

The Impact of Intergenerational Succession Intention on Family Firm's Innovation Strategy: Evidence from China

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Abstract

In the development and growth of family businesses, succession is an unsolvable problem, which is also a popular focus of academic research. For a family firm, succession may be a strategic decision but also a long-term and intricate "footrace." It will have a significant impact on the long-term viability of a family firm if it is not handled appropriately. This study mainly explores the influences of family business owners' intergenerational succession intention on their family firms' innovation strategy in China. In addition, this study further examines the moderating role of the institutional environment in the above relationship. Therefore, the data in this article comes from a survey of 271 family businesses in eight different regions of China. Also, this paper can aid the smooth transition of intergenerational transmission of small and medium-sized family businesses in addition to the untroubled development of technological innovation activities. Specifically, the institutional

environment plays a negative moderating role in the relationship between family succession, radical succession, technological innovation, and a positive regulating role in the relationship between single equity succession and technological innovation.

Keywords: Chinese family business, intergenerational succession intention, institutional environment, innovation investment, innovation output

Introduction

Family businesses are the most critical part of the private economy in China. Nonetheless, empirical research on their entire status and economic contribution is scarce. This is due to several factors. To begin with, family business research has a relatively brief history. In reality, only in the last several centuries has China begun to pay attention to family companies (Shi, 2021; Chen *et al.*, 2021). The phrase ‘family business’ is frequently used in China to refer to corporate units in which people and families possess 50% or more of the controlling powers. The United Front Work Department of the Central Committee of the Communist Party of China, the All-China Federation of Industry and Commerce, and the State Administration for Industry and Commerce, in collaboration with the China Civil (Private) Economic Research Association, conducted the ninth sampling survey of private enterprises in 2010. According to the report, 85.4 percent of private businesses are controlled by families. According to the survey, only 55.5 percent of private organizations are family firms if the family businesses are characterized by ownership and management. When considering family ownership, management, and multigenerational family involvement, the number of family businesses in China may be relatively small (Chen *et al.*, 2021; Kubíček and Machek, 2019; Yang *et al.*, 2021a).

In China, the proverb '*the state advances and the people retreat*' suggests that state-owned or collectively-owned firms have received more attention than privately-owned, family-based enterprises. However, employment statistics demonstrate that this is not the case (Chen *et al.*, 2021; Guan *et al.*, 2021). According to China's National Bureau of Statistics website, private firms have significantly improved their capacity to absorb urban employment, while state-owned enterprises' capacity has decreased. At the end of 2012, there were 74.29 million people employed in state-owned and collective cities and municipalities. By the end of 2017, the figure was reduced to 64.7 million, with the overall urban employed population decreasing from 20.0 to 15.2% (Chen *et al.*, 2021; Chung and Yuen, 2003; Yang *et al.*, 2020; Yu *et al.*, 2018).

China's family companies make up more than 90% of the nation's total economic units. There are major family enterprises with revenues above 100 billion Yuan, including BiguiYuan, Midea, Shagang, New Hope (Xinxiwang), BYD, and Gome. However, compared to state-owned and foreign-based businesses, the bulk of family businesses are still tiny, with a considerable number of couples' shops and small and micro businesses (Chen *et al.*, 2021; Guan *et al.*, 2021). Indeed, succession in small and medium-sized family firms is significantly more difficult and time-consuming than in other types of organizations, partially due to the owner-dual manager's leadership position in the company and the family. In family firms, authority is not only obtained from the corporate side; rather, the family side plays an integral part in the firm's decision-making at times. As a result, succession planning frequently starts with family attitudes and values, relationships, family involvement, and family socialization and governance, all of which are antecedents to the actual succession process before important succession events occur (Shi, 2021; Kubíček and Machek, 2019; Yang *et al.*, 2021b).

For family businesses, intergenerational succession is a huge concern. In a family business, the transfer of power occurs when control and management of the company is passed down from one generation to another. It is, in fact, the transfer of the family's property, prestige, and status. In a developing economy, the ability of family businesses to generate new products, services, and processes that add value to their marketplace can have a significant impact on their long-term viability (Gundry *et al.*, 2014; Carayannis and Grigoroudis, 2022; Rodríguez-Aceves *et al.*, 2022). For example, the pandemic has demonstrated how family businesses solve complex challenges faster than non-family enterprises. Because of their intimate proximity to the firm's processes and management, as well as their social network within and outside companies, they have exhibited the ability to alter and adapt. This allows them to respond swiftly to market needs based on a fast-making decision process (Zapata-Cantu *et al.*, 2022). Since family companies play a vital role in society, now is the most vulnerable time for them to plan for power transitions between generations (Rodríguez-Aceves *et al.*, 2022). The average lifespan of a family business is barely 24 years, as per statistics. When the founders of family enterprises depart or retire unexpectedly, it is frequently the end of the business (Qi, 2021; Yang *et al.*, 2020; Julita *et al.*, 2021). According to Qi (2021), just 30% of family businesses in the United States can successfully complete down to the second generation, 13% of family businesses can successfully transfer down to the third generation, and therefore only 3% of family businesses can successfully pass down to the 4th generation (Karagouni, 2018).

In the realm of family enterprises, 'the first generations create a firm, the second generations preserve the business, and the third generations close the business' is a common occurrence. Because of their lack of management and expertise, the younger generation of family company successors had many challenges in the business process when the older

generation passed over power to the next generation of successors. The vast majority of the first generation of business owners are hesitant to retire and unwilling to decentralize their control (Julita *et al.*, 2021; Shi, 2021; Zou *et al.*, 2020). They have complete control over their own destiny, and the next generation of successors is in relatively poor shape. In the first generation of the family company in China, at least 30% of firms died due to succession concerns, Mao Yixiang, president of Fangtai Group, stated after years of research and inquiry. According to an old Chinese proverb, ‘The rich are not three generations. Due to the wave of handovers, succession has become one of the most critical variables in the long-term viability of Chinese family enterprises (Qi, 2021; Kellermanns *et al.*, 2012; Yuan, 2019).

According to China’s 2018 PricewaterhouseCoopers Family Business Survey Report, most of China’s family businesses are less likely to develop heritage plans, with less than 25% having a clear succession plan. This increases the uncertainty regarding the succession of Chinese family businesses. However, the intergenerational succession of the family business is a dynamic and complex process. The inter-generational succession of a family firm entails not just the transfer of titles and responsibilities but also management, ownership, and control. It develops into a continuance of resources, such as family businesses, entrepreneurship, and interpersonal networks (Dubina *et al.*, 2012; Martinez-Conesa *et al.*, 2017; Carayannis *et al.*, 2021). For the creators, the family business is a unique form of spirit, existence, and belief. It is not only a venue for product research but also a unique expression of their spirit, way of life, and beliefs (Qi *et al.*, 2021; Kim *et al.*, 2021).

Consequently, intergenerational succession becomes more critical in this context. The appropriateness of the successor is essential to what the creator has been capable of holding the country for a lifetime, given the obstacles of the complex and challenging international economic and political situation, increased domestic expenditures, and downward pressure

on the economy (Huang *et al.*, 2019; Yan and He, 2019; Sari and Masdupi, 2020). Because of China's traditional 'home' culture, many family enterprises in the country 'follow the father's company.' Many creators, on the other hand, have begun to free their minds, putting aside the outdated concept of 'no outsider' and attempting to find appropriate successors from a wider variety of immediate children, friends, and relatives, as well as subordinate employees and professional managers, in order to open up a fresh way to pass the baton of the family business today (Qi *et al.*, 2021; Yu *et al.*, 2018; Yang *et al.*, 2021a, b).

Most existing literature about intergenerational succession generally focuses on the corporate activities in the intergenerational succession of family businesses which include selecting and training successors (Chang and Shim, 2015; Pukall and Calabro, 2014; Sirmon and Hitt, 2003; Lingas, 2013), recognizing and transferring elements of succession (Fernández and Nieto, 2005; Zahra, 2003), succession mechanisms (Sciascia *et al.*, 2012), and problems surrounding the successive results of intergenerational succession (Liang *et al.*, 2014; Zhao *et al.*, 2015). However, research on the intergenerational succession intention of business owners is relatively limited. Most scholars divide the intention of succession into the intention of the founders of family businesses to give shifts to their children and the intention of the founders' children to take over (Cennamo *et al.*, 2012; He *et al.*, 2014; Minichilli *et al.*, 2014).

With China entering a new stage of sustainable and stable economic growth, enterprises establishing a sustained competitive advantage at a low cost will deviate from the current market development rhythm. The key to the development of enterprises in the new normal period is adhering to long-term technological innovation (Graves and Shan, 2014; Kowalski, 2020). The long-term orientation of technological innovation will help family businesses in the succession period to seize strategic opportunities, improve performance, and build

competitive advantage (Chrisman *et al.*, 2015; Chatterjee and Chatterjee, 2021). Furthermore, according to the socioemotional wealth (SEW) perspective, long-term and high-risk technological innovation activities will cause changes in the family business, such as organizational adjustment, personnel changes, and institutional reorganization, which will harm the family's socioemotional wealth. As a result, family businesses have a propensity to become more risk averse and conservative when it comes to technical innovation. The time frame challenge has not been solved in prior studies on intergenerational succession and family business innovation. Scholars are often interested in either change in the succession process (e.g., second-generation management engagement or intervention) (Chen and Hsu, 2009; Duran *et al.*, 2016) or changes in the innovative activities of firms after the succession is completed. Neither the potential change of the innovation investment or innovation output of the enterprise nor if the business owner's intention of intergenerational succession will have an impact on the enterprise's technological innovation in the early stage of the intergenerational succession of the family business are taken into account (He *et al.*, 2014). Therefore, it is of theoretical and practical significance for family businesses facing the dual challenge of intergenerational succession and innovation transformation to study the relationship between the family business' intention to pass the company on as well as the technological innovation adopted by the company.

Therefore, Frezatti *et al.* (2022) state that the idea that intention or action is potentially sustainable over generations is included in the description of the essence of family companies, which aligns with the SEW dimension of renewal of family relationships through succession. The other four aspects convey the 'how to' of the family business personality: (a) family control and influence, (b) family emotional attachment, (c) family identity, and (d) family social bonds. As a result, some dimensions are part of the firm's day-to-day operations

and one that is critical to the long-term goal. This fifth dimension is strengthened the longer the family business remains family business.

The main contributions of this article are as follows. First, this paper is different from existing research on enterprise succession in that it researches the impact of succession on enterprise technology innovation—mainly from the early stage of intergenerational succession—from the perspective of the enterprise owner's intention to pass on the business. This not only adds to current research that focuses on the succession process and outcomes while generally ignoring the succession plan prior to the succession, but it also serves as a point of reference for succession planning in Chinese family businesses. Second, based on existing research on family business intergenerational succession, this paper segregates the business owner's succession intention into three dimensions: the object of succession, the content of succession, and the mode of succession, all in order to discuss the family business's innovation investment and output from the perspective of the specific content of the enterprise owner's succession intention.

Literature Review and Research Hypotheses

The intention of succession is not only the beginning of the intergenerational succession of a family business but also the necessary condition for the beginning of the succession. “To whom,” “what to pass,” and “how to pass” are the questions that the family business controller must answer about intergenerational succession. The traditional concept of “family culture” and the agent risk of external professional managers make founders of family businesses take offspring as successors in order to continue the family foundation, and the “child-parenting industry” has become the mainstream model of the intergenerational succession of family enterprises in China (Wang *et al.*, 2015). So, the question “to whom”

mainly focuses on choosing between children or other family members and non-family professional managers. While distinctive family resources (familiness) separate family enterprises from non-family firms and provide them with a competitive advantage, it is critical for family firms to have an entrepreneurial orientation that allows future generations to exploit such familiness in unique and inimitable ways (Canovi *et al.*, 2022). The family business succession is the continuation of the family's control of the enterprise. With the continuous acceleration of the reform and opening-up process and economic development, private enterprises created in the form of family businesses in the early stage of the reform and opening-up have also completed the reform of the modern enterprise system and gradually hired professional managers (Arregle *et al.*, 2017). However, some family business owners prefer to cultivate family members and pass on equity and management to those family members to ease the first layer of proxy conflict. This is due to an increase in the cost of agency, the growing competition of agents, disputes about business philosophy between external managers and traditional family businesses, and other factors. As a result, the topic of "what to pass" largely centers on the decision between single equity succession and simultaneous ownership and management rights (Debicki *et al.*, 2016); however, the transfer of authority is also an essential aspect of a family business's intergenerational succession. The manner in which the family business's founder departs has become crucial to the successful transfer of family enterprises. Mei *et al.* (2012) divided modes of succession into incremental exit mode¹ and radical exit mode². The study found that the founder's

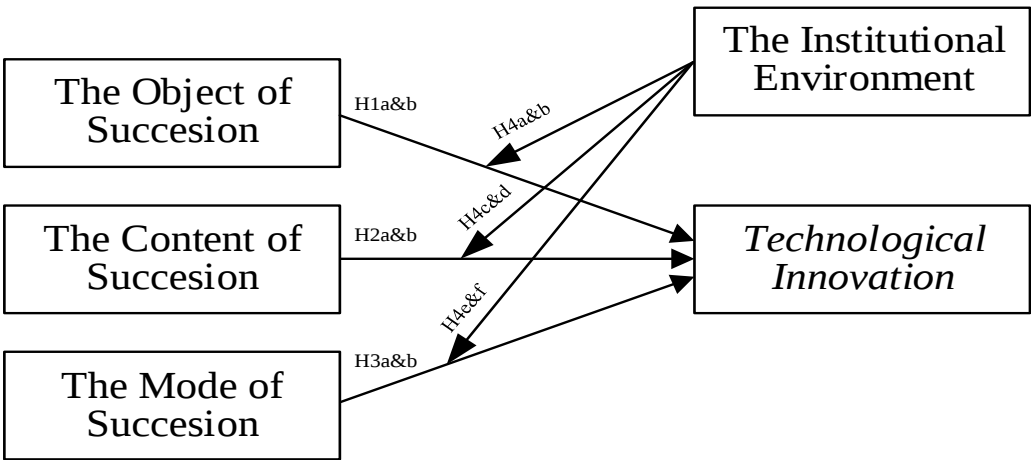
¹ The founder's control over the enterprise is gradually reduced, mainly by their position in the enterprise being gradually lowered, management power being gradually reduced, and finally exiting the enterprise.

² The founder suddenly and completely loses decision-making power and control, mainly manifested by the founder, from a certain time, no longer holding any management positions, and a one-time transfer of all enterprise control.

incremental exit will have a positive impact on the performance of the enterprise. Chen (2012) distinguished the modes of succession into incremental and radical modes by researching the process by which founders pass on management to professional managers. As a result, the question of ‘how to pass’ mainly focuses on choosing between the incremental mode of succession and the radical mode of succession.

The conceptual framework below (Figure 1) illustrates the dynamics and relations between the objective, the content, and the mode of succession with the institutional environment and technological innovation. The subsections below provide an in-depth analysis of these dynamics and relations.

Figure 1 Conceptual Model



The Objects of Succession and Technological Innovation

Compared to non-family businesses, family businesses often seek the preservation of non-economic benefits, such as interests and behaviors, that are closely related to their identity and SEW. The view of the SEW of a family business is a conventional perspective to explain

family behavior (Rondi *et al.*, 2019; Price *et al.*, 2013). Since socioemotional wealth is a multi-dimensional concept that includes family control, family identity, close social connections, emotional attachment, and cross-band renewal of family control (Vazquez, 2018), the decision-making around technological innovation may result in the loss of the socioemotional wealth of the family business and may also bring benefits to the family's socioemotional wealth (Gomez-Mejia *et al.*, 2014). Although technological innovation investment can provide supplementary socioemotional wealth benefits to some extent, the resulting socioemotional wealth benefits seem to be less than the socioemotional wealth loss caused by introducing external capital during the process due to the uncertainty of success (Cirillo *et al.*, 2019; Wu and Chen, 2014; Carayannis *et al.*, 2021). Family firms are more likely to minimize identified SEW losses early in the succession process by reducing innovation investment and output. When a family business owner wishes to pass on ownership or management power to family members, the family business will pay special attention to SEW and will not view the early stages of succession as a chance for the enterprise to engage in research and development (Hauck and Prüggl, 2015). Enterprises based on the preservation of SEW and altruism generally tend to risk aversion to preparing for the succession of family members. In addition, some of the unique assets that build core competitiveness, such as entrepreneurship, political connections, partners, supply chain resources, and bank-enterprise relations (Hasenzagl *et al.*, 2018; Carayannis *et al.*, 2020), are difficult to transfer in the process of succession (Vandekerckhof *et al.*, 2018).

Moreover, after the second generation of successors becomes involved in the enterprise, the new management is faced with the question of how to construct legitimate authority (Li *et al.*, 2015; Chen *et al.*, 2021). In order to enable successors to establish authority in the company earlier, it may drive enterprise owners to misappropriate enterprise resources to

establish successor's authority. Consequently, enterprises in the early stage of succession usually exhibit a higher consumption rate and a lower investment rate. It may also make the enterprise stakeholders temporarily pay more attention to short-term interests, which results in the consumption of internal resources, the reduction of the innovation of enterprises by lowering the innovation investment and innovation output, and the manipulation of financial data.

Hypothesis 1a (H1a). *The intention of family succession is negatively associated with technological innovation (innovation investment and innovation output).*

Hypothesis 1b (H1b). *The intention of non-family succession is positively associated with technological innovation (innovation investment and innovation output).*

The Content of Succession and Technological Innovation

Many private enterprises started in the form of family businesses. In these family businesses, high trust, low communication costs, and smooth operation laid a good foundation for the start-up period (Yang *et al.*, 2019). This network of resources, which is based on "kinship" and "blood" links, leads to a natural preference for "self-family" and a predisposition to convey equity and management to family members at the same time. When a firm owner intends to leave both share and management rights to heirs simultaneously, the concentration of family equity could become the top goal for succession. First, maintaining the family network, political contacts, family reputation, and safeguarding family interests can provide tremendous psychological comfort to the founder. Moreover, improved family control can pave the way for successor training and a smooth succession (Chen, 2018; Liu *et al.*, 2020; Qi *et al.*, 2021).

Previous studies divided socioemotional wealth into two categories: constrained socioemotional wealth and extended socioemotional wealth (Voordeckers *et al.*, 2014). Family control is a typical feature of constrained socioemotional wealth, and decision-makers with strong family control will attach importance to constrained socioemotional wealth. Also, the long-term orientation of technological innovation activities will pose a threat to family control during the period of succession (Acquaah, 2012). On the one hand, because the return on investment of technological innovation activities is long-term, enterprises must continuously invest their capital. Internal funds in family businesses are currently unable to meet sustainable investment needs; hence, external investment is frequently required to meet the requirement.

On the other hand, external investors will have varying needs for the company's organizational administration and capital allocation, putting the family's exclusive control of the company in jeopardy. Family businesses, on either hand, must initiate non-family technicians to meet the technical support and innovation requirements of technological innovation activities, and the leading role of technical experts changes the licensing and decentralization mode of the organizational structure, limiting family control over the technical route of products and technological innovation department (Shi *et al.*, 2019; Yang *et al.*, 2021a). Therefore, when business owners have the will to pass on equity and management rights to the next generation at the same time, they will strengthen family control and pay attention to constrained SEW to avoid the development of technological innovation activities.

An important alternative method is for the family business to pass on the equity to the family members and the management power to professional managers, which may be beneficial to the development of the enterprise's innovation activities to some extent

(Vliamos and Tzeremes, 2012; Dubina *et al.*, 2017; Zhang *et al.*, 2022). When enterprises intend to pass on management power to professional managers, enterprises will be somewhat endowed with the innovative management system of separation of powers. Additionally, enterprises are eager to carry out strategic changes through innovative forms to increase the family business continuity (Zou *et al.*, 2020; Qi, 2021). At this point, business decision-makers pay more attention to extended SEW. Yang *et al.* (2019) believe that decision-makers who value extended SEW are more focused on the long-term orientation of strategic change, innovation activities and drive companies to make long-term strategic investments (Voordeckers *et al.*, 2014). Therefore, the strategic decision-makers who think highly of extended SEW will be more inclined to the long-term survival and development of enterprises rather than short-term equity control or preserving non-economic factors such as in constrained SEW. They would tend to use a longer investment assessment period to enhance the enterprise's long-term competitiveness and external environmental adaptability to increase technological innovation investment.

Hypothesis 2a (H2a). *The intention of single equity succession³ is positively associated with technological innovation (innovation investment and innovation output).*

Hypothesis 2b (H2b). *The intention of succession with equity and management rights⁴ is negatively associated with technological innovation (innovation investment and innovation output).*

³ Pass on the equity to the family members and the management power to professional managers.

⁴ Pass on the equity and the management to family members at the same time.

The Mode of Succession and Technological Innovation

At present, some articles define the mode of succession, which mainly refers to the exit mode of family business owners, as the degree to which the founders give up decision-making power and control of enterprise management (Liu *et al.*, 2020; Rondi *et al.*, 2019; Lingas, 2013). First, the mode of incremental exit sees the founder's control over the enterprise gradually reduced—mainly by their position in the enterprise being gradually lowered—management power steadily declined, and finally, their exit from the enterprise. Second, the mode of radical exit sees the founder suddenly and completely losing decision-making power and control—mainly manifested by the founder—from a certain time, no longer holding any management positions, and then conducting a one-time transfer of all enterprise control. Research shows that the incremental mode of succession is more conducive to the smooth transition of succession in family businesses, while the mode of radical succession is disadvantageous to the smooth passing on of enterprises (Vazquez, 2018; Chen *et al.*, 2021). Incremental succession can form an effective pacification mechanism, avoiding the negative impact of a sudden break in a strong emotional attachment and reducing the enterprise's negative response behaviors before the founder's exit. The gradual withdrawal of the founder also provides a buffer and transition stage for the training and adaptation of successors to the internal organizational structure and strategic mode of the enterprise, which makes enterprises more long-term oriented and is beneficial to the development of innovative activities (Carayannis and Meissner, 2017; Rui and Breschi, 2019; Jibir and Abdu, 2021). When the family business owner intends to follow an incremental mode of succession, they often pay more attention to the long-term guidance of the enterprise and the positive strategic change of the enterprise. At this time, the founders paid more attention to extended SEW. So,

the incremental mode of succession is positively associated with innovation investment and innovation output (Yuan, 2019).

On the contrary, the mode of radical succession causes the founder to suddenly hand over control of the enterprise to successors. Hasty succession will make it impossible for partners, entrepreneurs, political connections, and other unique assets to be easily transferred within the organization (Okoroafo, 1999), resulting in organizational dysfunction (Penrose, 1959). Moreover, power shifts will not only shock the family but also affect employees and external stakeholders. In order to pass on control of the business to successors in a short period, the family must have higher control over the company. Hence, when the family business owner intends to follow a radical mode of succession, it tends to increase the control of the enterprise (Wu and Chen, 2014). At this time, the founder pays more attention to constrained SEW. So, the radical mode of succession is negatively associated with innovation investment and innovation output.

Hypothesis 3a (H3a). *The incremental mode of succession is positively associated with technological innovation (innovation investment and innovation output).*

Hypothesis 3b (H3b). *The radical mode of succession is negatively associated with technological innovation (innovation investment and innovation output).*

The Regulatory Role of the Institutional Environment

The institutional environment is an essential factor influencing organizational structure and enterprise decision-making (Zientara, 2017). A sound legal system and the market mechanism will also play an indispensable role for enterprises embedded in the institutional

environment. Differences in economic development levels and geographical locations make the institutional environments distinct for family enterprises located in different regions, and the differences in the institutional environments of family businesses in different regions may indirectly affect the influence of succession intention on the technological innovation of family enterprises (Jalilvand *et al.*, 2019; Ramesh, 2020).

Institutional Environment and Family Business Succession

Due to China's enormous size, there are significant variances in economic development and resource endowment among regions in the marketization process, resulting in substantial differences in institutional frameworks. In locations with inadequate institutions, Chinese family companies, like many other transition economies, face negative consequences such as lower-level legal systems, higher degrees of government intrusion, and poor financial growth. The inadequacies in these systems have become the major elements affecting the succession of organizations throughout the delicate period of a generation shift (Yang *et al.*, 2021a, b; Chen *et al.*, 2021).

The institutional environment in which Chinese family enterprises operate is basically in a time of economic transition when the socialist planned economy and the market economy interact (Usman *et al.*, 2021; Kim *et al.*, 2021). China's rules and regulations are improving rapidly, but they still serve to expand government control in the conventional sense, and there is no effective structure in place to defend private property rights. In terms of government intervention, there is no efficient mechanism in place in transition economies to separate corporate business activity from government oversight. Governments control most resources at all levels, and the government may intrude or even pillage private firms through some unneeded control measures (Liu *et al.*, 2020; Qi, 2021; Yang *et al.*, 2021). The grasping hand

is the term for this type of conduct. Government intervention has two key effects on family business management decisions in China. First, resources are misaligned and cannot flow easily to efficient private firms since the government controls a vast number of resources, and the redistributing system discriminates against private enterprises. As a result, family businesses are unable to get resources fairly and freely through effective market procedures, and they can only continue operations at high costs, eroding business owners' long-term confidence. Second, there is severe competition among China's numerous regions due to economic systems such as a political tournaments and fiscal decentralization (Huang *et al.*, 2019; Sari and Masdupi, 2020; Guan *et al.*, 2021). The local government could create various apportionments to the family business in order to enhance fiscal revenue, or it may openly seek bribes from the company, increasing the family's commercial risk. In this situation, the family business owners are unwilling to continue to incur the business risks associated with government intervention, resulting in a lack of family business inheritance preparedness (Yang *et al.*, 2021; Qi *et al.*, 2021).

In a good institutional environment, the legal and market systems that the family business face will be more standardized, the external human resources market and professional manager market will be better, and the family business will find experienced managers suitable for the business in the labor market at a relatively small cost (Chen *et al.*, 2021; Ramesh, 2020). If the family business owners in the early stage generate the intention of family succession, shares and management rights, and radical succession, then constrained SEW dominates. In the early stage of the succession, the family business will often protect existing SEW decisions and constantly enhance the family control of the enterprise. A good institutional environment develops the external human capital and professional manager market, which means that family control in reducing agency costs plays a decreasing role

(Okoroafo, 1999; Chen, 2018). Firm family control makes business owners keep more family members in management positions to maintain the family's SEW, which means that the family business cannot effectively introduce non-family management talent and technical expertise in the situation that the external human resources and professional managers market is good; this hinders the promotion of enterprise technological innovation activities (Yan and He, 2019; Yuan, 2019). This also indirectly strengthens the negative relationship between the intention of family succession and innovation investment or output. If the family business owner forms the intention of non-family succession, single equity succession, and radical succession in the early stage, then extended SEW dominates. Also, the family business in the early stage of succession tends to pay more attention to the long-term orientation of the enterprise. The better the institutional environment, the more conducive it is to continue obtaining innovative and human resources. Here, enterprises would pay more attention to the long-term competitiveness of technological innovation activities (Peng and Luo, 2000; Chen *et al.*, 2021; Guan *et al.*, 2021). A high level of trust and sound legal and market environments in a good institutional environment is beneficial for the family to maintain a healthy employment relationship with introduced external managers and non-family technicians; this somewhat reduces the agency costs of employing non-family professional managers. Therefore, a better institutional environment will strengthen the positive impact of single equity succession and radical succession on technological innovation. The following hypotheses are formulated:

Hypothesis 4a (H4a). *Institutional environment will strengthen the negative association of the intention of family succession with technological innovation (innovation investment and innovation output).*

Hypothesis 4b (H4b). *Institutional environment will strengthen the positive association of the intention of non-family succession with technological innovation (innovation investment and innovation output).*

Hypothesis 4c (H4c). *Institutional environment will strengthen the negative association of the intention of succession with equity and management rights with technological innovation (innovation investment and innovation output).*

Hypothesis 4d (H4d). *Institutional environment will strengthen the positive association of the intention of single equity succession with technological innovation (innovation investment and innovation output).*

Hypothesis 4e (H4e). *Institutional environment will strengthen the negative association of the radical mode of succession with technological innovation (innovation investment and innovation output).*

Hypothesis 4f (H4f). *Institutional environment will strengthen the positive association of the incremental mode of succession with technological innovation (innovation investment and innovation output).*

Data and Methods

Data Description and Variables Selection

Sample Selection and Sources of Data

The focus of this study is family business with the intention of intergenerational succession, and private enterprises with a family shareholding ratio of 50% or more are selected as the

sample of family businesses. The data comes from a questionnaire survey conducted by the research group in 2021 on private enterprises in 8 provinces and cities of China, including Zhejiang, Shanghai, Fujian, Guangdong, Chongqing, Qinghai, Shaanxi, and Yunnan. A total of 350 questionnaires were issued, with 312 of them being recovered; this is a recovery rate of 97.71%. Among them, there were 271 family business questionnaires, an effective rate of 80.12%. The samples can be broken down as follows: Zhejiang accounts for 38.70%, Shanghai for 5.50%, Fujian for 2.20%, Guangdong for 1.50%, Chongqing for 36.50%, Qinghai for 8.00%, Shaanxi for 1.70%, Yunnan for 2.90%, manufacturing for 77.10%, services for 16.80%, agriculture, forestry, animal husbandry and fishery for 4.40%, and construction for 1.50%.

Variables Selection

1. The Dependent Variable: The technological innovation of enterprises measured from innovation investment (technological innovation) and innovation output (PATENT). Measuring innovation investment in many studies often takes the technological innovation investment index as a measure, but a single technological innovation investment is not able to meet the current rapid development needs of knowledge and technology of the economy. This paper takes the proportion of technological innovation costs in the total sales revenue as the index of innovation investment. The technological innovation sales ratio is more robust than the absolute technological innovation investment. The innovation output is measured by patents in 2019, and add 1 is taken as the natural logarithm. Therefore, the questions about technological innovation concern the proportion of technological innovation expenses of enterprises in the total sales revenue of the year and the number of patents applied by enterprises in the year. Due to the difficulty of data acquisition of family businesses, the technological innovation sales ratio in the questionnaire design gives the value range items

in 2015. The numbers 1-7 represent proportions below 0.5%, 0.5-1%, 1-2%, 3-5%, 6-10%, 11-15%, and above 15% respectively.

2. The Independent Variable: Succession intention of business owners. It is mainly measured from the specific content of the owners' succession intention, including the objects of succession, the content of succession, and the mode of succession. In the questionnaire, the subject of the objects of succession is who the new/next-generation leaders of the enterprise will be, mainly including family members and non-family members. The numbers 1 and 0 represent passing on to family and non-family members, respectively. The item of the content of succession in the questionnaire considers the founder's options, which mainly includes four levels: passing on the equity to the next generation, passing on the equity and management rights to the next generation at the same time, passing on the management rights to the next generation, and passing on the management rights to the next generation as the benchmark group. The item of the mode of succession in the questionnaire refers to how founders intend to behave, which mainly includes the radical model of succession and the incremental mode of succession. In terms of dummy variables, the numbers 1 and 0 represent the sudden and complete transfer of management or control of the enterprise and the gradual reduction of management or control of the enterprise, respectively.

3. The Moderator Variable. Institutional environment (IE), referring to the scale of Chelariu *et al.* (2006), includes three items: always responds to unexpected changes in laws and regulations or policies; the current business laws, regulations, and regulatory policies are in rapid change; domestic laws and regulations fail to effectively protect the rights and interests of the enterprise. Exploratory factor analysis is conducted using SPSS19.0 statistical software, and the results show that the KMO of the scale is 0.788. The ability to accumulatively explain variance was 72.298%. Bartlett's ball test was significant ($P = 0.000$);

that is, the variable was suitable for factor analysis. Cronbach α reliability coefficient was 0.806, indicating that the scale has good reliability and validity.

4. The Control Variable. According to previous research results, this paper controls four critical factors that may affect business owners' succession intention and technological innovation: family ownership, business life span, business scale, and the cultural level of business owners. Too high or too low family ownership will make family businesses make different corporate strategic decisions. For example, a 100% family-controlled business will pay more attention to the preservation of social-emotional wealth than a 50% family-controlled business. Family businesses with different business life span may also have different succession intentions and strategic decisions for technological innovation. For example, a family business with a business life span of fewer than 5 years has a weak sense of succession, and the willingness to succeed may not affect the strategic decision-making of the business's technological innovation. However, family businesses with a business life of more than 20 years may have entered the initial succession stage, and the impact of intergenerational succession on technological innovation will be greater than that of family businesses with shorter business life. Similarly, a family business with a larger scale may be more open and democratic. On the contrary, a family business with a smaller scale will be more conservative and may be succeeded as one of the essential activities of the company. Therefore, different business scale is more important to business owners. The relationship between the willingness to succeed and technological innovation will have different effects. The cultural level of the business owners represents the quality of the business owner. The various attributes of the business owner may have different effects on the relationship between the business owner's willingness to succeed and technological innovation.

Table 1 below summarizes the main variables utilized in this study, as described above.

Table 1. Main Variables of the Study

Classification	Variable		Symbol	Variable Definition
Dependent variable	Innovation Investment (Proportion of technological innovation expenses)		Technological Innovation	Technological innovation expenses as a percentage of the annual gross sales revenue measure, the proportion of 0.5%, 0.5-1%, 1-2%, 3-5%, 6-10%, 11-15%, 15% or more were assigned 1-7
	Innovation Output (Number of patents)		PATENT	The number of patent applications business year
Independent variable	The objects of succession		FAMILY	Family members = 1, non-family = 0
	The content of succession	Single succession equity Stock and management rights at the same time succession	STOCK	Equity succession = 1, otherwise = 0
			MANAGE	Heritage with ownership and management at the same time = 1, otherwise = 0
	The mode of in succession		R-INHE	Radical succession = 1, incremental Succession = 0
Moderator variable	Institutional Environment		IE	Often must deal with unexpected changes in laws, regulations, or policies; the current business regulations and regulatory policies in rapid change; domestic laws and regulations failed to effectively protect the interests of the enterprise
The control variable	Family Ownership		OWNERSHIP	Family business owners and entrepreneurs the proportion of shares held by the company
	Business Life Span		L-SPAN	Companies have created life natural logarithm
	Business Scale		SIZE	The number of employees at the end of 2015 natural logarithm
	The cultural level of business owners		EDU	Primary school and below, junior high, high school (secondary school), college, undergraduate, master's degree or above, according to the order of assignment 1-6

Mode Checking

This paper uses the method of hierarchical regression to test the regulatory effect of the institutional environment on the enterprise owners' succession intentions and technological innovation. In order to ensure that there is no collinearity problem, the interaction measurement items are centralized in the regulation effect test. Test results are shown in

Tables 5 and 6. Model 1 in Tables 3 and 4 is the benchmark mode, only considering the influence of control variables on innovation investment and innovation output. Models 2-4 in Tables 3 and 4 test the influence of succeeding objects, succeeding contents, and succeeding modes on innovation investment and innovation output. Models 2-4 in Tables 5 and 6 test the regulatory effect of the institutional environment between enterprise owners' succession intentions and technological innovation. The diagnostic results of variance expansion factor (VIF) show that the highest value of VIF was 2.341, which indicates that there is no multicollinearity between variables.

Results

Descriptive Statistics and Correlation Analysis

The descriptive statistics of each variable of the sample companies is listed in Table A1 below, which shows the descriptive statistical analysis results and correlation coefficient matrix of the main research variables. Among them, family succession, the simultaneous succession of equity and management rights, radical mode of succession, and innovation investment have a significant negative correlation. Single equity succession and institutional environment have a significant positive correlation with innovation investment ($P < 0.001$). Family succession, the simultaneous succession of equity and management rights, radical mode of succession, and innovation output have a significant negative correlation. Single equity succession has a significant positive correlation between the institutional environment

and innovation output ($P < 0.001$). This shows a close relationship between the objects of succession, the content of succession, mode of succession, institutional environment, and technological innovation. This provides the initial evidence supporting H1, H2, H3, and H4.

Table A1 Descriptive statistics and correlation analysis

Variable	Means	Standard deviation	1	2	3	4	5	6	7	8	9	10	11
R&D	2.922	1.830	1										
PATENT	0.712	1.140	0.515***	1									
OWNERSHIP	84.956	18.571	-0.034	-0.002	1								
SIZE	4.163	1.575	0.161**	0.377***	-0.254***	1							
L-SPAN	2.259	0.694	-0.032	0.119*	-0.061	0.376***	1						
EDU	4.106	1.086	0.120*	0.143*	-0.125*	0.107+	-0.027	1					
FAMILY	0.624	0.485	-0.576***	-0.540***	-0.017	-0.157**	0.014	-0.154*	1				
STOCK	0.442	0.497	0.435***	0.404***	-0.123*	0.165**	0.022	0.144*	-0.675***	1			
MANAGE	0.485	0.500	-0.430***	-0.397***	0.116+	-0.181**	-0.011	-0.108+	0.573***	-0.549***	1		
R-INHE	0.733	0.443	-0.562***	-0.519***	-0.024	-0.173**	0.009	-0.139*	0.640***	-0.545***	0.470***	1	
IE	3.629	0.849	0.223***	0.373***	-0.077	0.117+	0.017	0.048	-0.117+	-0.016	0.029	-0.209***	1

Note: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; two-sided test.

Hypothetical Test

The Impact of Objects of Succession on Technological Innovation

Mode 2 in Table 2 shows that the objects of succession significantly impact innovation investment, and the objects of succession being the family member has a significant negative impact on innovation investment ($\beta = -2.106$, $P < 0.001$). After considering the regulatory role of the institutional environment in Mode 2 of Table 4, this negative relationship is still significant. Mode 2 in Table 3 shows that the objects of succession significantly impact innovation output, and the objects of succession, being the family member, has a significant negative impact ($\beta = -1.135$, $P < 0.001$). After considering the regulatory effect of the institutional environment in Mode 2 of Table 5, this negative relationship is still significant. It shows that family business owners' succession intentions for family members will inhibit the technological innovation of family business, and H1 is verified.

The Impact of Content of Succession on Technological Innovation

Mode 3 in Table 2 shows that the content of succession has a significant impact on innovation investment. The content of succession being single equity succession has a significant positive impact on innovation investment ($\beta = 0.895$, $P < 0.05$). The content of succession being equity and management right succession has a significant negative impact on innovation investment ($\beta = -0.742$, $P < 0.05$). After Mode 3 in Table 4 considers the regulatory role of the institutional environment, this relationship is still significant. Mode 3 in Table 3 shows that the content of succession has a substantial impact on innovation output,

and the content of succession, being single equity succession, has a significant positive impact on innovation output ($\beta = 0.520$, $P < 0.05$). After considering the regulatory role of the institutional environment in Mode 3 of Table 5, the positive relationship between single equity succession and innovation output is still significant. This indicates that the succession intention of family business owners being a single equity succession will promote the technological innovation of family business, and the intention of family business owners to succeed in the ownership and management rights at the same time will inhibit the innovation investment of family business.

Additionally, the content of succession of the family business as the simultaneous succession of equity and management negatively impacts innovation output but is not significant ($\beta = -0.341$, $P > 0.1$). The possible reasons are after the formation of the intention of the family business owners to succeed in the equity and management rights at the same time—although they continue to strengthen family control and gradually reduce the introduction of non-family managers and technicians—the patent invention of the enterprise is a long-term process and accompanied by the investment of capital, technology, human resources, and material resources. The investment of the previous cycle has a legacy effect on the next cycle. Therefore, the negative impact of the simultaneous succession of equity and management rights on innovation investment is weakened due to cyclical reasons. H2 is partially verified.

The Impact of Mode of Succession on Technological Innovation

Mode 4 in Table 2 shows that mode of succession significantly impacts innovation investment, and radical mode of succession has a significant negative impact on innovation investment ($\beta = -2.247$, $P < 0.001$).

Table 2 The Intergenerational Succession Intention of Family Firm Owners and Innovation Investment

Variable	MODE-1	MODE-2	MODE-3	MODE-4
	Dependent variable (Technological innovation)	Dependent variable (Technological innovation)	Dependent variable (Technological innovation)	Dependent variable (Technological innovation)
OWNERSHIP	0.004 (0.006)	-0.002 (0.005)	0.006 (0.006)	-0.002 (0.005)
SIZE	0.232 (0.079)	0.102 (0.067)	0.150* (0.072)	0.092 (0.068)
L-SPAN	-0.281 (0.172)	-0.147 (0.144)	-0.238 (0.157)	-0.145 (0.146)
EDU	0.169 (0.102)	0.036 (0.085)	0.093 (0.093)	0.054 (0.086)
FAMILY		-2.106*** (0.192)		
STOCK			0.895* (0.378)	
MANAGE			-0.742* (0.375)	
R-INHE				-2.247*** (0.214)
-CONS	1.597 (0.824)	4.120*** (0.724)	1.878* (0.814)	4.445*** (0.746)
R2	0.046	0.341	0.221	0.325
Adj R2	0.032	0.329	0.204	0.312
F	3.279*	27.739***	12.647***	25.775***
N	274	274	274	274

Note: + p <0.10, * p <0.05, ** p <0.01, *** p <0.001; two-sided test.

After considering the regulatory role of the institutional environment in Mode 4 of Table 4, this negative relationship is still significant. Mode 4 in Table 3 shows that mode of succession significantly impacts innovation output, and radical mode of succession has a significant negative impact on innovation output ($\beta = -1.173$, $P < 0.001$).

Table 3 The Intergenerational Succession Intention of Family Firm Owners and Innovation Output

Variable	MODE-1	MODE-2	MODE-3	MODE-4
	Dependent variable (PATENT)	Dependent variable (PATENT)	Dependent variable (PATENT)	Dependent variable (PATENT)
OWNERSHIP	0.007* (0.004)	0.005 (0.003)	0.009** (0.003)	0.005 (0.003)
SIZE	0.297*** (0.046)	0.228*** (0.404)	0.255*** (0.043)	0.224*** (0.041)
L-SPAN	-0.065 (0.100)	0.007*** (0.087)	-0.043 (0.093)	0.007* (0.088)
EDU	0.119* (0.059)	0.047 (0.051)	0.078 (0.055)	0.058 (0.052)
FAMILY		-1.135*** (0.116)		
STOCK			0.520* (0.225)	
MANAGE			-0.341 (0.223)	
R-INHE				-1.173** (0.130)
-CONS	-1.496** (0.480)	-0.137* (0.435)	-1.392** (0.484)	-0.004** (0.452)
R2	0.166	0.387	0.291	0.362
Adj R2	0.154	0.375	0.275	0.350
F	13.429***	33.769***	18.275***	30.385***
N	274	274	274	274

Note: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; two-sided test.

After Mode 4 in Table 5 considers the regulatory role of the institutional environment, this negative correlation is still significant. It shows that the succession intention of family business owners is a radical mode of succession, which will inhibit the technological innovation of family business. H3 is verified.

Regulation of the Institutional Environment

In Mode 2 of Table 4, the interaction term (IE×FAMILY) between the objects of succession and the institutional environment has a significant negative impact on innovation investment ($\beta = -1.218$, $P < 0.01$). In Mode 3 of Table 4, the interaction item of single equity succession and institutional environment (IE×STOCK) has a significant positive impact on innovation investment ($\beta = 0.855$, $P < 0.05$), while the interaction item of equity and management proper succession and institutional environment (IE×MANAGE) has a significant negative impact on innovation investment ($\beta = -1.302$, $P < 0.01$). In Mode 4 of Table 4, the interaction item

of the mode of succession and institutional environment (IE×R-INHE) has a significant negative effect on innovation investment ($\beta = -1.196$, $P < 0.001$).

Table 4 The Intergenerational Succession Intention of Family Firm Owners and Innovation Investment: Regulation of the Institutional Environment

Variable	MODE-1	MODE-2	MODE-3	MODE-4
	Dependent variable (Technological innovation)	Dependent variable (Technological innovation)	Dependent variable (Technological innovation)	Dependent variable (Technological innovation)
OWNERSHIP	0.006 (0.004)	0.003 (0.005)	0.003 (0.005)	-0.001 (0.005)
SIZE	0.206** (0.077)	0.071 (0.062)	0.084 (0.061)	0.030 (0.065)
L-SPAN	-0.269 (0.169)	-0.185 (0.134)	-0.216** (0.131)	-0.101 (0.138)
EDU	0.159*** (0.100)	-0.008 (0.080)	0.037*** (0.078)	0.082*** (0.082)
FAMILY		-2.056** (0.179)		
STOCK			0.911** (0.317)	
MANAGE			-0.757* (0.315)	
R-INHE				-2.002*** (0.208)
IE	0.436*** (0.127)	0.089*** (0.108)	0.019 (0.110)	0.125*** (0.107)
IE×FAMILY		-1.218** (0.203)		
IE×STOCK			0.855* (0.409)	
IE×MANAGE			-1.302** (0.434)	
IE×MODEL				-1.196*** (0.222)
-CONS	1.649* (0.808)	3.027*** (0.645)	2.663*** (0.631)	2.719 (0.666)
R2	0.087	0.439	0.462	0.400
Adj R2	0.070	0.424	0.443	0.384
F	5.089***	29.676***	25.155***	25.358***
N	274	274	274	274

Note: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; two-sided test.

According to the median size of the institutional environment, the samples are divided into groups for regression. The results are listed in Table A2 below, which shows that the negative impact of the objects of succession on innovation investment of family enterprises

with a good institutional environment is greater than that of family enterprises with a poor institutional environment ($\beta = -2.953, P < 0.001$; $\beta = -1.277, P < 0.001$). The positive impact of single equity succession on innovation investment of family businesses with a good institutional environment is greater than that of family businesses with a poor institutional environment ($\beta = 1.488, P < 0.001$; $\beta = 0.254, P > 0.1$). The negative influence of the succession of stock right and management right on the innovation investment of family businesses with a good institutional environment is greater than that of family businesses with a poor institutional environment ($\beta = -1.561, P < 0.01$; $\beta = -0.228, P < 0.01$). The negative impact of succession mode on innovation investment of family business with good institutional environment is greater than that of family business with poor institutional environment ($\beta = -2.919, P < 0.001$; $\beta = -1.354, P < 0.001$). To sum up, the better the institutional environment of the family business is, the greater the negative impact of family members on innovation investment. The greater the positive impact of single equity succession on innovation investment, the greater the negative impact of a simultaneous succession of equity and management rights. Finally, the greater the negative impact of radical succession on innovation investment, the more negative impact the institutional environment has on family succession, the simultaneous succession of equity and management rights, and radical succession on innovation investment; the positive impact of single equity succession on innovation investment is also strengthened.

Table A2 Sub-sample Regression Results: The Intergenerational Succession Intention of Family Firm Owners and Innovation Investment

Variable	Environment system (IE)		Environment system (IE)		Environment system (IE)	
	Good	Bad	Good	Bad	Good	Bad
OWNERSHIP	-0.007 (0.007)	0.003 (0.007)	-0.002 (0.006)	0.008 (0.008)	-0.010 (0.007)	0.003 (0.008)

SIZE	0.100 (0.082)	0.062 (0.099)	0.099 (0.081)	0.091 (0.105)	0.39 (0.086)	0.090 (0.101)
L-SPAN	-0.085 (0.174)	-0.262 (0.217)	-0.019 (0.173)	-0.379 (0.230)	0.120 (0.182)	-0.363 (0.220)
EDU	-0.125*** (0.111)	0.129 (0.121)	-0.053 (0.108)	0.158 (0.129)	0.025 (0.113)	0.101 (0.124)
FAMILY	-2.953*** (0.250)	-1.277*** (0.283)				
STOCK			1.488*** (0.517)	0.254 (0.479)		
MANAGE			-1.561** (0.524)	-0.228** (0.465)		
R-INHE					-2.919*** (0.264)	-1.354*** (0.352)
-CONS	5.621*** (0.918)	3.105** (1.045)	3.241** (0.973)	1.853 (1.139)	5.260** (0.943)	2.153** (0.005)
R2	0.581	0.150	0.594	0.051	0.551	0.121
Adj R2	0.563	0.122	0.573	0.012	0.531	0.091
F	31.634***	5.237***	27.567***	1.314	27.951***	4.068**
N	120	154	120	154	120	154

Note: + p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001; two-sided test.

In Mode 2 of Table 5, the interaction item of the objects of succession and institutional environment (IE×FAMILY) has a significant negative impact on innovation output ($\beta = -0.384$, $P < 0.001$). In Mode 3 of Table 5, the interaction item of single equity succession and institutional environment (IE×STOCK) has a significant positive impact on innovation output ($\beta = 0.563$, $P < 0.001$), and the interaction item of both equity and management proper succession and institutional environment (IE×MANAGE) has a negative impact on innovation output, although not significantly ($\beta = -0.140$, $P > 0.1$). In Mode 4 of Table 5, the interaction between the mode of succession and institutional environment (IE×R-INHE) has a significant negative impact on innovation output ($\beta = -0.440$, $P < 0.01$).

Table 5 The Intergenerational Succession Intention of Family Firm Owners and Innovation Output: Regulation of the Institutional Environment

Variable	MODE-1	MODE-2	MODE-3	MODE-4
	Dependent variable (PATENT)	Dependent variable (PATENT)	Dependent variable (PATENT)	Dependent variable (PATENT)
OWNERSHIP	0.008 (0.003)	0.006* (0.003)	0.009** (0.003)	0.006 (0.003)
SIZE	0.270*** (0.043)	0.204*** (0.037)	0.221*** (0.039)	0.192*** (0.039)
L-SPAN	-0.053 (0.094)	0.741 (0.080)	-0.018 (0.083)	0.024 (0.083)
EDU	0.108+ (0.055)	0.029 (0.047)	0.057 (0.050)	0.067 (0.049)
FAMILY		-1.067* (0.107)		
STOCK			0.534* (0.202)	
MANAGE			-0.366+ (0.201)	
R-INHE				-0.983*** (0.125)
IE	0.450*** (0.070)	0.317* (0.064)	0.380 (0.070)	0.311*** (0.064)
IE×FAMILY		-0.384*** (0.121)		
IE×STOCK			0.563* (0.260)	
IE×MANAGE			-0.140 (0.276)	
IE×R-INHE				-0.440** (0.133)
-CONS	-3.077*** (0.512)	-0.771* (0.384)	-1.149** (0.401)	-0.920* (0.399)
R2	0.277	0.488	0.439	0.448
Adj R2	0.263	0.457	0.420	0.433
F	20.499***	36.238***	23.000***	30.803***
N	274	274	274	274

Note: + p <0.10, * p <0.05, ** p <0.01, *** p <0.001; two-sided test.

According to the median size of the institutional environment, the samples are divided into groups for regression. The results are listed in Table A3 below, which shows that the negative impact of the objects of succession on the innovation output of family businesses with a good institutional environment is greater than that of family enterprises with a poor institutional environment ($\beta = -1.445$, $P < 0.001$; $\beta = -0.588$, $P < 0.001$). The positive impact of single equity succession on the innovation output of family businesses with good institutional environment is greater than that of poor institutional environment ($\beta = 1.224$, P

< 0.01 ; $\beta = -0.099$, $P > 0.1$). The negative impact of the mode of succession on the innovation output of family enterprises with a good institutional environment is greater than that of family businesses with a poor institutional environment ($\beta = -1.252$, $P < 0.001$; $\beta = 0.577$, $P > 0.1$). In conclusion, the better the institutional environment of the family business is, the greater the negative impact of family members on innovation output, the greater the positive impact of single equity succession on innovation output, and the greater the negative impact of radical succession on innovation output. That is to say that the institutional environment strengthens the negative impact of family succession and radical succession on innovation output, and it strengthens the positive impact of single equity succession on innovation output.

Table A3 Sub-sample Regression Results: The Intergenerational Succession Intention of Family Firm Owners and Innovation Output

Variable	Environment system (IE)		Environment system (IE)		Environment system (IE)	
	Good	Bad	Good	Bad	Good	Bad
OWNERSHIP	0.0007 (0.005)	0.003 (0.003)	0.009 (0.005)	0.005 (0.004)	0.007 (0.005)	0.003 (0.003)
SIZE	0.370*** (0.057)	0.019 (0.044)	0.384*** (0.060)	0.026 (0.046)	0.357*** (0.063)	0.033** (0.045)
L-SPAN	-0.081 (0.122)	0.082 (0.097)	-0.050 (0.127)	0.041 (0.101)	0.004 (0.133)	0.035 (0.099)
EDU	-0.070 (0.078)	0.114* (0.054)	-0.030 (0.080)	0.131* (0.057)	0.010 (0.083)	0.103+ (0.056)
FAMILY	-1.445*** (0.175)	-0.588*** (0.126)				
STOCK			1.224** (0.379)	-0.099 (0.211)		
MANAGE			-0.146 (0.385)	-0.417* (0.205)		
R-INHE					-1.252*** (0.193)	0.577 (0.159)

-CONS	0.161 (0.643)	-0.201 (0.467)	-1.590* (0.714)	-0.579 (0.502)	-0.249 (0.691)	-0.074 (0.501)
R2	0.568	0.168	0.540	0.097	0.439	0.125
Adj R2	0.549	0.140	0.516	0.060	0.470	0.095
F	29.595***	5.985***	22.145***	2.633**	22.136***	4.209***
N	120	154	120	154	120	154

Note: + p <0.10, * p <0.05, ** p <0.01, *** p <0.001; two-sided test.

Therefore, H4a, H4b, H4c, H4e, and H4f are assumed to be verified. H4d is not assumed to be verified; the institutional environment strengthens the positive association of the intention of single equity succession with innovation investment, but the institutional environment does not support the positive association of the intention of single equity succession with innovation output.

Findings and Discussion

In this paper, we use questionnaire data on family businesses in Zhejiang, Chongqing, and other provinces to study the influence of the intergenerational succession intentions of family business owners on technological innovation and the regulatory effect of the institutional environment on it. The main conclusions are as follows: (1) Different dimensions of family business owners' succession intentions have different effects on technological innovation. Specifically, the intention of family succession and radical succession has a significant negative impact on the technological innovation of family businesses; the intention of non-family members, single equity succession, and gradual succession have a significant positive impact on the technological innovation of family businesses. At the same time, the succession intention of passing on equity and management has a significant negative impact on innovation investment, but not on innovation output. (2) The institutional environment plays

a vital role in regulating the relationship between the family business owner's succession intention and technological innovation. Specifically, the institutional environment strengthens the negative impact of family succession and radical succession on technological innovation as well as the positive impact of single equity succession on technological innovation. The institutional environment strengthens the negative impact of a simultaneous succession of equity and management rights on innovation investment, and it has no significant regulatory effect on the relationship between a simultaneous succession of equity and management rights and innovation output.

The family business's succession approach has no bearing on the performance shift that occurs throughout the transition. According to empirical research based on succession samples of listed family companies in China, the choice of internal or external family succession has no substantial effect on the business performance measures during the succession period. After excluding the influence of industry changes and other variables, the choice of internal or external family succession has no significant effect on the business performance change during the succession period. Therefore, according to a vast number of follow-up studies on family business succession instances, the period of succession is typically long, ranging from 15-20 years. More and more academics are beginning to doubt the early account of events, believing that succession is more complicated than just passing the scepter. Although it is impossible to pinpoint the exact start and conclusion of succession, scholars believe it begins when the successor does not get inside and ends when the company's management and ownership are fully realized. Qi *et al.* (2021) claimed that the succession of a family business is a long-term social process. As the body of knowledge grows, more scholars agree that family business succession is a multi-stage, lengthy process driven by various circumstances.

There are various reasons why Chinese entrepreneurs opt to involve their families in the ownership and operation of their new firms. To begin with, most Chinese beginning entrepreneurs were motivated by two passions: escaping poverty and demonstrating a strong sense of family responsibility. When a Chinese entrepreneur launches a business, their family occupies a crucial position. Second, like in Western economies, blood links, kinship, and associated social networks amongst family members are frequently used as the initial resources when a firm is established in China. When compared to resources provided by non-family parties, relatives and the family network frequently provide access to financial and other resources at a low cost. A popular opinion in China's venture capital industry is that they do not put money with newbies (Chen *et al.*, 2021).

Third, family businesses are better able to adjust to changing market dynamics than non-family businesses. Internal communication among family members is improved, and mutual trust among family members makes reaching a consensus on crucial issues simpler. As a result, management costs are lower. As a reason, it is simpler for family firms to create and implement a responsive strategy when the market shifts unexpectedly. As a result, family firms generally have a survival benefit in the early stages of their operations.

Family business succession, intergenerational dynamics, and internationalization

Because it is among the most significant difficulties family businesses encounter, succession, widely defined as the transition of leadership and control from one generation to another, seems to be the most explored topic in the family business area. Intergenerational succession is a complicated process involving the family, business, and ownership structures, and it frequently leads to changes in business strategies, putting strain on family connections. Because succession is often a catalyst for entrepreneurship, it is reasonable to predict that it will have an impact on a family's attitude toward internationalization. Gallo and Garcia Pont

(1996) were among the first to suggest that succession and internationalization might be linked. They discovered that multigenerational family businesses were more prone to internationalize than founder-led businesses. Others have concurred with this conclusion.

On the other hand, other research cast doubt on the ostensibly beneficial correlation between succession and internationalization, implying that the interaction may be more complicated than previously thought. We propose that the scope of a firm's foreign involvement is influenced by the underlying intergenerational dynamics, not succession *per se*. Recent studies reveal that disparities in the internationalization of family enterprises may be attributable to relationship and goal conflict among generations, along with lessened concerns for transgenerational succession in future generations, reflecting this complexity.

Understanding how intergenerational dynamics underpinning succession patterns affect family firm internationalization is important for this research. Shi *et al.* (2019) and Shi (2021) looked at how various succession patterns can affect key parts of a family business, such as strategy and performance. For instance, "rebellious" succession patterns were much more likely to occur in the implementation of new radical strategic initiatives (the successor rejecting the incumbent's past means of directing the organization). Alternatively, "conservative" succession patterns (the successor's unhealthy commitment to the incumbent's previous ways of running the organization) were more likely to lead to the implementation of low-risk strategic initiatives and the maintenance of the status quo. Due to the evident indecisive, inconsistent, and stop-start nature of strategic decision-making, "waving" succession patterns (the successor's interest in making their mark on the firm but is uncertain how; torn between recognizing the incumbent and being independent) frequently resulted in the abandonment of strategic initiatives. Shi *et al.* (2019) discovered succession patterns that indicate the underlying character of the incumbent-successor relationship (i.e.,

intergenerational dynamics). This finding is notable because intergenerational relationships, rather than a succession, were considerable impacts on a family firm's strategy process. They identified three different types of succession patterns, but their findings may be restricted in application to our research because they concentrated on succession patterns that contribute to company failure, seen in Western cultures. Nonetheless, we might assume, based on Shi *et al.* (2019) results, that the intergenerational dynamics underpinning the various succession patterns of family SMEs may impact their adherence to, and resources available for, strategic efforts like internationalization (Shi *et al.*, 2019; Shi, 2021; Bennat, 2021).

Conclusion

The theoretical contributions that this paper gives to the related research of family business are as follows: (1) This paper researches the impact of succession on enterprise technology innovation, mainly from the early stage of intergenerational succession, from the perspective of the enterprise owner's intention to pass on the business. This not only supplements current studies that pay attention to the succession process and the results of succession while largely ignoring the succession plan before the succession but also provides a certain reference for the succession planning of Chinese family enterprises. (2) According to existing research on the intergenerational succession of family businesses, this paper divides the succession intention of the business owner into three dimensions: the object of succession, the content of succession, and the succession mode to discuss the innovation investment and innovation output of the family business from the perspective of the specific content of the enterprise owner's succession intention.

This paper also has some implications for the practice of intergenerational succession and technological innovation of family businesses: (1) In the process of intergenerational

succession, China's family businesses should make a perfect succession plan, starting from the early stage of intergenerational succession and more consideration should be given to the influence of different dimensions of succession intention on the technological innovation of enterprises. (2) To maintain the long-term orientation and continuity of family businesses, enterprises should choose a single equity succession governance structure that gives management power to external professional managers while constantly strengthening the ownership control to promote the smooth development of family businesses' technology innovation activities. (3) Family businesses should avoid the radical succession mode. They should start with the selection and cultivation of successors and gradually transfer the ownership to the next generation, leaving time and space for the smooth transition of the family business in the succession period as well as providing a good business environment for innovation and development. (4) The institutional environment for private family businesses in China should be improved so as to realize the matching of the institutional environment, the intergenerational succession intentions of family business owners, and technological innovation activities.

There are still a few shortcomings in this paper. For example, the investigation of the family business in this article is only an investigation at a time node, and the intergenerational succession of the family business is a time series process. Additionally, this article mainly studies the formation stage of family business owners' succession willingness. Due to the unavailability of data, no research has been conducted on all stages of family business succession, especially the changes in the impact of family business's different succession stages on business technological innovation. In future research, follow-up surveys of the same family business should be used to overcome the problem of data unavailability and to study the relationship between the changes in the family business's intergenerational

succession stage as well as the changes in family business technological innovation. Lastly, future scholars can also focus on the link between internationalization and family business, as internationalization is the practice of developing a company's involvement in overseas markets, and it is widely regarded as a key strategy for development and success. Identifying the processes underpinning family firm internationalization has been a popular issue in the strategy and family business disciplines, as ownership is a known predictor of internationalization. A rising topic of focus is the specific characteristics that may enable or impede family SMEs find and commit resources to pursue international business possibilities.

Therefore, the ambition of the business family to preserve the company for the long term and their desire for continuity suggests that family businesses will continue to have a significant need to develop adaptive capability, especially during times of crisis such as COVID-19. The success of family businesses is dependent not only on their ability to spot chances for innovation in the environment but also on their ability to capitalize on such opportunities. Because of their closeness to their operations and management, as well as their social network inside and outside organizations, family businesses have proved the ability to transform and adapt. This allows them to respond swiftly to market needs based on a rapid decision-making process. To support this flexibility, FBs must preserve their traditions, beliefs, and knowledge.

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