Green Finance: How the Banking Sector Can Foster a Low-Carbon Economy

Abstracts

This study examines global environmental challenges such as climate change, resource depletion, and ecological degradation, underscoring the critical need to transition to a green economy. It proposes a methodology grounded in social capital theory to facilitate this transition. Green transformation has emerged as a pivotal strategic objective for financial institutions aiming to achieve sustainable development within the global banking industry. As the nexus of capital flows, the banking sector is crucial in advancing the green economy and bolstering financial resilience. The study suggests that banks can support the low-carbon economy by developing green financial products and services, fostering innovation, and applying green technologies through bridging social capital. Additionally, linking social capital emphasizes the interaction and trust between banks and community members, strengthening community support for green policies. Finally, linking social capital connects banks with external markets, resources, and decision-making bodies, facilitating resource integration and synergy. Consequently, this study offers significant theoretical and practical insights for advancing the global transition to a green economy through a social capital lens.

Keywords: Green economy; social capital; Bonding social capital; Bridging social capital; Linking social capital; Financial resilience

JEL: M0;M3

1 Introduction

The world is currently facing urgent and pressing challenges such as climate change, resource depletion, and environmental degradation. These issues demand an immediate and fundamental shift towards a more sustainable and eco-friendly global economic model. Promoting green economic transformation through the framework of social capital theory represents a promising approach. Green transformation is gaining increasing prominence within the global banking industry and has become a critical strategic focus for financial

institutions aiming to achieve sustainable development (Kavitha, 2016). As the epicenter of capital flows, the banking sector is pivotal in supporting and advancing the green economy. With the rising influence of Environmental, Social, and Governance (ESG) factors in the global market, banking organizations face mounting pressure to integrate these principles into their business operations and decision-making processes. Green transformation encompasses not only the social responsibilities of banks but also their long-term economic efficiency and market competitiveness (Bhutta et al., 2022). By developing green financial products and services, banks can effectively support the growth of a low-carbon economy and capture opportunities in the expanding green market. This process involves reevaluating risk management frameworks, increasing financing for renewable energy projects, and enhancing the environmental efficiency of internal operations (Busch et al., 2016).

Green economic transformation is a crucial strategy for addressing global environmental challenges and achieving sustainable development, with banks playing a particularly vital role in fostering financial resilience and social capital (Galaz et al., 2017). As central players in capital flows, banks are not just essential but pivotal in supporting the growth of green industries and facilitating the transition to a low-carbon economy. Financial resilience pertains to the stability and adaptability of the financial system amidst uncertainties such as market fluctuations and environmental changes (Campiglio et al., 2018). Banks, with their innovative financial instruments, enhanced risk management mechanisms, and robust capital operations, can bolster financial resilience. These efforts ensure that capital continues to be directed towards green industries, supporting the advancement of low-carbon technologies and the construction of green infrastructure. This approach not only diminishes the economic system's dependence on highly polluting industries but also promotes the efficient allocation of resources, thereby advancing the transformation and development of the green economy (Thistlethwaite et al., 2014).

Furthermore, banks are pivotal in facilitating the formation of social capital. Bridging social capital underscores the connections between banks and diverse social groups and organizations, fostering the innovation and application of green technologies by facilitating the exchange of information and resources, enhancing cross-border cooperation, and promoting knowledge sharing (D'Orazio et al., 2019). Banks can act as intermediaries in these collaborations, amplifying the reach of green technologies and facilitating their widespread adoption (Park & Kim, 2020). Bonding social capital centers on the interaction and trust between banks and their internal community members, enhancing the group's endorsement and execution of green policies and increasing the efficacy of environmental behaviors (Söderholm, 2020). By engaging closely with local communities, banks advance green policies at the grassroots level and fortify social identification with environmental protection (Ferri & Acosta, 2019). Lastly, linking social capital connects banks, individuals, and groups with

external markets, resources, and decision-making entities, fostering a collaborative network with multi-stakeholder engagement. Such linkages facilitate the integration and synergy of resources, bolster social collaboration to propel green economic transformation, and enhance the sense of involvement and support throughout the transformation process. A social capital-based approach to promoting green economic transformation offers a promising framework for addressing the world's complex environmental challenges. By harnessing the power of social networks, trust, and collective action, policymakers and practitioners can nurture the development of green entrepreneurship, sustainable community initiatives, and other strategies to advance the transition to a more sustainable and eco-friendly economic paradigm (Park & Kim, 2020; Li, 2023).

2. Literature Review

2.1 Banks green Transformation

With the growing global concern over climate change and environmental protection, the green transformation of the banking sector has become an irreversible trend. Bolton et al. (2020) argue that banks, as a key driving force in the financial markets, are gradually integrating environmental, social, and governance (ESG) factors into their business operations and investment decisions. Many large international banks have set clear targets for green transformation, committing to gradually reduce funding support for high-carbon industries and increase investment in renewable energy, energy-saving and emission-reduction technologies, and green infrastructure over the next few years (Busch & Lewandowski, 2018). Enhanced requirements from regulators drive this trend and stem from a growing market focus on sustainability and increased consumer and investor demand for green financial products. Along with the change in banks' business model, green bonds, green loans, and other innovative green financial instruments are also gaining popularity. These financial products not only finance the development of the green economy but also enhance the image of banks' social responsibility, which further promotes the development of the global green economy (Zavadska, 2018; Niţescu & Cristea, 2020).

Agrawal et al. (2024) examine various theoretical frameworks and empirical methods to investigate the role of banks in the green transformation process and its broader economic implications. Thomä and Gibhardt (2019) explore how the banking sector can enhance resource allocation efficiency and mitigate environmental impacts while maintaining economic growth through green financial products. Their analysis specifically addresses the green bond market, assessing its effects on the capital market and its potential risks and benefits. Baker et al. (2022) highlight that most researchers concentrate on banks' management strategies for fostering green innovation and sustainability. This includes developing effective ESG risk management systems, encouraging green lending through internal policies, and assuring the

long-term viability of green projects.

The green transformation of the banking sector is not only limited to its business scope but also has a profound impact on the green development of other industries. As major providers of capital and credit, banks play a crucial role in promoting the green transformation of other industries, as shown by Heinkel et al. (2021), who argue that banks support the development and construction of renewable energy projects through the provision of specialized green loans, thereby reducing reliance on conventional fossil fuels. Thomä, J., & Gebhardt (2019) suggest that banks' green financial products have prompted enterprises to accelerate technological upgrading and cleaner production processes, further promoting the low-carbon transformation of industries. Agrawal et al. (2024) study points out that through close cooperation, green banks have enhanced the accuracy and risk management capabilities of green financial products by introducing technical means such as big data and artificial intelligence, promoting the development of intelligent green finance. This cross-industry cooperation model enhances the accuracy of green financial products and risk management capabilities and promotes intelligent green finance development. This cross-industry cooperation model not only improves the return on investment of green projects but also effectively promotes the development of the entire economy in the direction of low-carbon and sustainable development. Green transformation has become a significant development trend in the global banking industry that cannot be ignored. It has also shown great potential in academic research and practice in various industries. In the process of green transformation, banks face pressure from regulation and the market but also gain the opportunity to promote sustainable economic development (Zavadska, 2018).

2.2 Social Capital Theory

Amid the current global economic transformation and accelerated digitalization, the application of social capital theory in the banking industry is increasingly prevalent, emerging as a crucial theoretical tool for enhancing competitiveness and fostering sustainable development. Social capital theory, with its emphasis on elements such as trust, networks, and norms, is not just a trend but a promising avenue for the future of banking. In the banking sector, which lies at the heart of economic activity, there is a growing recognition that social capital is as vital as traditional capital and risk management techniques (Nahapiet & Ghoshal, 1998).

As customer needs diversify and market environments become more complex, banks are placing greater emphasis on the accumulation and utilization of social capital. By strengthening relationships with customers, partners, regulators, and the community, banks can more effectively build and sustain trust, drive business innovation, and maintain stability within a highly competitive financial landscape. Social capital theory, with its focus on stability, is a key factor in this equation (Granovetter, 1985; Uzzi, 1999). Particularly in the context of rapid

advancements in financial technology and the rise of the digital economy, banks can leverage social capital theory to forge closer social networks. This approach not only enhances customer loyalty but also helps banks sustain their competitive edge in an ever-evolving market.

Social capital theory encompasses three core components: bridging, bonding, and linking social capital. Bridging social capital pertains to the connections between individuals or groups across different social, cultural, or economic boundaries. It typically involves relationships between distinct social groups and networks, facilitating the exchange of diverse information and resources, thus breaking down isolation and fostering innovation and collaboration (Woolcock & Narayan, 2000; Szreter & Woolcock, 2004). Bonding social capital is characterized by solid ties within homogeneous social groups, such as family members, friends, or colleagues. These relationships are grounded in deep emotions and trust, providing crucial emotional support and promoting supportive behaviors. While bonding social capital reinforces group cohesion and enhances efficient usage of resources, it may also restrict external cooperation by being excessively insular (Woolcock & Narayan, 2000; Szreter & Woolcock, 2004). Linking social capital refers to the connections that individuals or groups establish with more powerful or resourceful external institutions or entities, such as government bodies, businesses, or nonprofit organizations. Social capital provides access to a broader range of resources and opportunities, facilitates the redistribution of social resources, and helps elevate the social status of disadvantaged groups. These three forms of social capital are interrelated and collectively contribute to social stability and development (Woolcock & Narayan, 2000; Szreter & Woolcock, 2004).

As the banking industry increasingly acknowledges the significance of social capital for its long-term development, Jin et al. (2017) explore how banks can leverage social capital to foster trust both within and outside the organization. This, in turn, enhances risk management efficiency and reduces transaction costs. Ostergaard et al. (2016) apply social capital theory to analyze the relationships between banks and various stakeholders, examining how these relationships influence strategic decisions and market performance. For instance, some studies have shown that the trust between banks and regulators positively impacts compliance management and policy implementation.

Li et al. (2022) highlight the role of social capital in fostering bank innovation, particularly in fintech and digital finance. Social capital facilitates knowledge sharing and technological cooperation, accelerating the development and marketability of innovative products. These insights deepen the understanding of social capital theory in the banking sector and offer valuable theoretical support and practical recommendations for banks' operational strategies.

Social capital theory has emerged as a crucial theoretical framework for developing banking and other industries. The banking sector has achieved risk management and business

innovation goals by linking social capital to build trust and enhance network connections (Cai et al., 2021). Research into applying social capital theory within the banking industry enriches theoretical understanding and offers significant guidance for practical banking operations (Christa et al., 2020). Moreover, the widespread application of social capital theory across other industries has proven its robust potential to enhance organizational performance and drive industrial development (Muliadi et al., 2024).

As the global economy continues to evolve, social capital theory in banking and other sectors is expected to deepen, providing a more robust theoretical foundation and practical guidance for sustainable development. Policymakers, business leaders, and academic researchers should collaborate to advance the application of social capital theory, addressing increasingly complex market challenges and fostering the synergistic development of the global economy.

3. Research model and hypotheses

3.1 Research model

This study's primary purpose is to explore the intricate relationships among financial resilience, bridging social capital, bonding social capital, linking social capital, and customers' usage intentions within the framework of green transformation. In this context, financial resilience is the independent variable, while usage intention is the dependent variable. Bridging social capital, bonding social capital, and linking social capital are treated as mediating variables. This study investigates how financial resilience interacts with usage intention and the mediating effects of the different forms of social capital. Specifically, it examines how bridging social capital, bonding social capital, and linking social capital mediate the relationship between financial resilience and usage intention. The study mainly focuses on elucidating the direct relationship between financial resilience and usage intention, highlighting its significance within the broader scope of the research (See Figure 1).

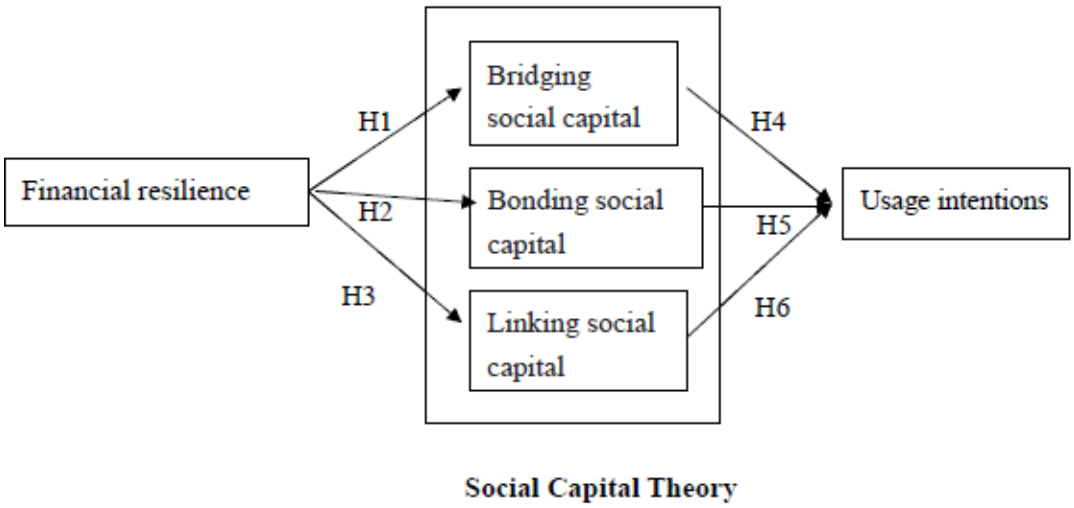

Figure 1 Research model

3.2 Hypotheses Development

In advancing the green transformation of banks, their ability to withstand market volatility and environmental challenges proves crucial in establishing and strengthening trust and cooperative relationships with diverse stakeholders (Park & Kim, 2022). These stakeholders include government agencies, non-governmental organizations, local communities, and other financial institutions. By adopting a green transformation strategy, banks enhance their proficiency in managing environmental risks and foster collaboration with these stakeholders to pursue sustainability (Bocken et al., 2016). Such partnerships boost the bank's stability and solidify its position as a leader in green financial products and sustainable investments, with support from a broad network of collaborators.

In the green transformation process, bridging social capital plays a pivotal role. It facilitates the exchange of knowledge and integration of resources across organizations, enabling banks to better understand and address socio-environmental needs. This, in turn, promotes the development of green financial products and advances green transformation (Aldrich, 2017; Roberto et al., 2019). By accumulating bridging social capital, banks not only strengthen their internal stability but also gain crucial social support and resources for their green transformation.

H1: Financial resilience has a positive effect on bridging social capital.

The green finance industry integrates financial resilience into its business and investment decision-making processes primarily through environmental sustainability and social responsibility (Afzal et al., 2022). Financial resilience enhances a bank’s ability to manage environmental risks and market uncertainties (Shen et al., 2024), instilling confidence in the organization’s long-term stability and sustainability objectives among internal members. This

confidence facilitates the mobilization of internal resources and knowledge sharing, enhancing organizational cohesion and reinforcing bonding social capital. This, in turn, establishes a stable internal support system that supports the implementation of the bank's decisions and innovative practices in green transformation (Nuryanto et al., 2020; Debrah et al., 2022). Consequently, financial resilience ensures the stability of banks in the face of external shocks and fosters cooperation and trust among internal members, serving as a crucial support for bonding social capital.

H2: Financial resilience has a positive effect on bonding social capital

Many studies have highlighted that a bank's ability to maintain stable operations and recover swiftly from market volatility, environmental shocks, and other uncertainties is a crucial indicator of its financial resilience. This capability encompasses effective risk management, optimized capital structures, and adherence to environmental, social, and governance (ESG) objectives (Chen et al., 2022). Bonding social capital pertains to the trust, reciprocity, and cooperation among members within a bank's internal community, typically observed in closely-knit groups or communities (Rezaei Soufi et al., 2023). Financial resilience fosters trust and cooperation among internal members by enhancing the bank's stability in uncertain environments (Tang et al., 2022). This trust and reciprocal relationship boosts internal team cohesion, resource sharing, and information flow. Thus, financial resilience not only ensures the operational stability of the bank but also facilitates the growth of bonding social capital, which serves as crucial internal support for advancing green transformation.

H3: Financial resilience has a positive effect on linking social capital

Bridging social capital encompasses the connections and interactions among disparate social groups or organizations, frequently involving stakeholders from varied backgrounds, including governmental agencies, industry associations, non-governmental organizations, and other financial entities (Agnitsch et al., 2006). This type of social capital fosters the exchange of information and resources, deepening a bank's comprehension of the external environment and market demands (Robison & Flora, 2003). Banks endowed with robust bridging social capital are adept at accessing diverse sources of knowledge and support, which can substantially bolster adopting green financial products and sustainable investment strategies (Saidin & O'Neill, 2022). By forging and strengthening relationships with many stakeholders, banks gain access to a broader array of resources and market insights, facilitating the execution of green transformation strategies and innovative endeavors. Thus, the augmentation of bridging social capital can significantly enhance the willingness and capacity of banks to embrace and advance green transformation initiatives.

H4: Bridging social capital has a positive effect on usage intention.

Bonding social capital pertains to the strong connections, trust, and reciprocity among members within an organization (Nahapiet & Ghoshal, 1998). This form of social capital underscores the importance of internal cohesion and collaboration, fostering resource sharing and knowledge exchange. Within a bank’s green transformation, bonding social capital is crucial in bolstering internal support and acceptance of green financial products and sustainable investment strategies (Tsai & Ghoshal, 1998). When internal members exhibit trust and effective collaboration regarding green transformation objectives, their propensity to engage with these initiatives increases markedly. This fortified internal support system not only streamlines the execution of green transformation efforts but also amplifies the efficacy of associated decisions and practices (Leana III & Van Buren, 1999). Consequently, the enhancement of bonding social capital positively influences the intent to adopt green transformation strategies within banks.

H5 Bonding social capital has a positive relationship on usage intention

Bonding social capital pertains to the strong connections, trust, and reciprocity among members within an organization (Nahapiet & Ghoshal, 1998). This form of social capital underscores the importance of internal cohesion and collaboration, fostering resource sharing and knowledge exchange. Within a bank's green transformation, bonding social capital Linking social capital pertains to the connections that banks forge with diverse social strata, power structures, or resource holders. This form of social capital enables banks to tap into support and resources from government agencies, industry associations, non-governmental organizations, and other financial institutions during the green transformation process (Lehtonen, 2004). By cultivating and sustaining these horizontal and vertical linkages, banks gain access to crucial information, technical assistance, and market opportunities—essential for advancing green financial products and sustainable investment strategies (Swain, 2003). Consequently, reinforcing linking social capital can markedly enhance a bank's propensity to adopt green transformation initiatives, as the infusion of external resources and support helps to surmount obstacles and ensure the seamless execution of these transformative efforts.

H6 Linking social capital has a positive effect on usage intention

4. Empirical Research

4.1 Measures

Financial resilience refers to the ability of the financial system to maintain stability and recover quickly from internal and external shocks, including the ability to cope with market fluctuations, economic crises, and environmental changes to ensure liquidity, risk management, and continuity of asset value, as suggested (Brasil et al., 2024). Bridging social capital refers to the linkages across different social groups through the establishment of diverse social networks that facilitate the exchange of information, resources, and trust, thereby enhancing society's

overall cooperation and innovation capacity, as Page-Tan (2021) suggests. Bonding social capital refers to the close trust and shared environmental values between the bank's internal departments and its employees. Bonding social capital refers to the cooperation and support network formed between internal departments and employees of a bank through close trust and shared environmental values, and enhances the efficiency and consistency of the implementation of green transformation strategies, ensuring that the bank can fully mobilize its internal resources in promoting environmental protection measures, as suggested (Page-Tan, 2021). Linking social capital refers to the cross-organizational cooperation network established between a bank and its external stakeholders, facilitating its role in promoting green transformation. This kind of capital facilitates the effective use of external resources, information, and support in promoting green finance and enhances the overall effectiveness of the green transformation, as suggested (Page-Tan, 2021). Usage intention refers to the willingness of bank employees or customers to adopt green financial products and services, which reflects their tendency to use green financial instruments driven by environmental protection concepts. As suggested, usage intention is influenced by personal values, environmental perceptions, and external influences (Deng, 2010).

4.2 Data Collection

This study employed existing literature to develop an online survey, carefully tailored with items that were previously validated and adjusted to align with the study's context. To enhance reliability and validity, a multi-item scale was utilized. The survey utilized a five-point Likert scale for responses, ranging from 1 = Strongly Disagree to 5 = Strongly Agree. To mitigate common method variance (CMV), the recommendations of Podsakoff et al. (2003) were followed. Anonymity was assured in the final statement, and participants had the option to withdraw from the survey at any time. The process of ensuring anonymity involved removing any identifying information from the survey responses and storing the data in a secure, password-protected database. Respondents were instructed to provide honest answers.

A convenience sample of Taiwanese individuals aged 18 years and older was used for this study. Data was collected via Google Forms, targeting 501 participants interested in financial resilience research. Consequently, the sample size was finalized at n=501. Initially, participants were asked whether they had engaged in financial transactions. Those who affirmed their involvement continued with the subsequent questions related to financial services.

4.3 Demographic Information

Table 1 shows that male customers accounted for 275 of the total number of customers, and

the age group of 36-45 years old accounted for 203 of the total number of customers. Married customers accounted for the largest number of 313. The highest number of university degree holders is 227.

Table 1. Demographic data

	N	%
Gender		
Male	226	45.3
Female	275	54.7
Age		
18~25	24	4.8
26~35	196	39.1
36~45	203	40.5
46~55	68	13.6
56 and over	10	2.0
Marital status		
Married	313	62.3
Single	190	37.7
Education level		
High school	54	10.8
Associate degree	192	38.3
Bachelor	227	45.3
Master or PhD	28	5.6

4.2 Measurement model

The Fornell-Larcker Criterion is a criterion for assessing the discriminant validity between latent variables. It checks whether each latent variable explains its own variation better than its correlation with other variables by comparing the average variance extracted (AVE) of the latent variable with the squared correlation coefficients of the latent variable with other latent variables. The AVE of the latent variable should be greater than the squared correlation coefficients with the other latent variables, which indicates that the latent variable is clearly distinguished from the other variables, thus supporting the discriminant validity of the concept. This criterion is used to ensure that the constructs of the measurement model are distinguished from each other (Rasoolimanesh, 2022). Table 2 show all Fornell-Larcker Criterion in this study met the threshold value.

Table 2 Fornell-Larcker Criterion

	Usage intention	Bridging social capital	Bonding social capital	Linking social capital	Financial resilience
usage intention	0.866				
bridging social capital	0.477	0.849			
bonding social capital	0.390	0.396	0.874		
linking social capital	0.482	0.582	0.328	0.877	
financial resilience	0.366	0.427	0.464	0.370	0.849

Cross-loadings refer to the factorial loadings of a measure on the latent variable to which it belongs and on other latent variables. When assessing discriminant validity, the criterion for cross-loadings is that the factorial loadings of each measure on its latent variable should be higher than its loadings on other latent variables (Wildt et al., 1982). If this condition is satisfied, then the measure is more representative of the latent variable to which it belongs than the other latent variables, thus supporting the discriminant validity of the construct. Table 3 shows cross-loadings in this study that met the threshold value.

Table 3 Cross Loadings

	Usage intention	Bridging social capital	Bonding social capital	Linking social capital	Financial resilience
UI1	0.839	0.365	0.325	0.400	0.308
UI 2	0.876	0.420	0.320	0.407	0.287
UI 3	0.881	0.473	0.373	0.455	0.344
UI 4	0.868	0.385	0.329	0.402	0.327
FR1	0.294	0.370	0.431	0.317	0.870
FR 2	0.314	0.337	0.428	0.269	0.852
FR 3	0.315	0.381	0.344	0.346	0.841
FR 4	0.323	0.363	0.372	0.322	0.833
IC1	0.427	0.540	0.332	0.903	0.365
IC2	0.480	0.478	0.338	0.882	0.333
IC3	0.374	0.520	0.254	0.877	0.305
IC4	0.398	0.508	0.213	0.846	0.288
BC1	0.267	0.321	0.875	0.275	0.446
BC2	0.389	0.404	0.890	0.314	0.424
BC3	0.332	0.323	0.881	0.283	0.364
BC4	0.370	0.328	0.851	0.273	0.387

BSC1	0.390	0.847	0.308	0.523	0.388
BSC2	0.409	0.842	0.370	0.499	0.349
BSC3	0.404	0.860	0.321	0.491	0.366
BSC4	0.419	0.848	0.346	0.465	0.349

Heterotrait-Monotrait Ratio (HTMT) is a method for assessing the discriminant validity between latent variables.Rasoolimanesh (2022). The HTMT ratio is the ratio of heterogeneous feature correlation (Heterotrait) to homogeneous feature correlation (Monotrait). The HTMT value of less than 0.85 indicates good discriminant validity between the concepts. Table 4 shows that the HTMT data in this study were supported.

Table 4 Heterotrait-Monotrait Ratio (HTMT)

	usage intention	**bridging social capital**	**bonding social capital**	**linking social capital**
bridging social capital	0.539			
bonding social capital	0.433	0.445		
linking social capital	0.533	0.658	0.360	
financial resilience	0.416	0.490	0.524	0.415

4.3 Structural Modelling

Financial resilience has a positive effect on bridging social capital (β=0.427; t=7.705; 0.326-0.533). financial resilience has a positive effect on bonding social capital (β=0.234; t=9.246; 0.358-0.556). financial resilience has a positive effect on linking social capital (β=0.370; t=6.619; 0.358-0.556). financial resilience has a positive effect on bonding social capital (β=0.234; t=9.246; 0.358-0.556). financial resilience has a positive effect on linking social capital (β=0.370; t=6.619; 0.255-0.477); bridging social capital has a positive effect on usage intention (β=0.370; t=6.619; 0.255-0.477). bridging social capital has a positive effect on usage intention (β=0.234; t=3.272; 0.111-0.383); bonding social capital has a positive effect on usage intention (β=0.207; t=3.812; 0.101-0.305); linking social capital has a positive effect on usage intention (β=0.207; t=3.812; 0.101-0.305). linking social capital has a positive effect on usage intention(β=0.278; t=4.541; 0.152-0.384).

Table 5 Structural Modelling

	β	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	2.5%	97.5%
financial resilience -> bridging social capital	0.427	0.429	0.055	7.705	0.326	0.533
financial resilience -> bonding social capital	0.464	0.464	0.050	9.246	0.358	0.556
financial resilience -> linking social capital	0.370	0.372	0.056	6.619	0.255	0.477
bridging social capital -> usage intention	0.234	0.242	0.072	3.272	0.111	0.383
bonding social capital -> usage intention	0.207	0.203	0.054	3.812	0.101	0.305
linking social capital -> usage intention	0.278	0.276	0.061	4.541	0.152	0.384

5. Conclusion and Discussion

This study found that financial resilience positively influences bridging social capital. Banks with high financial resilience maintain stability amid market volatility, policy changes, and environmental risks. This stability builds trust among external stakeholders, facilitating cross-organizational cooperation and resource sharing. When banks respond effectively to external challenges, they strengthen relationships with diverse groups, enhancing and deepening their bridging social capital. Additionally, financial resilience boosts a bank's reputation and influence in green transformation, making it easier to attract support and participation from various social groups. These connections help the bank access new information and resources, and they facilitate the dissemination and implementation of environmental protection concepts, further consolidating and expanding the bank's green transformation efforts.

Financial resilience positively impacts bonding social capital. By maintaining stable operations and effectively allocating internal resources amidst external environmental changes and market shocks, financial resilience lays the groundwork for fostering stronger trust and cooperation among internal staff and departments. When a bank exhibits robust risk management capabilities and business stability, it bolsters internal confidence in green transformation efforts, which, in turn, cultivates and strengthens shared values within the organization. Moreover, financial resilience enables banks to support internal green innovation, thereby promoting collaboration and knowledge sharing among employees, enhancing organizational cohesion, and fortifying bonding social capital. This ultimately aids in advancing the bank's green transformation initiatives.

Similarly, financial resilience positively affects linking social capital. Banks that exhibit financial resilience can maintain stability and swiftly recover from external shocks, which enhances trust and the willingness of external stakeholders—such as customers, suppliers, government agencies, and NGOs—to collaborate. When banks demonstrate resilience, external partners are more inclined to forge long-term relationships, facilitating resource exchange, information sharing, and strategic synergy between the bank and its stakeholders. This provides the bank with crucial external support for its green transformation efforts and strengthens its network with external entities, broadening its influence and resource acquisition capabilities in green finance, thereby consolidating and expanding the value of bridging social capital.

Bridging social capital enhances the flow of information and resources through cross-organizational connections between the bank and various external stakeholders—such as environmental organizations, government agencies, and community groups. This interaction helps employees and customers better understand and embrace green financial products and services, thereby increasing their intention to use them. When a bank effectively leverages bridging social capital to integrate external green ideas and resources, it significantly boosts internal employees' awareness and support for green transformation, influencing their willingness to adopt green financial instruments.

Additionally, bonding social capital plays a crucial role within the bank by fostering internal cooperation and knowledge sharing through the bedrock of trust among employees. This trust, built on shared values and a common goal of environmental sustainability, creates a sense of security and connection, enhancing employees' acceptance of green finance and motivating them to actively engage in green transformation efforts, thus reinforcing their usage intention.

Finally, linking social capital enhances external awareness of and trust in the bank's green financial products through stable relationships with external stakeholders. When a bank demonstrates resilience and robustness in the face of environmental risks, it increases external customers' and partners' confidence in its green financial offerings, driving their willingness to adopt these products. Linking social capital facilitates the bank's efforts to boost market acceptance and credibility of its green financial products through close collaboration with external stakeholders, ultimately strengthening the usage intention of customers and partners.

5.2 Theoretical meaning

The main theoretical contribution of this study is to reveal how financial resilience positively affects bridging social capital, bonding social capital, and linking social capital and further supports the strategic development of banks in the process of green transformation. First, the study extends the theoretical framework of financial resilience by showing empirical evidence that financial resilience is not only concerned with the financial stability of banks but also plays

a crucial role in developing social capital. Banks with high financial resilience can maintain stability in the face of market volatility, policy changes, and environmental risks, and this stability further enhances the trust of external stakeholders in the bank, facilitates cross-organizational cooperation and resource sharing, and thus strengthens the construction of bridging social capital (Salignac et al., 2019). Second, the study confirms the positive impact of financial resilience on bonding social capital through empirical analysis, pointing out that financial resilience can promote trust and cooperation among employees within the bank, enhance shared values, and support internal green innovation, which not only enhances employees' confidence in green transformation but also strengthens internal green innovation within the bank (Salignac et al., 2019).

This boosts employees' confidence in green transformation and strengthens the bank's internal cohesion and centripetal force. This finding deepens the understanding of the role of bonding social capital within banks and suggests the role of financial resilience in supporting internal collaboration and knowledge sharing. Third, the study also points to the impact of financial resilience on linking social capital, showing that banks with financial resilience can maintain stability in the face of external shocks, thereby enhancing trust and willingness to cooperate with external stakeholders (e.g., customers, suppliers, government agencies, and nongovernmental organizations). This enhances trust and willingness to cooperate with external stakeholders such as customers, suppliers, government agencies, and NGOs. Such stability facilitates the establishment of long-term cooperative relationships with external partners. It enhances resource exchange, information sharing, and strategic synergy, expanding the bank's influence and resource acquisition capacity in the green finance sector (Bahl, 2012). Finally, the theoretical contribution of this study lies in the deepening of the understanding of the role of social capital in the green transformation process, primarily how to support the green transformation of banks through bridging, combining, and linking social capital, which provides new theoretical perspectives and empirical support and points out the potential direction of future research, such as exploring financial resilience in other industries. It also points out potential directions for future research, such as exploring the role of financial resilience in other industries or comparing the impact of different types of social capital. Overall, this study enriches the theoretical system of financial resilience and social capital and provides crucial theoretical support for strategy formulation and policy recommendations in practice.

5.3 Practical Implications

The study's findings indicate that banks exhibiting high levels of financial resilience are more likely to possess substantial social capital. Banks with robust financial resilience can sustain operational stability amidst market volatility, policy shifts, and environmental uncertainties. This stability fortifies external stakeholders' trust in the bank and facilitates cross-organizational

cooperation and resource sharing, significantly expanding the bank's bridging social capital. The growth in bridging social capital further amplifies the bank's reputation and influence throughout the green transformation process, enhancing its ability to garner support and engagement from diverse social groups. This dynamic is crucial for effectively disseminating environmental protection principles and implementing green financial products. Financial resilience enhances collaboration with external stakeholders by bolstering the bank's stability and responsiveness, thus promoting resource exchange and information sharing. Consequently, this strengthens the bank's effectiveness and sustainability in advancing green transformation initiatives.

Furthermore, the study revealed that financial resilience exerts a beneficial influence on bonding social capital. This suggests that financial resilience can assist banks in maintaining the stability of their internal operations and the effective allocation of resources in the context of external challenges. Subsequently, it provides support for the establishment of a robust foundation of trust and collaboration among internal employees and departments. This provides a robust foundation for the development of trust and cooperation among internal staff and departments. This stability serves to reinforce the confidence of internal staff in green transformation, facilitating the formation and reinforcement of common values within the bank. This, in turn, provides support for internal green innovation, enhances overall organisational cohesion and centripetal force, and ultimately facilitates the process of green transformation. The internal environment created by bonding social capital is conducive to innovation and change, encouraging internal staff to be more willing to adopt and promote green transformation. The enhancement of bonding social capital facilitates the creation of an internal environment that is inclined to support innovation and change, which in turn encourages the bank's internal staff to adopt and promote green financial products with greater alacrity.

Finally, financial resilience significantly impacts linking social capital, highlighting its crucial role in fostering external partnerships. Banks with financial resilience effectively stabilize and recover from external shocks, which builds trust and willingness to collaborate with external stakeholders such as customers, suppliers, government agencies, and non-governmental organizations. This stability enables banks to form long-term cooperative relationships and enhances the exchange of resources, information sharing, and strategic synergies. Consequently, the bank's influence and resource acquisition capacity in green finance expand. Strengthening linking social capital helps banks secure external support for green transformation, boosts market acceptance and credibility of green financial products, and ultimately reinforces the trust and confidence of customers and partners. Therefore, recognizing the role of financial resilience in facilitating green transformation is essential, as it profoundly influences the long-term development and sustainability of banks.

5.4 Research limitations

This study has several limitations. First, the sample size and data collection methodology may limit the generalizability of the findings. While the study focuses on green transformation in the banking sector, it may not encompass all regions and types of banks. The sample could be biased towards large banks or those in specific regions, potentially affecting the representativeness of the results for banks of varying sizes and locations. Second, data availability and quality could impact the study's accuracy. Data collection on green transformation measures and the effectiveness of financial institutions might need to be completed, particularly for emerging markets or small banks. Such gaps and inconsistencies in data may constrain the study's depth and breadth. Future research might address this by conducting market segmentation analyses based on different markets. Third, measuring and defining financial resilience and social capital may involve subjectivity. Financial resilience can vary among banks and market conditions, leading to potential inaccuracies in quantifying its impact on green transformation. Social capital encompasses various dimensions, such as bridging, bonding, and linking, making it challenging to accurately measure the specific effects of each type.

Additionally, this study does not fully consider changes in financial resilience and social capital across different policy and economic environments. Fluctuations in the financial market, policy adjustments, and shifts in the economic environment might influence banks' strategies and effectiveness in green transformation. These external factors could have affected the study's findings, and it is not possible to account for all potential external influences comprehensively. However, future research might adjust measurement constructs to reflect market fluctuations, policy changes, and economic shifts, providing a more comprehensive analysis. The study's timeframe is insufficient for assessing the long-term effects of green transformation. As green transformation is a gradual process, this study only captures short-term or medium-term impacts, missing long-term changes and sustained effects. Future studies should use longitudinal approaches and longer-term data to provide a more comprehensive analysis and conclusions, reassuring the audience about the ongoing development in the field.

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