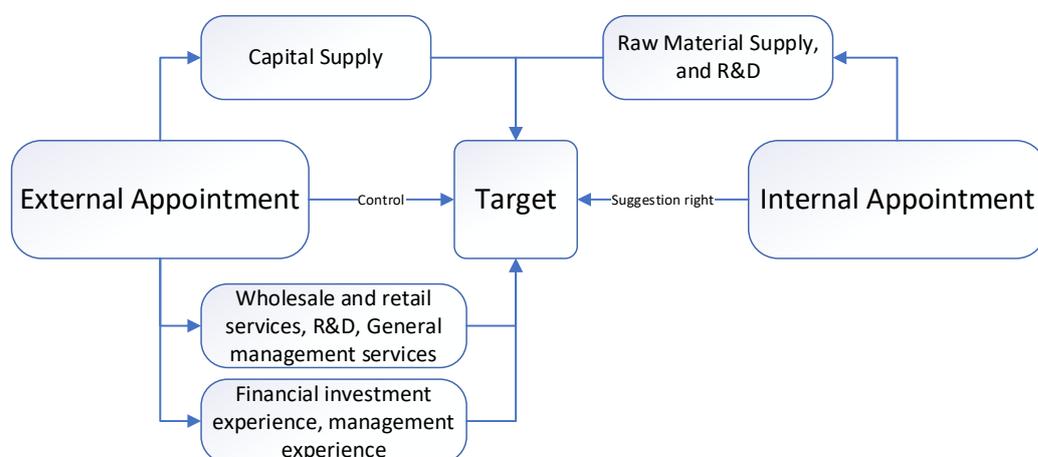


Table 7: The Model of Complete External Control (CEC)

- **Model of External Customer-Oriented**

From the industry structure of board interlocks, it can be seen that the external board interlocks of 'Kytola Instruments Oy' are much stronger than its internal board interlocks. From the personnel changes in the company (from Orbis), it can be observed that the board of directors of 'Kytola Instruments Oy' is mainly composed of members of the family. From the relevant public materials, it can be found that the main function of the internal board interlocks is to serve the business or products of the target company (for example, 'OK-Vise Oy' mainly shapes the products of the target company, while 'Kytolan Kello' mainly provides retail services for the products of the target company). On the other hand, the external board interlocks include six large and medium-sized enterprises, all of which are in the catering industry. Based on the target company's financial reports and official website information, it was found that the target enterprise is the main equipment supplier for these six catering companies.

Therefore, for the target enterprise in this case, the main function of this external board interlock is to provide a stable customer base. If a manufacturing enterprise is customer-oriented, it can continuously improve its management processes and product design and establish stable customer relationships (Wieland et al., 2015). However, a stable customer base also means that there is a certain lag in industrial and product updates and the risk of unlimited cost increases (Wieland et al., 2015) (as shown in table 8). Therefore, I call this type of binding customers with external board interlocks as "the Model of External Customer-Oriented".

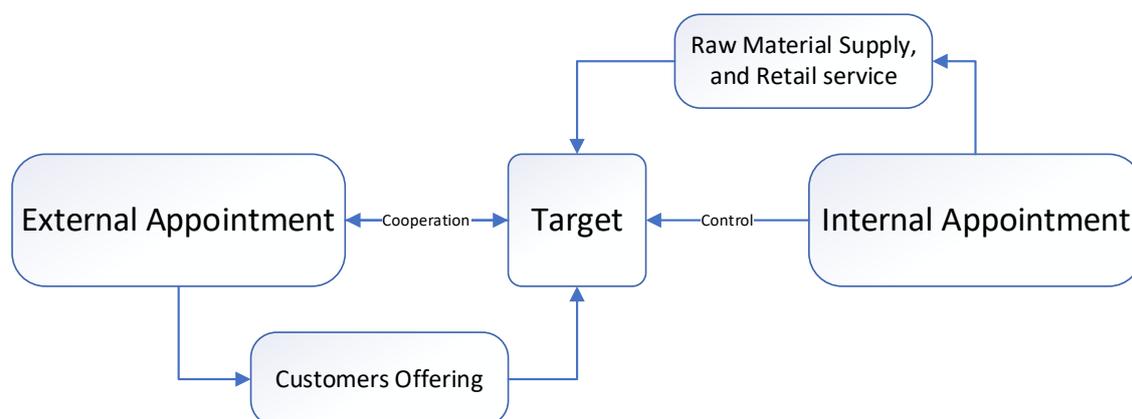


Table 8: Model of External Customer-Oriented (ECO)

- **Model of Internal Self-Growth**

There is a total of 9 board interlocks under 'Oy Narko Group Ab', out of which 7 companies have business transactions or collaborations with the target enterprise. Interestingly, all companies that have business cooperation or transactions with the target enterprise are subsidiaries of 'Oy Narko Group Ab' (as shown in Figure 10). From the public information of 'Oy Narko Group Ab', it can be found that the goods of 4 wholesale and retail companies are supplied by the target enterprise; 2 Intra-industry companies are suppliers of raw materials to the target enterprise; and 1 general management service company mainly handles administrative procurement matters of the target enterprise. Therefore, it can be seen from the business distribution that almost all board interlocks serve the target enterprise, and the main source of orders for 'Oy Narko Group Ab' is the internal retail and wholesale distributors. From the personnel changes of 'Oy Narko Group Ab', it can be seen that the target enterprise has always been a family-owned business with no changes in the board of directors, and the composition of the board of directors is exactly a family of three. From the cooperation

mechanism of 'Oy Narko Group Ab', it can be found that the development mode of the target enterprise is market-oriented, and this development in turn promotes timely updates within the enterprise (as shown in Table 9).

From the publicly available information about the enterprise, it can be seen that the target company's orders primarily come from the demand of its internal board interlocks, and the design of related products is also market-driven. Meanwhile, the profits obtained by the target company are continuously reinvested in production, design, and management of the enterprise. This self-development and self-sustaining mode are very suitable for family-owned enterprises that do not rely on external funding and resources. The manufacturer-retailer relationship is determined by the interactivity of product pricing, productivity levels, market responsiveness, and personal relationships (Ailawadi et al., 2010). In this case, since the manufacturer-retailer relationship is that of a parent company and a subsidiary company, the interaction of pricing, productivity levels, and personal relationships are all stably controlled by the family, with only market demand being an uncertain factor. Based on the above analysis, this is a manufacturing and retailing enterprise that also has a complete management mechanism and supply system. Therefore, I name this model "the Type of Internal Self-Growth".

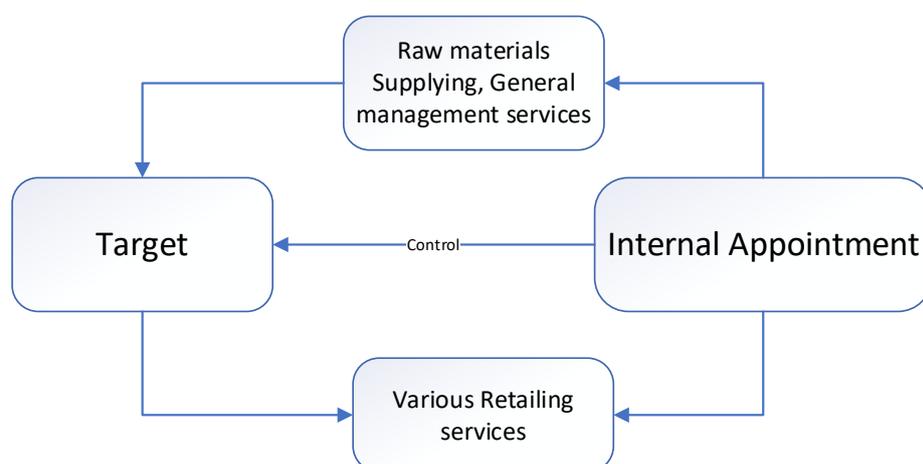


Table 9: Model of Internal Self-Growth (ISG)

4.5 Analysis of shareholding methods

From the data in Figures (7) to (11), it can be observed that cross-shareholding has not occurred in Finnish SMEs, and all external board interlocks are presented as shareholders with co-ownership. Firstly, the systematic review results indicate that Finnish family businesses place the greatest emphasis on reputation and honesty (Koiranen, 2002). However, the risks of cross-shareholding are more like a way for related companies to obtain security through stock pledging (Miyajima, 1994), which contradicts the secure development environment in which Finnish family businesses operate. Secondly, Finnish family businesses place more emphasis on innovation and a spirit of adventure (Sorama & Joensuu-Salo, 2022), which is completely opposite to the conservatism of most family businesses. However, cross-shareholding often means that related family businesses may be bound by other stakeholders (Miyajima, 1994). Thirdly, Finnish family businesses have higher profit margins and self-sufficiency rates (Pihkala et al., 2022), but one of the purposes of cross-shareholding is to cooperate in business and share resources (Miyajima, 1994). Compared with common shareholding, obtaining resource sharing through cross-shareholding appears to be highly distrustful of cooperative enterprises. Therefore, from the perspectives of objective environment, historical development, and enterprise purposes, it is reasonable that cross-shareholding has not appeared in Finnish small and medium-sized family businesses.

In contrast to cross-shareholding, common shareholding has less influence on related shareholders. Firstly, the more common shares held by shareholders outside the family, the more commitments the enterprise receives (Vilaseca, 2002). Commitments between enterprises often rely on higher levels of trust, which is why common shareholding is the primary way for Finnish family businesses to hold shares. Secondly, common shareholding is a common way for family businesses to manage subsidiaries and affiliates (Flath, 1992). From the data in Figures (7) to (11), it can be seen that family businesses have many subsidiaries and affiliates. Therefore, it is reasonable that common shareholding is widely used in Finnish small and medium-sized family businesses based on the objective environment and cultural characteristics.

4.6 Holistic Analysis

From the above analysis and summary, it can be seen that target companies tend to be conservative in internal appointments and more radical in external appointments. First of all, all five models involve internal appointments, and most target companies are subsidiaries of family-owned businesses or have family members serving as board chairman. Complete control by the family is beneficial for the stability of the management of the enterprise, but it may also reduce the motivation for enterprise development, similar to most family-owned enterprises. Three of the five types involve external appointments, with these external appointees either serving in multiple types of enterprises or in multiple enterprises of the same type. Compared to the industry singularity of internal appointments (excluding ECO), the overall structure of external appointments is more diverse, and the companies are generally larger in size. Therefore, the development strategies adopted by family businesses for different types of board interlocks are also different, at least the FBs with external board interlocks are more radical than those with only internal board interlocks.

Secondly, regardless of internal or external board interlocks, all five types of cases show the importance of intra-industry board interlocks. From the overall perspective of these five types, there has no evidence to show that internal board interlocks are more concerned with intra-industry than external board interlocks, and even in ERB, the intra-industry connections involved by external board interlocks are larger in scale and quantity than internal board interlocks. Except this, the function of the financial services industry as a whole is different from the original conclusion found through the review in the article. Through observations and analysis of the five different types, it can be found that the financial services industry in FFBBIs can be divided into 3 different forms and situations: 1), When the financial services industry appears in the form of internal board interlocks, its role is more towards strengthening the control and decision-making power of the family over the enterprise. In addition, it can also develop other types of businesses with the target enterprise as the core. 2), When the financial services industry appears in the form of external board interlocks, its role is to seek external funding to stabilize the development of family businesses. 3), Not all types of FFBBIs require financial investment companies as board interlocks (except for ECO and ISG).

Thirdly, although 'wholesale and retail' board interlocks are not the core of these five patterns, they have important role in each pattern. The scale of wholesale and retail enterprises involved by family businesses in internal board interlocks is generally small, and most wholesale and retail businesses are internal board interlocks, except for the Type of Complete External Control, because this type of enterprise is completely dependent on external resource supply.

Fourthly, whether internal or external appointments, customers are an important guiding factor. Although the industries of customers involved in the relevant family businesses cases can only be determined through the company's financial reports and public network information, it can be seen that most models in these 5 types involve customers (mainly concentrated in 'agriculture' and 'other' classifications), and customers generally appear in the form of external board interlocks. However, internal board interlocks tend to focus more on retail and intra-industry as the main development mode.

4.7 Comparative Analysis

This section uses a comparative approach to illustrate the different forms of FFBBIs by comparing them in pairs, and based on these forms, to explain the relative advantages of each mode (as shown in Figure 12).

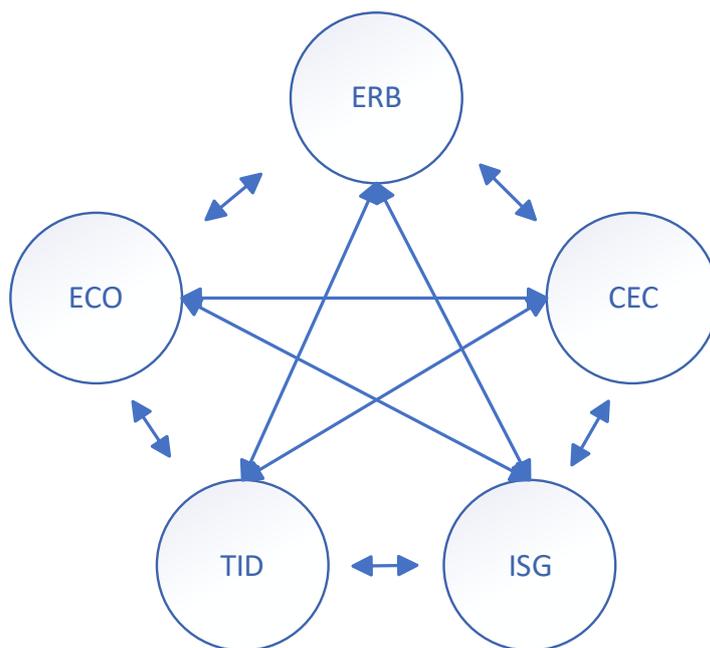


Figure 12: The comparison framework for different models

4.7.1 Models' pairwise comparison

- **External Resource Balance (ERB) & Complete External Control (CEC)**

The five different models represent different development paths for small and medium-sized family-owned equipment manufacturing companies in Finland, each with its own advantages and limitations. There are three models that have both internal and external board interlocks: ERB, CEC, and ECO.

Comparing ERB and CEC, both models emphasize the importance of external board interlocks for the development of family businesses and rely on the resources provided by external board interlocks. The difference is that ERB's target companies are chaired by family members, while CEC's chairperson is a shareholder of external board interlocks. In terms of control over family businesses, ERB has more control. In terms of industry structure, ERB's external board interlocks are mainly intra-industry, while CEC's external board interlocks are mainly financial service companies. From the industry structure of internal board interlocks, it can be seen that ERB's target companies are controlled by the family through their own financial investment companies, while CEC's internal board interlocks mainly focus on intra-industry production, which is exactly the opposite of ERB.

Therefore, compared with CEC's model, ERB has: 1) greater autonomy and balance of external board interlocks ' freedom; 2) greater control over the company by the family; 3) more reasonable resource board interlocking structure; and 4) better balance of interests between external and internal board interlocks. For ERB, the advantages of CEC are also obvious: 1) the family can focus on developing their expertise; 2) it reduces the risk of internal and external board interlocks being out of synchronous; 3) it has more sufficient financial support; 4) external retailers transfer risks in retail; and 5) stable customers and functional supply chains. Therefore, in terms of family control and industry structure balance, ERB is more suitable for relevant family businesses to choose. However, in terms of balancing external risks and strengthening production efficiency, CEC's stability is stronger.

- **External Resource Balance (ERB) & External Customer-Oriented (ECO)**

The ERB and ECO models both have strong external business inputs, and their boards of directors are also composed of family members, which means that the family has better control and decision-making power over the target enterprise. However, the external board interlocks of ERB are more inclined towards intra-industry, general management, and external consulting, while the external board interlocks of ECO are mainly the customer group that the target enterprise needs to serve. This is equivalent to the contracting party directly participating in the production process and product decision-making of the contracted party. For internal board interlocks, ERB models mainly include the family's own financial investment companies, but ECO does not have this type of enterprise. In addition, the types and quantities of ERB's internal board interlocks are more abundant than those of ECO.

Therefore, the advantages of ERB compared to ECO are mainly: 1) having a sounder industrial structure; 2) richer material resources for enterprises; 3) the company's customers are more diversified; 4) the management risk is relatively smaller; 5) the company has more channels to obtain funds. For ERB, the advantages of ECO are also very obvious: 1) having a more stable customer base; 2) a more focused production process; 3) no need for a large external funding demand. Therefore, ERB has a more abundant channel for obtaining funds and smaller management risk because external board interlocks can help ERB model family businesses obtain timely market information, while ECO's customer base is more stable and the production process is simpler and more efficient.

- **Complete External Control (CEC) & External Customer-Oriented (ECO)**

CEC and ECO both have strong external board interlocks and are focused on internal production efficiency. However, in CEC's model, the chairman of the board is appointed by the external board interlocks' shareholders, which is different from ECO. From the industry structure of external board interlocks, it can be seen that CEC's external board interlocks are more inclined towards financial services, and research & development, as well as retail-related businesses; while ECO's external board interlocks are only focused on customer-oriented businesses. Focusing on internal board interlocks, both family businesses focus on their own production efficiency and have few related subsidiaries. However, CEC's internal board interlocks focus on intra-industry and research and development industries, while ECO's internal board interlocks mainly include retail-related enterprises and intra-industry.

Therefore, compared to ECO, CEC's advantages mainly include: 1) Stronger industry flexibility; 2) Richer external resources; 3) Transfer of retail and financial risks to external parties. For CEC, ECO's advantages are also very obvious: 1) More stable customer base; 2) More concentrated and specialized internal production; 3) Stronger family control over the enterprise. From the above analysis, it can be seen that CEC relies more on external funding and technological support, while ECO relies more on external customer demand.

- **Traditional Internal Development (TID) & Internal Self-Growth (ISG)**

Both TID and ISG have modes that do not involve external board interlocks, and they both primarily operate within Intra industry and retail-type board interlocks within their internal board interlocks. Therefore, both TID and ISG's modes are entirely controlled by family ownership, but the difference is that TID's target company is a subsidiary of a family-controlled investment and finance company, while ISG primarily focuses on independent equipment manufacturing companies. From the industrial structure, TID's industries mainly involve finance, Intra industry, retail, and technology services, while ISG's board interlocks are mainly focused on multiple retail and Intra industry enterprises.

Therefore, compared to ISG, TID's advantages mainly lie in: 1) a more centralized industrial layout; 2) more professional funding channels; 3) more professional technical support. Similarly, compared to TID, ISG's advantages lie in: 1) a broader retail layout; 2) more professional Intra industry planning; 3) a strong focus on general management services. Based on the above analysis, TID's mode is more suitable for traditional family businesses' initial planning, while ISG is more suitable for relevant family businesses to further expand their business or complete their enterprise inheritance process.

- **External Resource Balance (ERB) & Traditional Internal Development (TID)**

The fundamental difference between ERB and TID is that ERB has complex external board interlocks, while TID does not. Both models have an internal board interlock focused on financial investment, and this enterprise is the parent company of the target company. Another similarity is that both models emphasize retail and intra-industry board interlocks in their internal board interlocks. The difference is that ERB has a much larger and more diverse portfolio of enterprises in both internal and external board interlocks, while TID has only a few internal board interlocks. Another important difference is that the complex external board interlocks bring ERB a large number of external resources and customers, while TID is more inclined to a conservative development system.

Therefore, compared to TID, the advantages of ERB mainly include: 1) abundant external funds and resources; 2) a wider range of customers; 3) a more extensive application of general management services; 4) a stable source of funding. Similarly, compared to ERB, the advantages of TID mainly include: 1) a more concentrated production mode; 2) more accurate risk prediction; 3) safer and more reliable technical services for internal board interlocks. From the above analysis, it can be seen that ERB's model is more open but has greater uncertainty in risk, while TID's model is safe and predictable, but completely conservative externally.

- **External Resource Balance (ERB) & Internal Self-Growth (ISG)**

The comparison results between ERB and ISG are similar to those between ERB and TID. However, ISG has a more diversified industry layout in its internal board interlocks, primarily in intra-industry and wholesale and retail enterprises.

ERB, on the other hand, has a simpler internal board interlock structure and targets financial investment companies controlled by its own family as subsidiary companies. ISG's target companies are not affiliated with any enterprise, but instead, it has more subsidiary companies with a relatively single industry distribution (mainly in intra-industry and wholesale and retail enterprises).

Therefore, compared to ERB, ISG's advantages mainly include: 1) an independent and specialized internal production structure; 2) stronger family control and easier inheritance; 3) subsidiary companies' industry distribution and business development goals that match. Compared to ISG, ERB's advantages mainly include: 1) more abundant external resources and channels; 2) a more reasonable industrial structure and distribution; 3) clear internal and external board interlock division of labor; 4) faster business expansion. From the above analysis, it can be seen that ERB has a more balanced internal and external resource channel, while ISG has a more stable development trend.

- **Complete External Control (CEC) & Traditional Internal Development (TID)**

Both CEC and TID exhibit significantly different models in terms of industry composition and family control over businesses. Firstly, in the CEC model, the chairman of the board is typically an external shareholder, while in the TID model, there are no external board interlocks at all. Therefore, TID has absolute control over its target companies, whereas target companies under the CEC model have the least control. Secondly, TID's target companies can obtain funding from their parent companies, whereas the CEC model generally relies on external funding channels. Thirdly, CEC places more emphasis on partnerships with external wholesale and retail companies, whereas TID primarily includes these types of wholesale and retail in its internal board interlocks.

Therefore, based on the above analysis, the advantages of the CEC model over TID are primarily: 1) clear division of internal and external tasks; 2) external entities assume the risks associated with wholesale and retail; 3) financial risks are also borne by external entities; 4) more comprehensive industry distribution. In comparison, TID's advantages are also evident: 1) a more centralized production process; 2) stronger family control over businesses; 3) greater flexibility in decision-making. It can be observed that the CEC model is more dependent on external decision-making changes, while TID's family control is stronger.

- **Complete External Control (CEC) & Internal Self-Growth (ISG)**

CEC and ISG both focus on the Intra-industry and wholesale/retail board interlocks models. However, CEC tends to place wholesale/retail board interlocks in external board interlocks, while ISG focuses more on internal board interlocks. From the perspective of industry structure, CEC's industrial layout is more extensive, and it also has stable external funding. From the perspective of family control, ISG has complete control over the target family business, but CEC is the opposite.

Therefore, compared to CEC, ISG's advantages mainly include: 1) good family control and decision-making power; 2) a more concentrated industrial layout that is conducive to stable income; 3) no external financial and management risks. Compared to ISG, CEC's advantages are also obvious: 1) a more perfect industrial layout; 2) more funding channels and improvement methods; 3) retail risks transferred to the outside; 4) better general management services. From the above analysis, it can be seen that CEC pays more attention to the establishment of an external resource system and then feeds it back to its own development, while ISG focuses more on improving its own system and growing more healthily.

- **External Customer-Oriented (ECO) & Traditional Internal Development (TID)**

The commonality between ECO and TID models is that both are chaired by family members within the board of directors. However, there are significant differences between these two models. From the perspective of industrial structure, customers are the most important entity in both internal and external board interlocks in ECO, while TID's model mainly focuses on the development of its own enterprise, without any external board interlocks.

Therefore, compared to ECO, the advantages of TID model mainly include: 1) more autonomous decision-making power and family control; 2) more centralized production process; 3) more stable internal funding channels. Similarly, compared to TID, the main advantages of ECO model include: 1) more stable customer base; 2) faster feedback and business improvement; 3) more stable income. From the above analysis, it can be seen that ECO's characteristic is a stronger stability of customers, while TID's characteristic is a higher degree of freedom in enterprise development.

- **External Customer-Oriented (ECO) & Internal Self-Growth (ISG)**

The common feature of ECO and ISG is that they are both chaired by family members. However, ISG has two co-chairs who are a married couple, while ECO typically has an older generation family member as the chair. In terms of board interlocks, ECO has external board interlocks but only one fixed type of customer board interlock shareholder, while ISG has no external board interlocks. In terms of industry structure, ECO focuses more on the customer's industry type, while ISG emphasizes internal wholesale and retail businesses, as well as Intra industry.

Therefore, compared to ECO, ISG's advantages mainly include: 1) greater freedom of family decision-making and control; 2) stable supply chain and retail system; 3) stable family inheritance relationship; 4) no risk from external board interlocks; 5) higher degree of freedom in future business development. Similarly, compared to ISG, ECO's advantages are also evident: 1) stable customer base; 2) income from orders is more stable than from retail; 3) fewer internal board interlocks, which means lower management risks. From the above analysis, it can be seen that ECO still has a customer-oriented development model, but the large size of its customer base limits the potential for the target company's growth. The characteristic of ISG is a stable family inheritance relationship and a reasonable self-growth system for the enterprise (from manufacturing board interlocks to wholesale and retail board interlocks)

4.7.2 Summary of Comparative Analysis

Different models have their own relative competitive advantages. To determine these advantages, this research combined the above specific data of Figure (7) to Figure (11) and other public information of enterprises for analysis (as shown in Table 10). Through the analysis results from 4.6.1 Models' pairwise comparison, these advantages can be sorted into Table (10).

	ERB	TID	CEC	ECO
TID	ERB structure is more open; it is completely conservative externally.			
CEC	ERB's family control and external resource requirements are parallel; CEC has no external risks and complex industrial structure.	The internal and external development of ERB is balanced; the development structure of ISG is stable.		
ECO	ERB has more channels for obtaining funds; ECO has a more stable customer base.	ECO has better customer stability; TID has stronger corporate control.	CEC is more dependent on external funding channels; ECO is more dependent on internal customer groups.	
ISG	The internal and external development of ERB is balanced; the development structure of ISG is more stable.	TID is more suitable for FB's initial development plan; ISG is more suitable for FB's further business expansion.	CEC's external resource structure feeds back internal development; ISG's internal industrial layout completes self-development.	ECO is customer-oriented; ISG is market-oriented and based on family inheritance.

Table 10: List of relative advantages of different models.

Based on the above analysis, it can be found that the Internal Self-Growth (ISG) and Traditional Internal Development (TID) models have the strongest control over the enterprise by the family, as they only have internal board interlocks. However, compared to the other three models, their biggest drawback is that the enterprise has no external resource channels, funding channels, stable customer base, wholesale and retail services, and general management services. External board interlocks can provide not only these high-value channels and resources, but more importantly, they can provide advanced technology, knowledge, and management experience. For external board interlock shareholders of family businesses, open external board interlocks mean good resource channels and personal development opportunities.

If only comparing the ISG and TID models, it can be found that the retail industry involved in ISG has a greater variety of products (as seen through relevant public information). The development of these retail businesses is market-oriented, so ISG and related intra-industry are also developed based on market information. The TID model mainly focuses on the production and maintenance of single products, so the development mode of TID is more traditional and fixed.

Compared with the External Resource Balance (ERB), Complete External Control (CEC), and External Customer-Oriented (ECO) models, it can be found that the ERB model has the strongest ability to balance internal and external resources. Its internal board interlocks' main function is to provide funds and related product development. Although its external board interlocks are powerful, they do not have much influence on the family's control over the enterprise. On the contrary, CEC is completely controlled by external board interlock shareholders (chairman of the board); although ECO is controlled by the family, all its re-

lated industries and layouts are aimed at serving designated customers. Therefore, compared with CEC and ECO, ERB's "balance of internal and external development" demonstrates the family's stable control over external board interlocks. However, compared with CEC and ERB, ECO's stable customer base and enterprise orders minimize the unknown risks brought by external board interlocks. Finally, compared with ECO and ERB, the CEC model completely transfers the risks and responsibilities of internal enterprise development to external board interlocks.

Therefore, depending on the type of business, customer base, enterprise values, resource needs, family development inertia, risk thinking, and other factors, it can be found that each model has its suitable enterprise and survival environment. Most of the time, SMEs cannot decide on their desired board interlocks because for SMEs, every development model that can survive is a good development model (Veglio et al., 2020).

4.8 Functional Strategy Definition

By combining the findings from the systematic review and the multiple case analysis, it can be observed that different categories of board interlocks serve different functions for family businesses. From the specific functions and the publicly available information of these businesses, the actual purposes for utilizing these functions can be identified. In the systematic review, the main categories of board interlocks are financial interlock and intra-industry interlock. However, in the multiple case analysis, board interlocks can be divided into eight major categories, but their classifications are based on specific industry-related business functions. Therefore, in this chapter, based on the specific content of "Holistic analysis" and "Comparative analysis," these eight major categories are reclassified into six types based on their strategic roles for the related family businesses: Production interlock, Financial interlock, Marketing interlock, Customer interlock, Technology interlock, and Management interlock.

In the multiple case analysis of this study, intra-industry interlock mainly refers to the raw material suppliers or product processors of the related family businesses. In these five cases, except for some board interlocks that have no business transactions, the other intra-industry interlocks are involved in the product

manufacturing process. The manufacturing process in the machinery manufacturing industry includes casting, forging, machining, coating, and waste disposal (Cai et al., 2019, p. 10). Therefore, for the family businesses in the cases, "production interlock" can better describe the specific strategic value of these businesses to the target companies. On the other hand, the specific role of financial interlock in the cases aligns with its strategic value for family businesses: providing funding channels, strengthening control, etc., so the term "financial interlock" remains unchanged. Similarly, the actual function of "general management service" board interlock in the cases is to provide effective management services and assist in planning daily administrative management and personnel transfers. The term "management interlock" better captures its actual strategic value for family businesses as it encompasses a wide range of management scope and helps attract external talent.

In the cases, board interlocks related to wholesale and retail mainly refer to providing sales channels or advertising channels for family businesses to ensure stable income and profits. In ISG's model, diversified sales channels have strategic value for family businesses. They not only generate income but also help companies identify market trends and product preferences. The term "wholesale and retail board interlock" only describes its industry function, but cannot capture its actual value for family businesses. In the machinery manufacturing industry, the marketing process primarily involves advertising, market positioning, packaging, and providing timely after-sales services for products (Childs, 2014, p. 13). Therefore, the term "marketing interlock" better reflects the strategic value for the related family businesses.

In the cases, most 'agricultural board interlocks' and some 'other board interlocks' primarily serve the function of providing stable customer sources for family businesses. For the sake of convenience in subsequent analysis, we will collectively refer to this category of board interlocks as "Customer interlock." In the machinery manufacturing industry, customer-driven production processes can accelerate optimization and ensure the actual value of manufacturing enterprises (Campos Sabioni et al., 2022). The strategic value of "Customer interlock" is evident as it not only provides stable customers but also influences the production processes of family businesses (e.g., ECO). Lastly, the functions of "Technical support" and "Consulting and research" board interlocks in the cases mainly involve providing auxiliary technical support and developing better products. Diversified research and technical support are the best ways for manufacturing industries to create profits, and cross-industry knowledge spillover is an important

driver for maintaining innovation in businesses (Scott & Pascoe, 1987). Therefore, the term "Technology interlock" better reflects the actual value of these two types of interlocks for family businesses.

5 THE CASE OF LARGE ENTERPRISES

During the process of selecting cases of large enterprises, I came across Ponsse OYJ, a well-known company in the field of mechanical manufacturing. This large forestry equipment manufacturing enterprise is headquartered in Finland and employs 1,988 people with an annual turnover of approximately 85 million euros. As a large multinational company, its relevant subsidiaries overseas are also included in the scope of research to ensure the accuracy of the validation process (Ponsse., 2022).

Firstly, selecting large companies in the same industry can help to more accurately validate the case model and research conclusions. Secondly, the purpose of selecting large companies is to explore the relationship between large firms and models of SMEs, thereby providing assistance for future research on other large mechanical manufacturing companies.

Unlike many previous cases, Ponsse's third-party information and annual reports are equally comprehensive as Ensto's (Ponsse., 2022). The annual report provides precise details about Ponsse's business types and key information regarding its collaborative enterprises (Ponsse., 2022). This information helps determine the primary role of board interlocks in the target company. Additionally, the shareholder information in Ponsse's annual report outlines the roles and main functions of different board members, which aids in studying the actual impact of board interlocks. Unfortunately, for some companies like Keitele Timer Oy and Keitele Forest Oy, the specific functions are not explicitly stated. These types of board interlocks are categorized as experiential board interlocks, indicating their function is to provide development experience or potential collaboration opportunities.

Unlike the types of data available for SMEs, during the process of searching for data on 'Ponsse OYJ', many board interlocks companies did not have direct business dealings (Ponsse., 2022). Their appearance is more to verify the theory of "corporate elites", which is that the role of board interlocks is to provide professional knowledge and management experience to relevant enterprises (Davis, 1996) (Smith & Sarabi, 2020). Therefore, I named these board interlocks without actual business dealings as "Experience board interlocks", while the related enterprises with specific business and close cooperation were named "Function board interlocks". As the name suggests, shareholders involved in experience

board interlocks are responsible for providing professional expertise and knowledge, while shareholders involved in functional board interlocks are responsible for providing actual business collaborations. Fortunately, Ponsse's annual report provides detailed information on the customer base and related companies involved in actual business collaborations, which facilitates the precise differentiation of these two types of board interlocks in the research (Ponsse., 2022).

It should be noted that these two types of board interlocks are not completely separate concepts, as 'function board interlocks' can also often provide relevant management expertise and professional knowledge through shareholders. The reason for categorizing these two types is that the role of 'experience board interlocks' is only to transfer professional knowledge and experience. In the case analysis of SMEs, Due to the lack of relevant data, many related models can only be inferred based on functionality.

5.1 Case Company: PONSSE OYJ

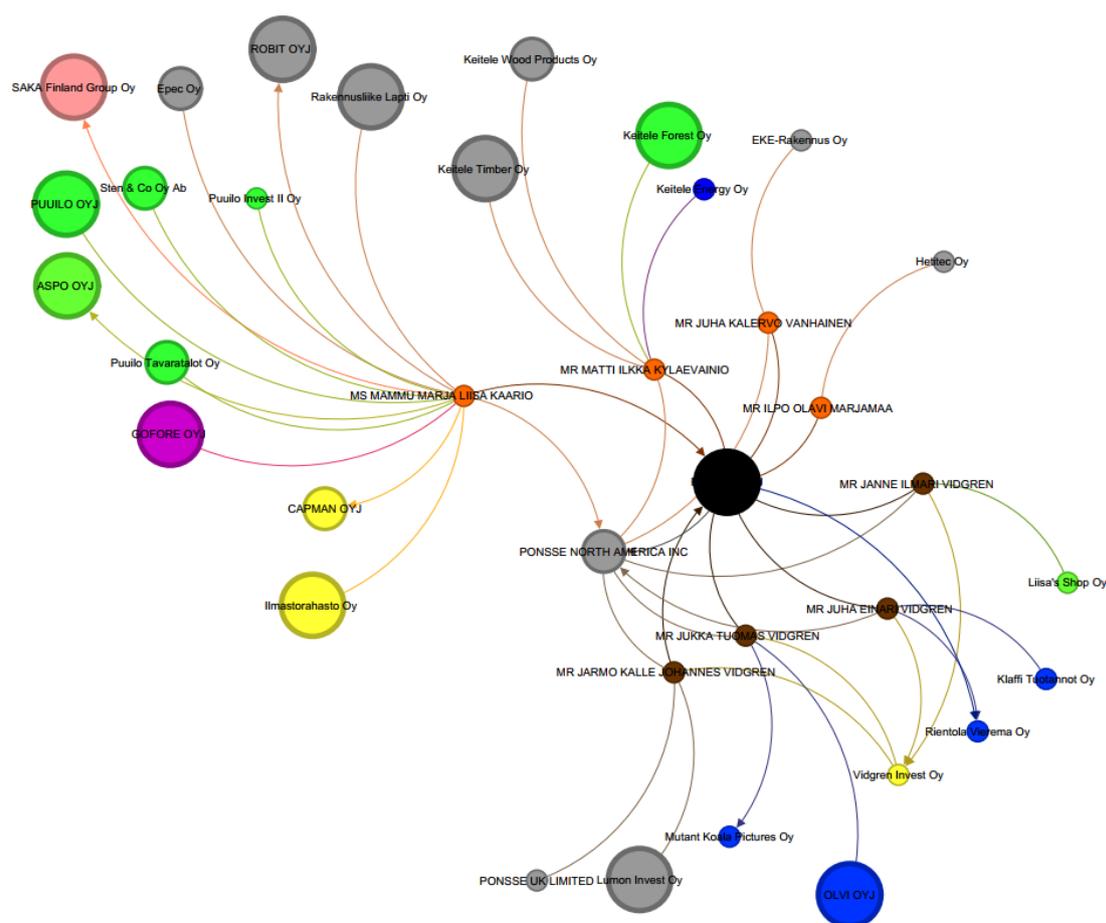


Figure 13: Large Enterprise: Ponsse OYJ

From the perspective of industry structure, Ponsse OYJ, as a large multinational enterprise, has a much more diverse range of industries than the SMEs previously analyzed. In the internal board interlocks of Ponsse OYJ, the dominant industries are mainly intra-industry and small investment finance enterprises. In addition, in the "other" field, the four companies involved are all technology service providers for the target enterprise. In the external board interlocks of Ponsse OYJ, the main industries involved include intra-industry, financial services, wholesale and retail, general management services, and technical support. Among them, "Ms Mammu Marja Liisa Kaario" is the most important figure in external board interlocks, as she holds positions in 12 large enterprises and five different industries. Meanwhile, she is also the vice chairman of the target enterprise's board of directors, with significant decision-making and management authority (as shown in the Figure 13).

In the board structure of Ponsse OYJ, the number of family shareholders and external shareholders is the same (four each), but there are two board chairmen, one of whom is a family member and the other an external member. In addition, different family members also serve as chairmen of different subsidiary boards.

Interestingly, even in the board interlocks of such a large multinational enterprise as Ponsse OYJ, cross-shareholding has not occurred. Family members do not hold shares and management rights of non-family shareholders' enterprises, and vice versa. Instead, external shareholders unilaterally hold a large number of shares in related family enterprises and their subsidiaries, and serve on the board of directors, which is the same as the board interlocks of SMEs previously analyzed.

However, because the board interlocks in Ponsse OYJ are divided into two different categories, functional and experiential, it is currently not directly stated that the board interlocks of the target enterprise have actual cooperation. Personally, whether based on functional or experiential cooperation, the individual value of external shareholders is a wealth that Ponsse OYJ values.

5.2 Function Board Interlock or Experience Board Interlock

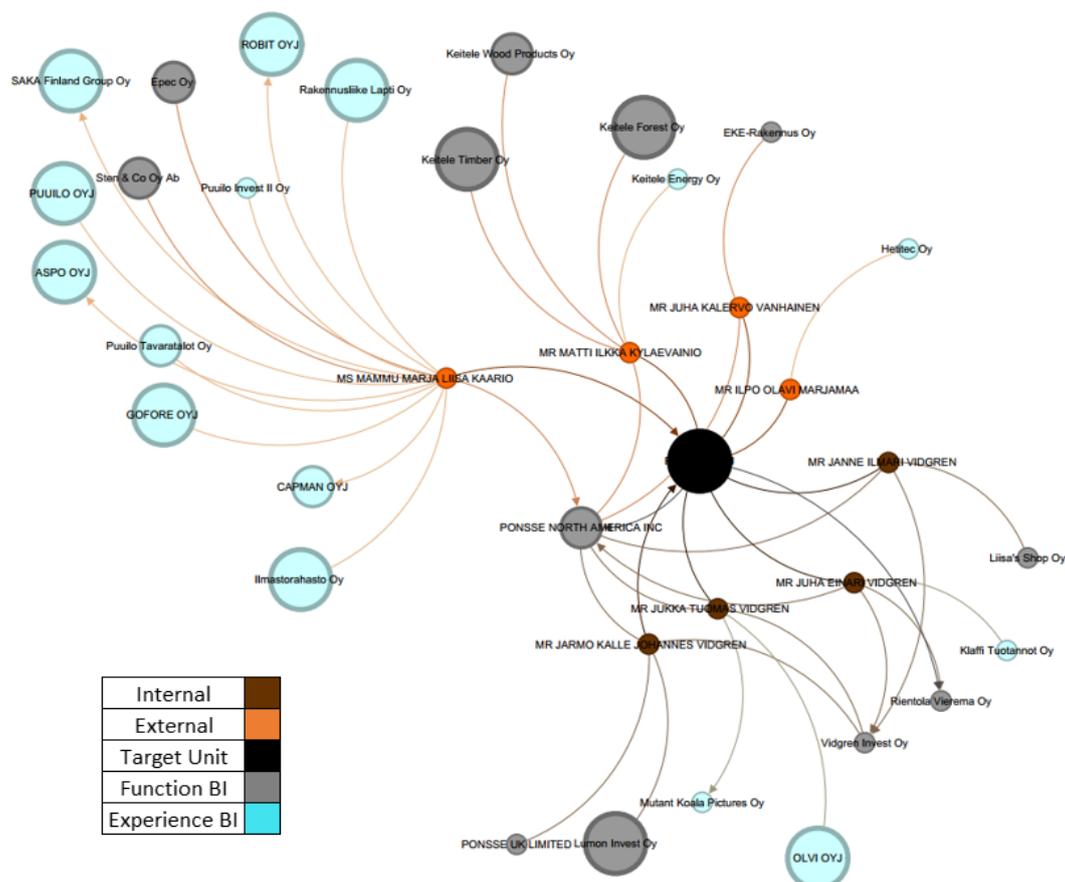


Figure 14: Ponsse OYJ's function board interlocks and experience board interlocks

Firstly, in this chapter, I divide all companies with board interlocks into two categories: function board interlocks and experience board interlocks. The reason for this classification has been explained in the beginning of "5 THE CASE OF LARGE ENTERPRISES". Here, the black color still represents the target company; brown represents family members appointed internally; orange represents external shareholders appointed to the board; light blue represents experience board interlocks; and gray represents function board interlocks.

Through the analysis of these two different forms of board interlocks, it can be observed that the main form of external board interlocks is experience board interlocks, while the main form of internal board interlocks is function board interlocks (as shown in Figure 14). According to publicly available information, although "Ms. Mammu Marja Liisa Kaario" is not a shareholder within the family,

and she has only two medium-sized interlocking companies with direct business contacts with the target company (one intra-industry and one wholesale and retail), "MR Matti Ilkka Kylaevainio" as an external shareholder has three large intra-industry companies as board interlocks, and also has direct business contacts with the target company. However, "Ms. Mammu Marja Liisa Kaario" is still the vice chairman of the board of the target company and enjoys a great deal of decision-making power as a senior shareholder in 12 different companies. This indicates that the experience board interlocks, which is based on the "corporate elite" theory, play a very important role in family businesses. This role is difficult to demonstrate in SMEs because the development of SMEs is based on survival as the top priority. Therefore, consulting board interlocks and function board interlocks may replace the role of experience board interlocks in SMEs.

From the industry structure of the companies, it can be found that the companies truly in the category of function board interlocks are mainly intra-industry, investment finance, and wholesale and retail companies. Among them, external board interlocks are mainly in intra-industry and wholesale and retail, while internal board interlocks are mainly in financial investment, intra-industry, and small-scale retail. From the perspective of experience board interlocks, it can be found that the number of internally appointed directors is very small, mainly "MR Jukka Tuomas Vidgern" serving as a minority shareholder on the board of "OLVI OYJ". On the contrary, many companies in external board interlocks appear in the form of experience board interlocks, including finance, wholesale and retail, general management, and technical support.

Through the review of relevant publicly available information, it can be found that the significance of experience board interlocks in the Ponsee case is very complex, because it not only provides experience but may also be a potential partner or a short-term business contact (Ponsee., 2022). The true meaning of function board interlocks often implies a long-term cooperation and binding, which may not always be beneficial to the target company.

5.3 Large Enterprise Model

Based on the above analysis, it can be observed that although there are certain differences in functionality between function board interlocks and experience board interlocks, they both serve as important forms of long-term or short-term collaboration mechanisms for the target company. Therefore, in the process of creating the model for Ponsse, I try to differentiate between these two types of board interlocks, while also emphasizing their similar or different roles.

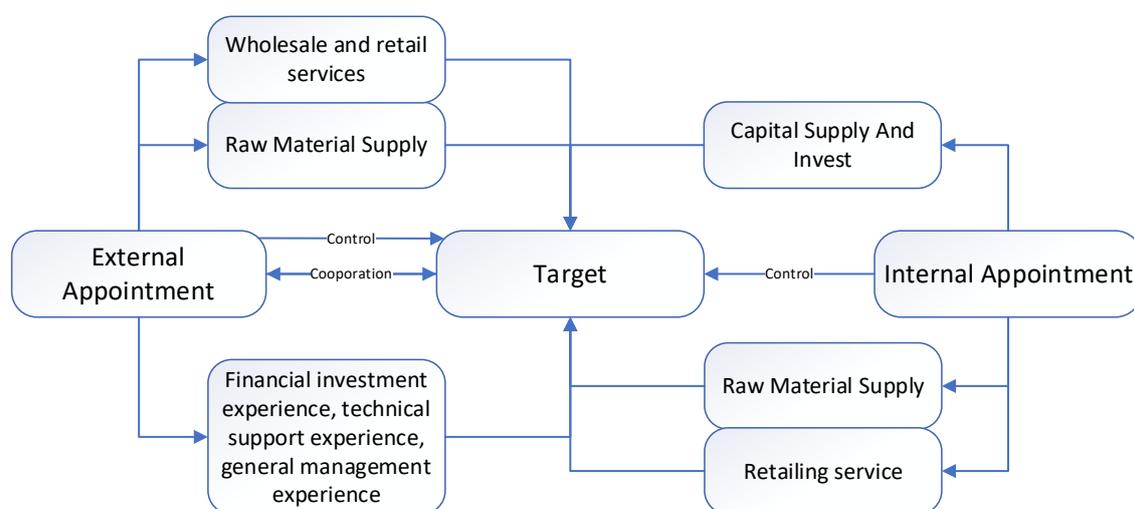


Table 11: Ponsse's synthetic model

After combining the above analysis with relevant public information to draw the model for Ponsse, it is easy to see that it is a combination of multiple SME models (as shown in Table 11). First, from the structure of the internally appointed board in the target company, it can be seen that Ponsse's model is almost identical to Traditional Internal Development (TID). Like the composition of TID, Ponsse's internal board interlocks provide the target company with small-scale retail services and large-scale financial support. The difference is that the target company in TID is controlled by a family through a financial investment-type enterprise, while the financial-type board interlocks within Ponsse serve the target company.

Secondly, the external appointment structure of Ponsse is a combination of the Model of External Resource Balance (ERB) and The Model of Complete External Control (CEC). From the structure of ERB and CEC, it can be seen that external board interlocks are generally stronger than internal board interlocks,

and the CEC model also involves a small amount of the external enterprises belonging to experience board interlocks. From the view of the family controlling power, Ponsse's model and CEC both have external appointed shareholders serving as the chairman of the board. In terms of functionality and role, the external appointments of ERB and CEC both provide board interlocks for raw materials, wholesale and retail, financial services, general management, etc. This is almost the same for Ponsse's external appointments. The difference is that CEC is completely controlled by an external board, while ERB also provides customers for the target company. Meanwhile, most of Ponsse's external board interlocks have no business contact with the target company.

Although Ponsse's model has some differences from the above three categories of models, the structure and function of board interlocks are almost the same. Therefore, I named Ponsse's model the "synthetic model."

6 DISCUSSION

6.1 Answers to research questions

Firstly, based on a systematic review of the literature, this study provides a conceptual framework summarizing the definition and functions of board interlocks in family businesses, elucidating the background of board interlock development and its primary domains. Meanwhile, the study gradually extends from the initial definition and functions of board interlocks to the three main theoretical domains (capitalist economy, corporate governance, and corporate elite) and the practical functions of board interlocks in family businesses. Based on the summary of the background, it can be observed that board interlocks in family businesses are mainly divided into two different appointment forms: internal appointments and external appointments, each with distinct conditions and practical functions. Internal appointments refer to family members serving on the boards of other companies as board interlocks. Its main purposes include expanding the family business's operations and scale, seeking innovative business approaches, stabilizing related supply chains, and obtaining external financial support. External appointments refer to the introduction of new board members from other companies by the family and their service on the board. Its main purposes include strengthening the family's understanding of rational development, enhancing family members' learning of new skills and knowledge, establishing a better reputation system, and strengthening the stability of the internal structure of the family business.

Secondly, the systematic review results reveal that the main industrial structure of board interlocks in family businesses currently revolves around intra-industry and financial sectors. Additionally, different forms of shareholding are the primary modes of participation in board interlocks through the two appointment methods. Common shareholding is mainly used for internal appointments within the family and the family's control over related subsidiaries. Cross-shareholding primarily serves as a mechanism for external appointments of shareholders and related board interlocks. However, the review does not exclude the possibility of these two forms of shareholding being used interchangeably in each other's scenarios.

After systematically retrieving these literatures and obtaining the relevant framework, the article can then validate whether Finnish family businesses in the mechanical manufacturing industry align with the findings of the systematic review.

Research question 1: What are the main forms of board interlocks in small and medium-sized Finnish family business in the mechanical manufacturing industry?

After screening, this study analyzed 5 case studies of the family-owned Finnish SME mechanical manufacturing industry. Five different models of board interlocks were identified: Traditional Internal Development (TID), External Resource Balance (ERB), Complete External Control (CEC), External Customer-Oriented (ECO), and Internal Self-Growth (ISG). These models are tailored to different developmental environments and have their own development advantages.

These five models have both similarities and differences compared to the findings of the systematic review. Firstly, in these case studies, intra-industry board interlocks and financial board interlocks are not the only options, and in most cases, financial board interlocks are completely absent (e.g., ECO and ISG). Additionally, the industries involved in these cases can be classified into eight major categories (as shown in Table 4), and each category has its unique functions for family businesses. Secondly, apart from financial board interlocks and intra-industry board interlocks, there are also many cases that focus on board interlocks related to wholesale and retail, research and development, general management, technical support, and customers. For example, ECO is a case dominated by customer board interlocks, while ISG is a case dominated by retail board interlocks. Thirdly, not all cases have external board interlocks. The development models of TID and ISG are mainly based on internal appointments, and most of the internally appointed companies are subsidiaries. Fourthly, cross-shareholding is not present in any of the five cases, whether through internal or external appointments. Interestingly, in the case of a large multinational corporation (Ponsse), cross-shareholding did not occur either. This may be related to the development history and culture of Finnish family businesses, but the specific reasons cannot be confirmed in this study.

The points of agreement between the case analysis and the conclusions of the systematic review can be summarized in two aspects. Firstly, common shareholding is indeed the primary form of shareholding, and most of the internally

appointed board interlocks are subsidiaries or affiliated companies of the family business. Secondly, intra-industry is an important industry type in all cases and plays different roles in different models. For ISG, ECO, and TID, intra-industry primarily provides raw materials and related processing services. However, for ERB and CEC, external intra-industry board interlocks can provide industry expertise and experience. In the large enterprise of the case study Ponsse, intra-industry also serves these two different purposes.

Research Question 2: Are there any differences or consistencies in the board interlocks constructed by different enterprises?

In the conclusions and analyses of the '*4.5 Holistic Analysis*' and '*4.6 Comparative Analysis*' sections, a detailed comparison of the consistencies and differences among the five different models has been conducted. In terms of consistencies, firstly, all five models involve board interlocks through common shareholding. Secondly, they all emphasize the importance of customers and intra-industry in their industrial structure. Thirdly, most of the internal board interlocks are subsidiaries and have intra-industry connections. Fourthly, the five family-owned SMEs have developed and survived based on their own favorable conditions.

Regarding differences, firstly, although the chairman of the family businesses has significant decision-making power, when external board interlocks are strong, the overall development of the company tends to be driven by external demands. For example, from current available data, the external board interlock of 'Kytola Instruments Oy' may have the authority to determine the company's production and processing processes. Similarly, the external board interlock of 'Lumikko Oy' may be able to adjust the corresponding suppliers based on their own retail requirements. However, this result still needs to be proved by more relevant research. Secondly, the development advantages and patterns of different models differ greatly in terms of appointment methods and the industrial structure of board interlocks. Thirdly, the level of family control varies among the five cases, resulting in different degrees of freedom in company development. Fourthly, the appointment methods and industrial structure of board interlocks in different categories of Finnish family businesses have distinct functions and roles in each specific case.

In terms of ownership structure, family businesses in the mechanical manufacturing sector in Finland only have common shareholding and do not have

cross shareholding. This is quite different from other regions in the world, as cross shareholding is an important means of binding related companies together based on shared interests, and it often carries a certain degree of compulsion. However, in the research conducted, all forms of board interlocks only involve common stock ownership. This indicates that the regional characteristics and corporate culture in Finland are significantly different from other regions. The specific reasons for this difference are difficult to validate based on current data, but it can be regarded as a phenomenon that warrants further research.

Research Question 3: What is the strategic significance of developing different board interlocks mechanisms for Finnish family business (From the macro theoretical strategies and the micro functional strategies)?

- **Macro theoretical strategic significance**

Although summarizing different cases helps researchers observe the categories of models more intuitively, a deeper understanding of the formation mechanisms of these types requires comparing the systematic review results and multiple case analysis results from three different aspects: "capitalist economy," "corporate governance," and "corporate elite" (as shown in Table 12). Meanwhile, to verify the specific information related to these three aspects, this study also incorporates publicly available information and some valid public information of different cases. Some of the missing information is extrapolated from the current available information.

	Systematic Review		Multiple-Cases Analysis	
	Internal Appointment	External Appointment	Internal Appointment	External Appointment
Capitalist Economy	Stabilize the supply chain and improve the development model	Establish a good reputation system and develop long-term strategies	1), Stabilize the supply chain. 2), Expand business and generate profit.	1), Establish a reputation system. 2), The functions of various cases are different.
Corporate Governance	Mediation of family conflicts, stable development	Coordination of Interests and Third-Party Oversight	1), Share the management pressure of the family business. 2), Strengthen the control of subsidiaries	1), Balance the decision-making power of the family business. 2), Share the business and legal responsibilities of the family business. 3), Improve the internal management of the enterprise.
Corporate Elites	Lack of relevant research	Provide professional knowledge and skills, maintain development rationality	1), Learn from the experience of related companies. 2), Enhance personal resume and complete family inheritance.	1), Provide professional knowledge and management experience. 2), Enhance the awareness of family business to peers.

Table 12: Comparison of systematic review and multiple case analysis in capitalist economy, corporate governance and corporate elite

Firstly, in the systematic review's conclusions, in the context of "capitalist economy," the roles of internal and external appointments in family businesses are viewed as two distinct forms of "division of labor" (Barrese et al., 2007). From the perspective of industry structure, internal appointments in the analyzed models all involve intra-industry board interlocks, thus assisting in stabilizing the supply chain for all cases. However, in the 'Internal Self-Growth (ISG)' model, it can be inferred that internal board interlocks not only ensure a stable supply chain but also provide stable profits through wholesale and retail board interlocks (The official website of Narko Group Ab illustrates the multi-channel sales purpose of the business), thereby having a broader impact beyond supply chain stability. However, this needs to be determined with more specific data in the future. In terms of external appointments in family businesses, there are some differences between the theoretical framework and actual case analysis in the "capitalist economy" perspective. In the External Customer-Oriented (ECO) model, the role of external board interlocks is indeed to build a reputation system and develop long-term strategies (Chrisman et al., 2010) because customers are the primary driving force in this model. However, for the Complete External Control (CEC) and External Resource Balance (ERB) models, ERB emphasizes the balanced development of internal and external board interlock structures to ensure the stability of the supply chain and funding channels, while CEC focuses

more on the interests of external companies as the family's control over the business is weakest in the CEC model.

Secondly, in the systematic review, the main function of internal appointments in "corporate governance" is to regulate internal conflicts within the family and ensure the stability of business development (Aronoff & Ward, 2016, p. 38). The main function of external appointments is to help coordinate interests within the family and serve as a third-party monitor (Chrisman et al., 2010). The aspect of regulating internal conflicts within the family is not confirmed in the case analysis, but internal board interlocks in the five models do expand various industries, which serve as an important foundation for the stable development of family businesses. Additionally, in the case analysis, these family businesses alleviate development pressures and transfer some responsibilities to subsidiary companies through internal board interlocks. They also strengthen control over subsidiary companies through internal board interlocks. For external appointments in the case analysis, board interlocks can balance the family's decision-making power and even directly control a significant portion of the family's decision-making authority (e.g., CEC and ECO models).

Thirdly, in the systematic review, there is currently no relevant research on the main functions of internal appointments in the "corporate elite" perspective. The main function of external appointments is to provide professional knowledge or experience to the family business and help maintain rationality in its development (Rector, 2005; Caiazza et al., 2022). However, in the case analysis, internal appointments corresponding to the "corporate elite" perspective enable family members to acquire professional knowledge and skills within the relevant enterprises (e.g., verified in the Ponsse case). Moreover, internal board interlocks can also facilitate the inheritance of family businesses by strengthening individual resumes and capabilities (e.g., functionality of board interlocks in the ISG case). In the case analysis, for external board interlocks corresponding to the "corporate elite" perspective, their main functions are partially consistent with the conclusions of the systematic review: providing professional knowledge and experience while maintaining the rationality of business development (e.g., external board interlocks in the ERB model). However, this theory is not universally applicable, as most information provided by external shareholders in the ECO model pertains to product requirements and does not directly relate to the rationality of business development.

- **Micro functional strategic significance**

To address this question, this study first provides descriptions of the functions of production interlocks and financial interlocks and compares them based on the results of the systematic review and multiple case analyses. Secondly, although the systematic review did not cover marketing interlocks, customer interlocks, technology interlocks, and management interlocks, the summary of the multiple case analyses revealed the critical role of these four types of board interlocks. Therefore, this study separately elucidates their strategic significance in the context of the multiple case analyses (As shown in the Table 13).

In the systematic review, Lamb & Roundy (2016) explains that the primary objective of financial interlock strategy is to enhance management control over the business and increase avenues for accessing funds. However, the results of the multiple case analyses indicate that the actual impact of financial interlock strategy goes beyond the current theoretical analysis. Firstly, in the context of internal appointments, financial interlocks not only strengthen family control but also assist families in investing in new industries and businesses. This can currently be demonstrated in the cases of Ensto and Ponsse, but other cases require more detailed studies to determine. Additionally, families can inject more funds into the company through financial interlocks (e.g., ERB). In the case of external appointments, financial interlocks not only provide additional funding sources for family businesses but also balance family control power (e.g., ERB). Moreover, financial interlock emerges as a favorable strategy when families aim to expand their operations or transfer legal responsibilities for certain aspects of the business. Lastly, financial interlocks, in some cases, serve as a source of investment expertise and development advice rather than tangible assistance (e.g., CEC and Ponsse).

In the systematic review, Caiazza et al. (2022) describes the objective of production interlock strategy as enhancing supply chain stability and preventing malicious competition. However, in the multiple case analyses, for internal appointments, the primary purpose of production interlock strategy goes beyond supply chain stability and includes clarifying responsibilities and division of labor within the business, thereby mitigating the risks of excessive expansion. Additionally, family businesses can develop a deeper understanding of the core operations of the company through the detailed production processes (e.g., ISG). For external appointments, the objective of production interlock strategy is to complement certain production processes and transfer production risks (e.g.,

ERB and CEC). Moreover, these businesses can benefit from sharing production-related experiences and accessing a wider pool of talent (e.g., ERB and CEC).

In the conclusions of the multiple case analyses, marketing interlock demonstrates significant differences in strategic value between internal and external appointments. In internal appointments, the value of marketing interlock lies in enhancing the company's responsiveness to market changes and catering to diverse market segments with different wholesale and retail businesses (e.g., ISG). In external appointments, its value lies in assisting family businesses in mitigating risks associated with production and sales, as well as controlling costs related to wholesale and retail operations (e.g., ISG). Additionally, proactive market responsiveness can lead to timely improvements in production processes, thereby promoting the synergy with production interlock (e.g., ERB and ISG).

Similarly, in the multiple case analyses, customer interlock demonstrates distinct strategic values in internal and external appointments. In internal appointments, its strategic value lies in helping related enterprises determine the overall volume of orders, which contributes to stable income accumulation for the respective family businesses (e.g., ISG). In external appointments, its value extends beyond providing fixed order income and also encompasses stabilizing the company's production processes (e.g., ECO).

Technology interlock exhibits diverse functions for family businesses in the multiple case analyses. Firstly, in internal appointments, its primary function is to enhance the R&D capabilities of family enterprises and provide all necessary technological support for production (e.g., CEC and TID). Secondly, in external appointments, its function not only enhances R&D capabilities but also provides professional expertise and advice for the development direction of family businesses, helping to coordinate production and market conflicts with competitors (e.g., ERB, CEC, and Ponsse).

Lastly, in the multiple case analyses, management interlock serves different functions. In internal appointments, it provides professional management processes and division of labor (e.g., ISG). In external appointments, its main function is to outsource management processes and risks, provide professional management expertise, and ensure smooth cooperation and production for related family businesses (e.g., CEC and Ponsse).

Functional Strategy	Systematic Review		Multiple-Cases Analysis	
	Internal Appointment	External Appointment	Internal Appointment	External Appointment
Financial	strengthen family control to company	Find more sources of funding	1), Strengthen family control. 2), Invest in new enterprises and extend the influence of the family. 3), Providing funding.	1) Provide funding for development. 2), Balance the control power of the family. 3), Transfer the business and responsibilities of the family. 4), Provide more investment experience and advice.
Production	Ensure the stability of the supply chain	Enhance cooperation and prevent malicious competition	1), Stabilize the supply chain. 2), Clarify the responsibility and division of labor of the enterprise. 3), Cultivate family members.	1), Transfer part of the production risk. 2), Provide peer development experience. 3), Supplement part of the production process. 4), Provide a wider range of personnel transfer.
Marketing	/	/	Enhance market orientation and diversify production	1), Transfer product sales pressure and risk. 2), Control the cost brought by sales. 3), Reversely improve the production process.
Customer	/	/	Fixed order income	1), Fixed order income. 2), Stabilize the production and development direction of the enterprise.
Technology	/	/	Improve the R&D capabilities and increase the support of other auxiliary technologies.	1), Improve the R&D capabilities of enterprises, and increase the support of other auxiliary technologies. 2), Provide research and development direction and suggestions. 3), Mediate competitive conflicts.
Management	/	/	Provide professional administration and processes.	1), Outsourcing administrative management. 2), Provide professional management experience. 3), Ensure the stability of internal and external production.

Table 13: Purpose of different functional strategies

6.2 Theoretical significance

Firstly, this study provides a systematic summary of the definition, scope, and functions of board interlocks. The study first incorporates the research of Caiazza et al. (2022) on board interlocks in family businesses. It then integrates the research of Smith & Sarabi (2020) on board interlocks in the context of corporate elites, capitalist economies, and corporate governance (Macro perspective). Additionally, it incorporates the research of Veglio et al. (2020) on board interlocks in small and medium-sized enterprises (SMEs). This theoretical integration is groundbreaking as it not only encompasses the development needs of family businesses and SMEs but also considers the theoretical approaches of board interlocks in addressing these needs.

Secondly, this study innovatively categorizes board interlocks according to their industries for the relevant family businesses and observes their actual functionalities. Additionally, based on different types of board interlocks, this study proposes five theoretical development models for Finnish small and medium-sized mechanical manufacturing family businesses. These models provide a theoretical foundation for future research.

Thirdly, this study compares the results of the systematic review with those of the multiple case analyses, successfully supplementing the existing theoretical frameworks of FFBBIs. Furthermore, by examining the consistency and differences in the results, this study provides a more detailed explanation of the distinct combinations of different appointment modes and related theories. This expands the theoretical foundation of board interlocks in family businesses and provides a more refined theoretical classification.

Fourthly, this research reveals the lack of research and theoretical frameworks regarding board interlocks in Finnish family businesses. Based on this gap, the study bridges relevant theories through a combination of systematic review and case studies, establishing a theoretical foundation for board interlocks in Finnish family businesses.

Fifth, this study provides a strategic theoretical analysis for small and medium-sized family businesses in the Finnish machinery manufacturing industry (Micro perspective). The relevant theories categorize board interlocks into six dif-

ferent areas (management, technology, customer, marketing, production, and financial) and supplement the limitations of the systematic review, which only had two categories (intra-industry and financial). This classification expands the concept of board interlocks and integrates it more extensively with management studies. By comparing the results of the systematic review and the multiple case analysis, it can be observed that the theoretical value of board interlocks is more extensive. It not only involves the strategic purposes of family businesses regarding different appointment methods but also encompasses different functional systems of board interlocks in different categories.

	Systematic Review Contribution	Multiple Cases analysis Contribution
Corporate Governance	It summarizes the theoretical development of board interlock in terms of family conflicts, balance of interests, and regulatory responsibilities.	By analyzing practical cases, board interlocks contribute to structural improvements in family businesses by assisting them in making rational decisions and sharing financial as well legal risks.
Capitalist Economy	By summarizing, supply system and reputation system are the main methods to help family business maintain the comparative advantages	Stability of the supply system and reputation system is important for the expansion of the company's scale and increase in profits. But it may also be driven by factors such as the company's values or identity positioning.
Corporate Elite	Obtaining experience and skills from the external board interlock is an important condition to help the family business maintain a rational development.	Both external experience and internal experience are important cornerstones to improve the capabilities of family members, which can not only ensure the stability of family succession, but also improve the family business's recognition of peers.

Table 14: Contributions of systematic reviews and multiple case analyzes to macro-theory.

Finally, the current focus of long-term governance in family businesses is on establishing a clear family business identity and core values (Kansikas & Nemilentsev, 2010). Related priorities include developing family members, introducing external members such as the board of directors, and building effective governance frameworks (Laakkonen et al., 2011). At the same time, the systematic review reveals that governance in family businesses primarily addresses conflicts among family members and the lack of internal monitoring mechanisms. This multi-case analysis provides theoretical evidence that board interlock is a commonly used tool in family businesses to address the issues mentioned by Kansikas & Nemilentsev (2010). Additionally, the conclusions of the multi-case

analysis extend the findings of the systematic review by delving into specific details and identifying more nuanced topics for future research (as shown in the Table 13). In addition, the multiple case analysis of the capitalist economy also complements the systematic summary by providing insights into the analysis of business diversity. The diverse benchmark conditions of businesses in their early stages determine the future development models of these businesses. Therefore, the shaping of values and the positioning of corporate identity in the early stages play a crucial role in stabilizing the supply chain and reputation system through board interlocks. This alignment of values and corporate identity can contribute significantly to the long-term development of the business. The conclusions drawn from the multiple case analysis of the corporate elite also supplement the theoretical framework of the systematic review (as shown in Table 14). Therefore, in terms of theoretical contributions, the multiple case analysis not only expands upon the theories presented in the systematic review but also addresses important development areas that were not covered by the systematic review.

6.3 Practical significance

Firstly, this study provides a more comprehensive perspective for small and medium-sized family businesses in the Finnish machinery manufacturing industry to understand the functions and types of board interlocks. Based on the categories of different models and their own resource conditions, relevant family businesses can determine their future development direction. By considering the actual effects of board interlocks in corporate elites, capitalist economies, and corporate governance, these family businesses can better determine their actual planning (Macro perspective).

Secondly, since this study conducted a validation case of a large-scale enterprise (Ponsse) and successfully demonstrated that the models of small and medium-sized enterprises can be combined to form larger models, family businesses of any scale can use board interlocks to plan their development strategies according to their needs and conditions. Meanwhile, the categorization of "function board interlock" and "experience board interlock" in the 'Ponsse' case also indicates that family businesses not only need to structure board interlocks based on the actual resource needs of the company but also need to plan corresponding

board interlocks based on the lack of management experience and professional expertise within the family.

Thirdly, although the focus of this study is on small and medium-sized family businesses in the Finnish machinery manufacturing industry, family businesses in other sectors can also derive board interlock development theories and models that are more suitable for their own enterprises based on the relevant methods and analytical approaches. Therefore, the most significant practical value of this study is that it elucidates the adjustability and diversity of board interlock models.

Fourth, this study elucidates the strategic significance of board interlocks in small and medium-sized family businesses in the Finnish machinery manufacturing industry from a practical functional perspective. By addressing different functions and the two appointment methods within the family, businesses can flexibly utilize board interlocks according to their specific needs and efficiently plan their long-term strategies.

6.4 Limitations and Future Research

Firstly, this study is static research and lacks dynamic data validation. During the process of retrieving multiple case data, many companies' business types and board interlock information are subject to annual changes. However, this study can only collect the most current data and information, making it impossible to retrieve historical data for these companies all at once. Additionally, in the process of selecting target companies, many filtered-out companies were previously family businesses but have since transformed into other types of enterprises. Although these companies with changes in board structure are not the focus of this study, they still hold significant research value. Similarly, the actual collaboration between board interlocks and companies is crucial research information, but it is challenging to define. Some board interlock companies may have a history of collaboration or have had long-standing partnerships (such as in the financial industry), but may currently have no collaboration. Therefore, future research can focus on dynamic studies to analyze the historical data of board interlocks in family businesses and develop more accurate theoretical models. Additionally, future research can further investigate the specific conditions and

mechanisms that lead to the formation and functioning of different types of board interlocks.

Secondly, due to the limited scope of this study, focusing solely on small and medium-sized family businesses in the Finnish machinery manufacturing industry, the significance of the research is also limited. The research results for the selected target may not be highly representative, and the chosen companies mainly fall within the medium-sized range. If future research aims to investigate board interlocks in other industries, the theoretical framework and model used in this study may not be applicable. Moreover, if the size and industry of the research target are adjusted, the classification of industries and the specific functions of board interlocks may vary significantly. Therefore, future research can expand the scope of study to include a broader range of companies or focus on other industries. For example, the research can target larger international corporations (such as Ponsse) and encompass a wider geographical area (such as the Nordic region). Additionally, future research could explore other industries, such as the tourism service sector and so on.

Thirdly, this study utilizes a comparative approach through systematic reviews and multiple case analyses. However, most cases in the multiple case analysis may possess unique developmental characteristics that limit their representativeness. Fortunately, during the validation process, the summarized model from the multiple case analysis can be verified with large-scale companies in the same industry. Nevertheless, this analytical and validation method also has limitations, as the research results cannot exclude the possibility of coincidence or further exploration of the forming conditions. Exploring these forming conditions would generally be more suitable using quantitative analysis. Therefore, future research can consider larger datasets and relax the selection criteria (such as not limiting the number of family members on the board) to determine the significant characteristics of board interlocks in family businesses using quantitative research methods.

Fourthly, the inferences made in this study regarding the functions of board interlocks involve a certain degree of subjectivity. Although many target companies with interlocking relationships have business collaborations, this study determines their actual functions not only based on publicly available information but also by referencing descriptions of inter-industry collaborations in the literature. Therefore, when elucidating the purposes of board interlocks in related fam-

ily businesses, this study lacks more precise information and data, such as interviews, questionnaires, and so on. Therefore, future research can employ methods such as interviews or surveys to obtain more accurate data from companies. Based on this data, future studies can validate the accuracy and applicability of the findings from this research.

Finally, due to the limited descriptive power of the Gephi graphs in illustrating the structure of the theoretical models in this study, official website information and sustainability reports of the five small and medium-sized cases were utilized to validate the relevant information. However, some companies still lack comprehensive data, so this study had to rely on the available and valid data to make inferences about the related theoretical models (e.g., CEC, TID, and ECO). Therefore, there are certain limitations regarding the validity of the data in this research. Future studies could employ interviews, questionnaires, quantitative methods, and other approaches to conduct more detailed investigations and validate the effectiveness and reliability of the relevant theoretical models.

7 CONCLUSION

This paper begins by conducting a systematic review to determine the current state of board interlocks in family businesses and the characteristics of family business development in Finland. It then combines the main theoretical areas of board interlocks (corporate elites, capitalist economies, and corporate governance), the main modes of board interlocks in family businesses (internal appointment and external appointment), and the main forms of board interlocks in family businesses (intra-industry and financial). Based on the conclusions of the systematic review, this paper discusses the characteristics exhibited by family businesses when employing different appointment modes and board interlock forms: 1) the combination of internal appointment and intra-industry aims to stabilize the supply chain; 2) the combination of internal appointment and financial aims to strengthen family control over the business; 3) the combination of external appointment and intra-industry aims to enhance collaboration and prevent malicious competition; 4) the combination of external appointment and financial aims to access more sources of funding.

Subsequently, through multiple-case analyses, this study investigates the board interlocks of selected small and medium-sized family businesses in the Finnish mechanical manufacturing industry and creates an industry distribution graph based on publicly available information about the related family. After analyzing the specific industry density and distribution among relevant companies, this study combines background materials and current available information to determine the business information between the interlocking companies and creates five theoretical models: Traditional Internal Development (TID), External Resource Balance (ERB), Complete External Control (CEC), External Customer-Oriented (ECO), and Internal Self-Growth (ISG). Furthermore, this study conducts a holistic analysis and comparative analysis of these five models and summarizes the conditions and functions they have. Based on the specific functions of different types of board interlocks in the case studies, this study categorizes 8 industry types into 6 functional board interlocks (marketing, financial, production, technology, customer, and management).

In the discussion section, this study compares the results of the systematic review and the multiple case analyses (as shown in Table 12 and Table 13). The comparative analysis reveals that the results of the multiple case analyses are

more comprehensive and detailed than those of the systematic review, both in terms of theoretical and practical aspects. In terms of theoretical expansion, the multiple case analyses provide a more detailed exploration of the practical applications of relevant theories. Additionally, the multiple case analyses address certain gaps in current theories, such as the lack of the "corporate elites" theory regarding internal appointment (as shown in Table 12). In terms of summarizing the functional aspects of board interlocks, the multiple case analyses add six industries and four different categories of functional board interlocks. Although some theoretical models are inferred based on existing valid data, it is also beneficial for future research to verify with more detailed data in this direction. Moreover, the multiple case analyses compare the strategic value and practical implications of each functional board interlock within family businesses (as shown in Table 13). Therefore, compared to the results of the systematic review, the multiple case analyses provide a more comprehensive and detailed summary of different types of board interlocks, and based on the two appointment modes, they elucidate the strategic value of board interlocks in family businesses.

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APPENDIX

A: Specific data and classification of systematic reviews' references

BI: Board Interlock

FB: Family Business

FFB: Finnish Family Business

FBBI: Family Business Board Interlock

Authors	Main content	Type
Mizruchi (1996)	The focus of BIs development in different periods. Definition of BIs through ephemeral studies.	BI
Mizruchi & Stearns (1988)	BIs are driven by corporate messages or by individuals. BIs can help companies form a steady supply of resources, increase legitimacy, and strengthen political solidarity, as well as help individuals with their career planning.	BI
Benton (2019)	Most of the BIs of companies nowadays are between the industrial and financial sectors. It depends on how much the company needs and relies on external funding.	BI
Heemskerk et al. (2016)	BIs may increase the complexity of the board. This can circumvent radicalism in management, but tends to increase the number of different employee factions.	BI
Mizruchi (1983)	Historical changes in BIs, the enactment of the Clayton Act, 1980/1990 U.S. financial deregulation led to capital concentration and a dramatic decrease in BIs.	BI
Heemskerk et al. (2016)	In the mid-2000s, BIs began to disappear and managerialism began to flourish.	BI
Zajac (1988)	The functions of BIs are more hypothetical than actual. There is no evidence that BIs are deliberate monopolies formed through cooperation between competing firms.	BI
Gala-votti (2021)	Board interlock is a defense mechanism that can help enterprises reduce information asymmetry and resist hostile takeovers	BI
Veglio et al. (2020)	For SMEs, board interlock is an important factor in shaping the corporate structure, developing direction and strategy	BI

Perrow (1993, p. 391)	BIs connects and stabilizes the head enterprises and downstream enterprises in the supply chain, which greatly improves the administrative efficiency of enterprises and establishes a trust cooperation system. The intersection of BIs of enterprises is not only the mutual holding of equity, but also the mutual restraint of management power.	BI
Davis (1996)	The form of BIs can be a means for corporate managers to seek high salaries, a strategic method of corporate mergers and acquisitions, and behavior of strategic defense. BIs are embedded social structure, and changing the incentive structure of equity cannot reform the board of directors.	BI
Davis & Greve (1997)	The development of BIs in the 1980s led to a wave of acquisitions among companies, and thus derived corresponding defense mechanisms: poison pills and golden parachutes. However, this wide-ranging takeover between firms also complicates the social linkages between firms. Therefore, structural embeddedness, director norms and cultural embeddedness determine the speed and direction of an enterprise's adaptation to related fields.	BI
Smith & Sarabi (2020)	Corporate elites, capitalist economies and corporate governance are the most prominent themes and areas of research in board interlock.	BI
Gulati & Westphal (1999)	BIs is an important way for senior managers of enterprises to establish a social network with high credibility, and it can build horizontal and vertical strategic alliances. However, BIs have two sides. It may cause enterprises to commit crimes or lose control over the board of directors.	BI
(Lamb & Roundy, 2016)	The importance of board interlock in the financial field and a summary of systematic reviews: an important way to obtain manpower, funds, monitoring and feedback.	BI
Akhter et al. (2022)	Definition and operational forms of family business.	FB
Chua et al. (1999)	Family businesses are classified as: 1) family owned and family managed; 2) family owned	FB

	but not family managed; 3) family managed but not family owned.	
Sharma (2004)	The research criteria for family businesses require at least: size, ownership, industry and time frame.	FB
Keskgñ (2010)	The criteria for classifying the size of a family business: number of people, total assets and industry limits.	FB
Zahra (2003)	Manufacturing companies are judged by the following criteria: production capacity and market share.	FB
Gustavsson & Amador Regalado (2020)	The size of companies in the financial industry is judged by the following criteria: corporate statements and the number of employees in the company.	FB
Martínez-Olvera (2022)	Various industries relationships and details involved in manufacturing.	FB
Miller et al. (2003)	The decline of most family businesses is due to internal family struggles.	FB
Ei-senhardt & Schoonhoven, (1996)	No matter what state FBs is in, it is necessary to consider in a timely manner the enterprise's demand for corresponding resources and how to establish a stable supply-demand relationship.	FB
Ingram & Roberts, (2000)	BI can not only enhance the relationship of interests but also help FB to leverage the family members embedded in the supply chain to acquire relevant resources or knowledge.	FB
Vi-laseca (2002)	The more ordinary shares held by family members in a family-owned enterprise, the fewer commitments the company receives; the more ordinary shares held by shareholders outside the family, the more commitments the company receives.	FB
Astrachan et al. (2002)	In the F-PEC scale measuring the influence of family on the enterprise, the two most important evaluation indicators in the cultural component are overlapping family and business values as well as family business commitment.	FB
Flath (1992)	Indirect shareholding can be divided into father-son-grandson relationships and subordinate relationships, of which the common one in family businesses is the father-son-grandson relationship	FB

Boyd & Solarino (2016)	Cross-shareholding can help FBs strengthen control over the enterprise, reduce financial and legal regulatory risks, and gain access to relevant resources channels, etc.	FB
Chrisman et al. (2010)	Discuss the development dilemma of family business from the perspective of family governance.	FB
Siebels & zu Knyphausen - Aufseß (2012)	The competitive resources of a family business include human resources available to the business, social capital (the reputation system of the family and suppliers, etc.), patient capital (the directional system for long-term cooperation) and survival capital (the personal resources of family members)	FB
Miyajima (1994)	In family businesses, there are various ways of cross-shareholding, and different forms of cross-shareholding correspond to different functions.	FB
Kansikas & Nemilentsev (2010)	Establishing one's own corporate culture and identity, shaping values, developing an effective family governance model and bringing in external talents are important steps in the long-term development strategy of a family business.	FB
Kogut & Zander (1992)	The formation of resource alliances between FBs and other enterprises requires stable BIs to contain relevant interests. Most of the strategic resources and technologies of enterprises of FBs need suppliers to complete.	FBBI
Caiazza et al. (2022)	1, BI traditionally aims at the maintenance of hegemony by the ruling class. 2, Industry embeddedness is one of the ways in which FBIs are perpetuated. 3, Currently, FBs prefer to be associated with financial institutions such as banks: they can share financial risks and guide companies to market. 4, Bringing in external BIs can help family businesses improve their performance: professional advice and channels.	FBBI
Chua et al. (2006)	1, FBs' external BIs can help related families and companies avoid related management risks. 2, the geographical distribution of FBs is	FBBI

	a key element for cooperation between companies. 3, the use of external BIs can help FBs reduce internal family struggles instead.	
Barrese et al. (2007)	BIs can help FBs maintain a relatively stable position in the stock market and economic conditions.	FBBI
Galatasaray University, Turkey & Ataay (2016)	1, BIs can help FBs strengthen their management power. 2, FBBI can be divided into horizontal and vertical management modes.3, FBs more frequently use horizontal BIs.	FBBI
Philippines & Yu (2022)	FBBI can be appointed in two ways: internal appointments and external appointments.	FBBI
Jeong et al. (2022)	External appointments can help family businesses strengthen their control of the business as well as their control of the family	FBBI
Davis (1996)	Social embeddedness of FBBI: appointed by board (family members) interpersonal relationships	FBBI
Bazerman & Schoorman (1983)	Economic rationale for the appointment of FBBI: Such directors are often appointed to ensure that a certain mission can be properly accomplished. There is a corresponding economic rationality in the appointment of FBs.	FBBI
Tumbe (2022)	FBs are appointed in a way that takes more account of geography, cultural identity, gender and race.	FBBI
Cyr et al. (2023)	FBs decision-making requires higher stability and is easily affected by subjective control. This will lead to higher decision-making costs and risks for enterprises.	FBBI
Rector (2005)	Newly appointed managers in FBs are often behind in experience and take a long time to adapt. This will lead to the corresponding risk of FBBI will continue to increase.	FBBI
Koiranen (2002)	The values of Finnish family business are: transparency, openness, pragmatism and honesty.	FFB
Rautamäki & Römer-Paakkanen (2016)	The continuity of inheritance in Finnish family businesses is very stable, so there is generally not much demand for BIs for inheritance.	FFB
Lane et al. (2006)	The problem of inheritance and discovery has always been an important research direction of	FFB

	FBs. Related BIs can help FBs maintain the stability of inheritance.	
Littunen & Hyrsky (2000)	The main aspects influencing the development of small and medium-sized family businesses in Finland are the nature of the business, organizational characteristics, family financial expectations and owner motivations.	FFB
Sorama & Joensuu-Salo (2022)	Most Finnish family-owned SMEs use conservatism as the early development model of the enterprise, but the most important thing for the development of these enterprises is the spirit of adventure and innovation of the enterprise.	FFB
Pihkala et al. (2022)	Small and medium-sized family businesses in Finland have higher profit margins and self-sufficiency compared to other types of businesses	FFB

B: Case Companies

Size	L: Large
	M: Middle
	S: Small
Relationship	Sub: Subsidiary
	Par: Parent
	Sub-sub: Subsidiary's subsidiary
Position	C: Chairman
	VC: Vice Chairman
	S: Shareholder
	OM: Ordinary Member
	DM: Duty Member

Case 1: Ensto Finland Oy

Code	Generation Code	Family member	Company	Industries	Position	Size	Relationsh
Internal							
1	1	Ms Marjo Tuuli Irene Miettinen	Ensto Finland Oy	712 - Manufacture of electricity distribution and control apparatus	C	M	Sub
			Ensto Invest Oy	7010 - Activities of head offices	C	L	Par
			EM Group Oy	7010 - Activities of head offices	OM	S	Sub
			Solidium Oy	6499 Other financial service activities, except insurance and pension funding	OM	S	O
2	2	Ms Anna Maria Miettinen	Ensto Finland Oy	420 - Activities of holding companies (Electrical machinery and equipment	OM	M	Sub
			Ensto Invest Oy	7010 - Activities of head offices	OM	L	Par
			Inasis Oy	4673 - Wholesale of wood, construction materials and sanitary	C	S	Sub
			Sewatek Oy	4120 - Construction of residential and non-residential buildings	C	S	Sub-Sub
3	2	Ms Iida Elisabet Miettinen	Inasis Oy	4673 - Wholesale of wood, construction materials and sanitary	OM	S	Sub
			Sewatek Oy	4120 - Construction of residential and non-residential buildings	OM	S	Sub-Sub
			Ensto Invest Oy	7010 - Activities of head offices	OM	L	Par
External							
4		MR PEKKA HEIKKI PUUSTINEN	Pohjola Vakuutus Oy	6500 - Insurance, reinsurance and pension funding	OM	S	/
5		MR PANU HENRIK ROUTILA	Havator Group Oy	4399 - Other specialised construction activities nec	C	L	/
			Havator Oy	4399 - Other specialised construction activities nec	C	M	/
			Neova Oy	0892 - Extraction of peat (engineering construction industry)	C	L	/
			Green Industry Park Oy	7022 - Business and other management consultancy activities	C	S	/
			FIFAX PLC	0321 - Marine aquaculture	C	S	/
			Patria Oyj	8411 - General public administration activities	C	L	/
			Turku Science Park Oy Ab	490 - Other professional, scientific and technical activities nec	C	M	/
			Nordic Traction Group Oy	7010 - Activities of head offices	OM	M	/
			Pesmel Oy	2599 - Manufacture of other fabricated metal products nec	OM	M	/
			Ambientia Group Oy	6201 - Computer programming activities	OM	M	/
			Ensto Finland Oy	712 - Manufacture of electricity distribution and control apparatus	OM	M	/
			Famifarm Oy	0113 - Growing of vegetables and melons, roots and tubers	OM	M	/
6		DR JUKKA AULIS RUUSUNEN	Fingrid Datahub Oy	7490 - Other professional, scientific and technical activities nec	OM	S	/
			Ensto Finland Oy	712 - Manufacture of electricity distribution and control apparatus	OM	M	/

Case 2: Oy Botnia Marin Ab

Code	Generation Code	Family member	Company	Industries	Position	Size	Relationship
Internal							
1	2	MR ROBERT MAXIMILIAN CARPELAN	Oy Botnia Marin Ab	3012 - Building of pleasure and sporting boats	OM	M	Sub
			JOBROMA Holding Ab	6499 - Other financial service activities, except insurance and pension funding nec	OM	M	Par
			Oy Targa Center Ab	4764 - Retail sale of sporting equipment in specialised stores	OM	S	O
2	1	MR JOHAN FREDRIK MAXIMILIAN CARPELAN	Oy Targa Center Ab	4764 - Retail sale of sporting equipment in specialised stores	C	S	O
			Oy Botnia Marin Ab	3012 - Building of pleasure and sporting boats	C	M	Sub
			Nykarleby Sprinklerpump Ab	4322 - Plumbing, heat and air conditioning installation	OM	S	Com
			Oy Standpoint Ab	5811 - Book publishing	OM	S	Com
3	1	MS INGA BRITT-MARIE CARPELAN	Oy Botnia Marin Ab	3012 - Building of pleasure and sporting boats	OM	M	Sub
			JOBROMA Holding Ab	6499 - Other financial service activities, except insurance and pension funding nec	OM	M	Par
4	2	MS MARTINA HELENA	Oy Botnia Marin Ab	3012 - Building of pleasure and sporting boats	OM	M	Sub

Case 3: Lumikko Oy

Code	Generation Code	Family member	Company	Industries	Position	Size	Relationship
Internal							
1	1	MR ANSSI KALEVI LATVALA	Lag or trade Oy	7022 - Business and other management consultancy activities	C	S	Com
			Luho Oy	7022 - Business and other management consultancy activities	DM	S	Com
			Lumikko Oy	2825 - Manufacture of non-domestic cooling and ventilation equipment	OM	S	Par
			Lumikko Huuoltopalvelut Oy	3312 - Repair of machinery	OM	S	Sub
			Lanssi Oy	7022 - Business and other management consultancy activities	OM	S	Com
			Harmamedi Oy	8622 - Specialist medical practice activities	DM,OM	S	Com
2	2	MR LAURI PETTERI LATVALA	Lag or trade Oy	7022 - Business and other management consultancy activities	C	S	Com
			Luho Oy	7022 - Business and other management consultancy activities	OM	S	Com
			Lumikko Oy	2825 - Manufacture of non-domestic cooling and ventilation equipment	OM	S	Par
			Lumikko Huuoltopalvelut Oy	3312 - Repair of machinery	C	S	Sub
			Lanssi Oy	7022 - Business and other management consultancy activities	OM	S	Com
External							
3		MR JUHA UNTAMO SAARINEN	Oy Accumulation Ab	6612 - Security and commodity contracts brokerage	C	S	/
			Lumikko Oy	2825 - Manufacture of non-domestic cooling and ventilation equipment	C	S	/
			NGS Finland Oy	7490 - Other professional, scientific and technical activities nec	C	S	/
			Avanto Group Oy	8299 - Other business support service activities nec	C	S	/
			Juni Holding Oy	6420 - Activities of holding companies	OM	S	/
			Catalyst Ventures 1 Oy	8299 - Other business support service activities nec	DM	S	/
			Premico Group Oy	6820 - Renting and operating of own or leased real estate	OM	S	/
			ProtosDemos Oy	7410 - Specialised design activities	OM	S	/
			Monttu Ventures Oy	7022 - Business and other management consultancy activities	OM	S	/
			Avanto Capital Oy	6630 - Fund management activities	OM	S	/
			Indoor Group Holding Oy	6420 - Activities of holding companies	OM	L	/
			Indoor Group Oy	4759 - Retail sale of furniture, lighting equipment and other household articles in specialised stores	OM	L	/
			Premico Paaomarahastot Oy	6430 - Trusts, funds and similar financial entities	OM	S	/
			PREMICO ASUNTORAHASTON HALLINNOINTIYHTIO II OY	6430 - Trusts, funds and similar financial entities	OM	S	/
HPJ Invest Oy	7022 - Business and other management consultancy activities	S	S	/			
4		MR MIKA MARKO JUHANI LUOPAJARVI	Lumikko Oy	2825 - Manufacture of non-domestic cooling and ventilation equipment	OM	S	/
			Formel C-Team Mika Luopajarvi	9312 - Activities of sport clubs	S	S	/
			Insinooritoimisto Luopajarvi Oy	4321 - Electrical installation	S	S	/

Case 4: Kytola Instruments Oy

Code	Generation Code	Family member	Company	Industries	Position	Size	Relationship
Internal							
1	2	MR SEPPO SAKARI KYTOELAE	Muuramen Ollila Oy	6820 - Renting and operating of own or leased real estate	OM	S	Sub
			OK-Vise Oy	2841 - Manufacture of metal forming machinery	OM	S	Sub
			Kytola Instruments Oy	2651 - Manufacture of instruments and appliances for measuring, testing and navigation	OM	M	Par
			Kytolan Kello ja Kulta Oy	4777 - Retail sale of watches and jewellery in specialised stores	OM	S	Com
2	3	MR TIMO OSKARI KYTOELAE	Kytola Instruments Oy	2651 - Manufacture of instruments and appliances for measuring, testing and navigation	OM	M	Par
3	1	MR RISTO TAPANI KYTOELAE	Muuramen Ollila Oy	6820 - Renting and operating of own or leased real estate	C	S	Sub
			Kytola Instruments Oy	2651 - Manufacture of instruments and appliances for measuring, testing and navigation	C	M	Par
External							
4		MR ARI ILKKA JUHANI TAIVALSAARI	Arinomaiset Oy	5610 - Restaurants and mobile food service activities	OM	S	/
			Arinomainen Oy	5610 - Restaurants and mobile food service activities	OM	M	/
			Arinomaisesti Oy	5610 - Restaurants and mobile food service activities	OM	M	/
			Ari Taivalsaari Oy	5610 - Restaurants and mobile food service activities	OM	L	/
			Arinomaista Oy	5610 - Restaurants and mobile food service activities	OM	M	/
			Profitable Oy	6820 - Renting and operating of own or leased real estate	S	M	/
			Kytola Instruments Oy	2651 - Manufacture of instruments and appliances for measuring, testing and navigation	OM	M	/

Case 5: Oy Narko Group Ab

Code	Generation Code	Family member	Company	Industries	Position	Size	Relationship
Internal							
1	1	MR HANNU ILMARI LOUHI	Oy Narko Group Ab	2920 - Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	C	M	Par
			Oy KRS Potato-Products Ab	4631 - Wholesale of fruit and vegetables	C	S	Sub
			HH InterTrade Oy Ab	4631 - Wholesale of fruit and vegetables	C	S	O
			BOTNIA GRONSAKER AB - BOTNIA VIHANNES OY	4631 - Wholesale of fruit and vegetables	C	S	Sub
			Oy Gevesta Ab	7739 - Renting and leasing of other machinery, equipment and tangible goods nec	OM	S	Sub
			Narko Finland Ab	4511 - Sale of cars and light motor vehicles	OM	S	Sub
			Oy Narko Ab	2920 - Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	OM	M	Sub
			NARPES FJARRVARME AB - NARPION KAUKOLAMPO OY	3530 - Steam and air conditioning supply	OM	S	O
			Oy Trailer RIGG Ab	2599 - Manufacture of other fabricated metal products nec	OM	S	Sub
			AB SYDOSTERBOTTENS ISHALL- SUUPOHJAN JAAHALLI OY	9311 - Operation of sports facilities	OM	S	O
2	1	MS ANNE CHRISTINE GULLSTROEM- LOUHI	Oy Narko Group Ab	2920 - Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	C	M	Par
			Oy Trailer RIGG Ab	2599 - Manufacture of other fabricated metal products nec	OM	S	Sub
			Oy KRS Potato-Products Ab	4631 - Wholesale of fruit and vegetables	OM	S	Sub
			HH InterTrade Oy Ab	4631 - Wholesale of fruit and vegetables	DM	S	O
			BOTNIA GRONSAKER AB - BOTNIA VIHANNES OY	4631 - Wholesale of fruit and vegetables	OM	S	Sub
			Oy Gevesta Ab	7739 - Renting and leasing of other machinery, equipment and tangible goods nec	OM	S	Sub
			Narko Finland Ab	4511 - Sale of cars and light motor vehicles	OM	S	Sub
Oy Narko Ab	2920 - Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	OM	M	Sub			
3	2	MR MIKAEL JOHANNES LOUHI	Oy Gevesta Ab	7739 - Renting and leasing of other machinery, equipment and tangible goods nec	C	S	Sub
			Oy Trailer RIGG Ab	2599 - Manufacture of other fabricated metal products nec	C	S	Sub
			Oy Narko Ab	2920 - Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	C	M	Sub
			Narko Finland Ab	4511 - Sale of cars and light motor vehicles	C	S	Sub
			Oy Narko Group Ab	2920 - Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	OM	M	Par
			BOTNIA GRONSAKER AB - BOTNIA VIHANNES OY	4631 - Wholesale of fruit and vegetables	OM	S	Sub

C: Industries Classification

Industries	Industry Classification	Industry Summary	representative color
0113 - Growing of vegetables and melons, roots and tubers	Agriculture, forestry and fishing	Agriculture	
0321 - Marine aquaculture	Agriculture, forestry and fishing		
7010 - Activities of head offices	Professional, scientific and technical activities	Consulting and Research	
7022 - Business and other management consultancy activities	Professional, scientific and technical activities		
7410 - Specialised design activities	Professional, scientific and technical activities		
7490 - Other professional, scientific and technical activities nec	Professional, scientific and technical activities		
7739 - Renting and leasing of other machinery, equipment and tangible goods nec	Administrative and support service activities	General management services	
8211 - Combined office administrative service activities	Administrative and support service activities		
8299 - Other business support service activities nec	Administrative and support service activities		
8411 - General public administration activities	Public administration and defence; compulsory social security		
6420 - Activities of holding companies	Financial and insurance activities	Financial Services	
6430 - Trusts, funds and similar financial entities	Financial and insurance activities		
6499 Other financial service activities, except insurance and pension funding nec	Financial and insurance activities		
6500 - Insurance, reinsurance and pension funding	Financial and insurance activities		
6612 - Security and commodity contracts brokerage	Financial and insurance activities		
6630 - Fund management activities	Financial and insurance activities		
0892 - Extraction of peat (engineering construction industry)	Mining and quarrying	Intra-industries	
1610 - Sawmilling and planing of wood	Manufacturing		
2452 - Casting of steel	Manufacturing		

2599 - Manufacture of other fabricated metal products nec	Manufacturing
2611 - Manufacture of electronic components	Manufacturing
2651 - Manufacture of instruments and appliances for measuring, testing and navigation	Manufacturing
2825 - Manufacture of non-domestic cooling and ventilation equipment	Manufacturing
2841 - Manufacture of metal forming machinery	Manufacturing
2892 - Manufacture of machinery for mining, quarrying and construction	Manufacturing
2899 - Manufacture of other special-purpose machinery nec	Manufacturing
2920 - Manufacture of bodies (coach-work) for motor vehicles; manufacture of trailers and semi-trailers	Manufacturing
3012 - Building of pleasure and sporting boats	Manufacturing
3312 - Repair of machinery	Manufacturing
4120 - Construction of residential and non-residential buildings	Construction
4321 - Electrical installation	Construction
4399 - Other specialised construction activities nec	Construction
3530 - Steam and air conditioning supply	Electricity, gas, steam and air conditioning supply
3511 - Production of electricity	Electricity, gas, steam and air conditioning supply
1105 - Manufacture of beer	Manufacturing
5610 - Restaurants and mobile food service activities	Accommodation and food service activities
5911 - Motion picture, video and television programme production activities	Accommodation and food service activities
6820 - Renting and operating of own or leased real estate	Real estate activities
8622 - Specialist medical practice activities	Human health and social work activities
9311 - Operation of sports facilities	Arts, entertainment and recreation
9329 - Other amusement and recreation activities	Arts, entertainment and recreation

Other

9312 - Activities of sport clubs	Arts, entertainment and recreation		
4511 - Sale of cars and light motor vehicles	Wholesale and retail trade; repair of motor vehicles and motorcycles	Retailing and after-sales service	
4631 - Wholesale of fruit and vegetables	Wholesale and retail trade; repair of motor vehicles and motorcycles		
4663 - Wholesale of mining, construction and civil engineering machinery	Wholesale and retail trade; repair of motor vehicles and motorcycles		
4673 - Wholesale of wood, construction materials and sanitary equipment	Wholesale and retail trade; repair of motor vehicles and motorcycles		
4675 - Wholesale of chemical products	Wholesale and retail trade; repair of motor vehicles and motorcycles		
4719 - Other retail sale in non-specialised stores	Wholesale and retail trade; repair of motor vehicles and motorcycles		
4759 - Retail sale of furniture, lighting equipment and other household articles in specialised stores	Wholesale and retail trade; repair of motor vehicles and motorcycles		
4764 - Retail sale of sporting equipment in specialised stores	Wholesale and retail trade; repair of motor vehicles and motorcycles		
4778 - Other retail sale of new goods in specialised stores	Wholesale and retail trade; repair of motor vehicles and motorcycles		
4777 - Retail sale of watches and jewellery in specialised stores	Wholesale and retail trade; repair of motor vehicles and motorcycles		
6201 - Computer programming activities	Information and communication	Technical Services	
5829 - Other software publishing	Information and communication		
5811 - Book publishing	Information and communication		

D: The case of large enterprises: Ponsse OYJ

F&E: Function Board Interlock or Experience Board interlock

Code	Generation Code	Family Members	Company	Industries	Position	Size	Relationship	F&E
Internal Appointments								
1	1	MR JARMO KALLE JOHANNES VIDGREN	PONSSE OYJ	2899 - Manufacture of other special-purpose machinery nec	C	L	Par	
			Vidgren Invest Oy	6499 - Other financial service activities, except insurance and pension funding nec	OM	S		Function
			PONSSE NORTH AMERICA INC	4663 - Wholesale of mining, construction and civil engineering machinery	BM	M	Sub	Function
			PONSSE UK LIMITED	3312 - Repair of machinery	OM	S	Sub	Function
			Lumon Invest Oy	4120 - Construction of residential and non-residential buildings	OM	L		Function
2	1	MR JANNE ILMARI VIDGREN	Vidgren Invest Oy	6499 - Other financial service activities, except insurance and pension funding nec	C	S		Function
			PONSSE OYJ	2899 - Manufacture of other special-purpose machinery nec	OM	L	Par	
			PONSSE NORTH AMERICA INC	4663 - Wholesale of mining, construction and civil engineering machinery	BM	M	Sub	Function
			Liisa's Shop Oy	4778 - Other retail sale of new goods in specialised stores	DM	S		Function
3	1	MR JUHA EINARI VIDGREN	Rientola Vierema Oy	9329 - Other amusement and recreation activities	C	S	Sub	Function
			PONSSE OYJ	2899 - Manufacture of other special-purpose machinery nec	OM	L	Par	
			PONSSE NORTH AMERICA INC	4663 - Wholesale of mining, construction and civil engineering machinery	C	M	Sub	Function
			Vidgren Invest Oy	6499 - Other financial service activities, except insurance and pension funding nec	C	S		Function
			Klaffi Tuotannot Oy	5911 - Motion picture, video and television programme production activities	OM	S		Experience
4	2	MR JUKKA TUOMAS VIDGREN	Mutant Koala Pictures Oy	5911 - Motion picture, video and television programme production activities	C	S		Experience
			Vidgren Invest Oy	6499 - Other financial service activities, except insurance and pension funding nec	C	S		Function
			PONSSE OYJ	2899 - Manufacture of other special-purpose machinery nec	BM	L	Par	
			PONSSE NORTH AMERICA INC	4663 - Wholesale of mining, construction and civil engineering machinery	BM	M	Sub	Function
			OLVI OYJ	1105 - Manufacture of beer	BM	L		Experience

External Appointments							
5	MS MAMMU MARJA LIISA KAARIO	PONSSE OYJ	2899 - Manufacture of other special-purpose machinery nec	VC	L		
		SAKA Finland Group Oy	8211 - Combined office administrative service activities	C	L		Experience
		ASPO OYJ	4675 - Wholesale of chemical products	DC	L		Experience
		ØAPMAN OYJ	6430 - Trusts, funds and similar financial entities	DC	M		Experience
		PONSSE NORTH AMERICA INC	4663 - Wholesale of mining, construction and civil engineering machinery	VC	M		Function
		ROBIT OYJ	2892 - Manufacture of machinery for mining, quarrying and construction	VC	L		Experience
		Sten & Co Oy Ab	4673 - Wholesale of wood, construction materials and sanitary equipment	OM	M		Function
		Rakennusliike Lapti Oy	4120 - Construction of residential and non-residential buildings	OM	L		Experience
		Epec Oy	2611 - Manufacture of electronic components	OM	M		Function
		PUUILO OYJ	4719 - Other retail sale in non-specialised stores	MB	L		Experience
		Puulo Tavaratalot Oy	4719 - Other retail sale in non-specialised stores	OM	M		Experience
		Puulo Invest II Oy	4759 - Retail sale of furniture, lighting equipment and other household articles in specialised stores	OM	S		Experience
		Ilmastorahasto Oy	6630 - Fund management activities	OM	S		Experience
		GOFORE OYJ	5829 - Other software publishing	BM	L		Experience
6	MR MATTI ILKKA KYLAEVAINIO	PONSSE OYJ	2899 - Manufacture of other special-purpose machinery nec	BM	L		
		Keitele Wood Products Oy	1610 - Sawmilling and planing of wood	OM	M		Function
		Keitele Timber Oy	1610 - Sawmilling and planing of wood	OM	L		Function
		Keitele Energy Oy	3511 - Production of electricity	OM	S		Experience
		Keitele Forest Oy	4673 - Wholesale of wood, construction materials and sanitary equipment	OM	L		Function
		PONSSE NORTH AMERICA INC	4663 - Wholesale of mining, construction and civil engineering machinery	BM	M		Function
7	MR ILPO OLAVI MARJAMAA	PONSSE OYJ	2899 - Manufacture of other special-purpose machinery nec	BM	L		
		Hetitec Oy	2452 - Casting of steel	OM	S		Experience
8	MR JUHA KALERVO VANHAINEN	EKE-Rakennus Oy	4120 - Construction of residential and non-residential buildings	OM			Experience
		PONSSE OYJ	2899 - Manufacture of other special-purpose machinery nec	BM	L		
		PONSSE NORTH AMERICA INC	4663 - Wholesale of mining, construction and civil engineering machinery	BM	M		Function