

Venture Capital Attachment to Startups and Investment Performance

: Impact Investment Strategy in Japan's Public-Private Fund

Kansai University Keiko YOKOYAMA
Tokyo University of Science Akitsu OE
Chuo University Haruomi SHINDO

Abstract

This study elucidates the mechanism by which financial and non-financial support from venture capital firms to startups influences investment outcomes. The novelty and originality of this research lie in its focus on the emotional aspect of “attachment” (*Aichaku*), which investors feel toward their portfolio companies. This facet has not been thoroughly examined in previous studies.

Focusing on the investment activities of INCJ, Ltd., a public-private investment fund in Japan, we examined the impact of the “degree of attachment” on startup investment outcomes using a mixed-methods approach. First, a qualitative study of four case companies provided the insight that investor attachment leads to substantial non-financial support (i.e., network-building support), such as introducing and connecting startups to a diverse range of stakeholders. Subsequently, based on this insight, we conducted a quantitative study using panel data from INCJ's portfolio startups.

The results revealed that: 1) a higher “degree of attachment” from the investor makes it more likely for a startup to establish a network position within its own networks to mediate information, and 2) such ego-mediated centrality positively influences the future likelihood of an IPO and the number of patents generated (including green patents). These findings suggest a two-stage mechanism wherein investor “attachment” strategically shapes a portfolio company's network structure, which in turn promotes the firm's growth and innovation.

Key words : Impact investment, Emotional attachment, Non-financial support, Network structure

1 Introduction

1.1 Research Objectives

INCJ, Ltd. was established in September 2018 through a spin-off from the existing public-private investment fund, Innovation Network Corporation of Japan (now Japan Investment Corporation). INCJ is a limited-life organization, with all shares held by the Japan Investment Corporation, and operations scheduled to conclude by the end of March 2025. The government (Ministry of Economy, Trade, and Industry [METI]) contributed approximately ¥367 billion, while 25 private companies contributed ¥13.5 billion.

As a public-private investment fund, INCJ has supported startups through bold financial backing and extensive hands-on involvement. Regarding hands-on support, it has sent external directors to most portfolio startups to provide as much assistance as possible.

This study aims to clarify the relationship between such funding, hands-on (non-financial) support, and investment outcomes, thereby deriving theoretical and practical implications for future startup support. Specifically, we examine the investment behavior of public-private investment funds under the hypothesis that attachment may influence investment outcomes.

Previous research has not identified studies focusing on the attachment exhibited by investment funds. Organizational behavior studies exist concerning trust, defined as rational expectations based on cognitive evaluations of others' actions and intentions, which inform the choice of contractual forms (Gulati, 1995). However, this study places greater emphasis on the aspects of emotional and

psychological connections using the term “attachment” to denote the degree to which one is cherished. Attachment and trust are concepts that cannot be easily separated; they are complementary and often overlap in human relationships and organizational behavior. However, based on the findings of qualitative research, this study focuses on the state of attachment rather than the relationship of trust. This study views investment managers’ emotional aspects as attachment to portfolio companies (startups) and specifically clarifies the relationship between investors’ attachment to portfolio companies and investment outcomes.

Here, the level of attachment to a portfolio company does not necessarily lead directly to investment outcomes, and mediating factors are likely to be involved. Logical judgments about a portfolio company influence the monetary investment amount, whereas the level of attachment to a portfolio company is assumed to influence hands-on involvement. In other words, a higher level of attachment is likely to lead to greater enthusiasm for providing management advice and various types of information to a portfolio company, thereby increasing the likelihood of introducing and connecting them to diverse organizations. Thus, we propose a two-stage model in which the level of attachment to portfolio startups influences the network structure between investors and portfolio startups, which, in turn, affects investment outcomes.

1.2 Structure of This Study

This study comprises two sections: qualitative and quantitative research. The qualitative research section explores the current state of impact investments in Japan and the nature of investment strategies by clarifying INCJ’s investment management processes and investment lifecycles. The insights gained during the qualitative research process form the basis for the quantitative research.

Table 1: Search Terms for Scoping Review

topic	must include	must include	all results
"venture capital"	"social ent**"		35
"venture capital"	social business		1
"venture capital"	venture capital investment	process	70
"venture capital"	venture capital investment	syndicat*	54
"social investment"	startup		0
"social investment"	venture philanthropy		3
"social investment"	social impact		47
"impact investment"			255

Source: Author.

2 Qualitative Research

2.1 Design of Literature Reviews

In the qualitative research, a narrative review was conducted while partially adopting the scoping review method to examine prior studies.

For the scoping review, a literature search was performed on the Web of Science using combinations of search terms as shown in Table 1. All abstracts of the retrieved papers were reviewed, and papers deemed useful for this study were extracted. Subsequently, a narrative review was conducted.

2.2 Prior Research on Impact Investment

Since INCJ is a public-private investment fund, its investment criteria and project evaluation axes include “investment impact” alongside growth, profitability, and feasibility—similar to private-sector funds—indicating that a form of “impact investment” is being implemented.

Impact investment refers to “investments made with the intention of generating positive, measurable social and environmental impact alongside financial returns” (Hehenberger, Mair, & Metz, 2019; Islam, 2022; Gigante, Sironi, & Tridenti, 2023). Similar to conventional investment, impact investment provides funding for financial returns; however, their purpose extends beyond delivering social and environmental impacts. The term “impact investment” is said to have been coined at a conference hosted by the Rockefeller Foundation in 2007. It is a relatively new concept, and the lack of a clear definition has been highlighted by previous studies (Höchstädter & Scheck, 2015; Hehenberger et al., 2019; Agrawal & Hockerts, 2021).

Within this context, Höchstädter and Scheck

(2015) defined impact investment as a concept centered on two core elements: financial returns (economic impact) and non-financial impact (social and environmental impact). They identified two key characteristics: the intentional pursuit of non-financial impact and the necessity of measuring this non-financial impact.

While the investment activities of INCJ, which is the subject of this study, may be difficult to classify as an impact investment given that it does not measure non-financial impact, it can be considered to have implemented a form of impact investment in the sense that it has intentionally pursued non-financial impact and conducted investments aimed at both financial and non-financial impacts.

Academic empirical research on impact investment is extremely scarce (Ormiston, Charlton, Donald, & Seymour, 2015), and we could not locate any studies conducted in Japan. Therefore, in qualitative research, we examine and empirically explore the reality of impact investment in Japan and the nature of the impact investing strategy by considering INCJ's investment behavior, process, and outcomes from the perspectives of INCJ as the investor and startups as recipients of investment.

Literature reviews on impact investment and related topics are increasing (Islam, 2022; Singhanian & Swami, 2024). These studies highlight research gaps and directions for future research.

Islam (2022) reviewed 114 relevant papers across multiple fields and identified four research streams: impact investment decision making (criteria, decision system design), impact evaluation, behavioral challenges in impact investment, and the impact investment ecosystem. He argued that promising future research themes include studies that incorporate a lifecycle perspective in impact investment and examine the problems of impact investment behavior and the corresponding overcoming actions from the perspectives of both investors and startups.

Therefore, this study examines the lifecycle (investment process) of impact investment from the perspectives of both investors and startups.

2.3 Prior Research from the Investors' Perspective

Freireich and Fulton (2009) suggested that impact investors can be categorized into financial-first and impact-first investors. In other words, when considering impact investment, it is challenging to prioritize either financial returns (economic impacts) or non-financial impacts (social and environmental impacts). Financial-first investors prioritize the former, and impact-first investors prioritize the latter.

However, it is important to note that impact investment fundamentally challenges the traditional dichotomy that posits an inverse relationship between financial returns and non-financial impact, aiming instead for "blended value creation" that generates both (Ormiston et al., 2015). Here, we also examine which investor category INCJ falls into and what intentions and balance guide its actions.

Furthermore, the investment process was analyzed following the ideal impact investment process pioneered by Borrello, Bengo, and Moran (2024). This process consists of three phases, each comprising six steps: Phase 1: Deal origin (including deal sourcing and initial deal screening); Phase 2: Deal screening (including due diligence and deal structuring); and Phase 3: Deal Establishment (including investment management and exit).

2.4 Prior Research from the Startups' Perspective

How do startups receiving investment evaluate investor attractiveness? Mayer and Scheck (2018) revealed the following through experimental methods: Investor support behaviors in areas such as "business advisory" (i.e., providing advice on finance, management, marketing, strategy, and organization) and "network access" (i.e., expanding the investor's social capital) positively affect investor attractiveness. Conversely, investors' monitoring behaviors, such as the right to obtain information from startups and the right to exercise control, negatively affect investors' attractiveness. Finally, they concluded that investor reputation positively

influences investor attractiveness.

This study examines how INCJ's investment behavior was evaluated based on these three aspects: support, monitoring, and reputation.

2.5 Purpose and Methods of Qualitative Research

In qualitative research, to examine the reality of impact investment in Japan and the nature of the impact investing strategy, we analyzed INCJ's investment actions, processes, and outcomes from the perspective of INCJ as an investor and that of startups as recipients. Specifically, the success of impact investment depends on whether startups receiving investment achieved blended value creation, that is, the combination of financial returns and non-financial impacts (Ormiston et al., 2015).

We extracted companies from INCJ's portfolio that achieved both non-financial impacts and financial returns (successful blended value creation) and those that did not (insufficient financial returns). We examined the causes of this difference from an investment management perspective. By examining the investment lifecycle (investment process) and actual investment strategies of both groups from the perspectives of investors and startups, we aim to identify desirable approaches for impact investing.

Pursuing this qualitative research objective also allows us to reflect on the characteristics, strengths, and weaknesses of INCJ's investment actions. This further aids in deriving hypotheses that can lead to quantitative analysis.

For case selection, INCJ utilized its four-tier evaluation system to assess portfolio startups' alignment with society's long-term needs, growth, innovation, and governance. Objective metrics, including green patent acquisitions, total funding raised, and valuations, were also incorporated.

Interviews for the case studies were conducted by teams of at least two researchers, and all data were transcribed into text. The text was then coded based on the analytical perspectives identified through a survey of prior research, thereby enabling comparative case studies.

A qualitative analysis was conducted on four companies, hereby referred to as Companies A through D (Table 2).

Interviews were conducted between November and December 2024. First, on Thursday, November 14, 2024, individual interviews were held with four INCJ investment officers regarding Companies A through D. Each interview lasted approximately one to one-and-a-half hours.

Subsequently, interviews lasting approximately one hour and 30 minutes were conducted with the personnel responsible for Companies A through D. The interviews were held on Thursday, November 21, 2024, for Company A; Monday, December 16, 2024, for Company B; and morning and afternoon sessions on Monday, November 25, 2024, for Companies C and D.

Table 2: Overview of Companies for Qualitative

	Company A	Company B	Company C	Company D
Industry/Sector	Health & Medical	Industrial Machinery	Materials & Chemicals	Electronic Devices
Year Founded	2012	2015	2014	2004
INCJ Initial Investment Year	2014	2017	2017	2014
Stage at Initial Investment	Series A	Series A	Series B	Series B
Number of INCJ Investments	3	2	1	1
Current Stage	Series E	Series C	Series E	Series B
Total Funding (in millions of JPY)	20,017	4,633	14,897	7,953
Valuation (in millions of JPY)	46,807	2,829	20,023	11,139
Green Patents / Total Patents	5/51	57/194	11/54	54/183

Analysis

Source: Prepared by the author based on various materials.

2.6 Qualitative Analysis

Following the impact investment process outlined by Borrello et al. (2024), we analyzed INCJ's investment actions for Companies A through D.

(1) Characteristics of Deal Origin

Deal origin encompasses deal sourcing and initial screening.

A key characteristic of deal sourcing is the provision of substantial resources in terms of funding and personnel.

"INCJ is a public-private investment fund and was very resourceful." (INCJ officer, Company B)

INCJ sets three investment criteria: alignment with society's long-term needs, growth, and innovation. Consequently, a key characteristic of its initial screening is that it prioritizes alignment with

society's long-term needs over seeking investment returns. In a sense, investing in socially significant businesses is a prerequisite.

"Unlike investments from other private venture capital (VC) firms, INCJ's investment required us to demonstrate social significance." (Company D)

"Every project is evaluated with social impact in mind. We operate on the premise that we will not invest without it. Furthermore, to complement private sector activities, we invest the necessary capital in the early stages when risks are high and difficult to fully assess. We invest on a scale that private VCs typically cannot match." (INCJ officer, Company A)

Additionally, based on the investment criteria of growth and innovation, even high-risk projects undergo initial screening with a focus on investments aimed at open innovation.

"I remember the investment phase was at the seed stage, commercializing basic research. I believe that our growth since the previous consultation has been highly valued." (Company C)

"Based on our proprietary technology, the business domains we can capture are expanding. While there have been twists and turns in the past, the discussion concludes that there is growth potential ahead." (INCJ officer, Company D)

(2) Characteristics of Deal Screening

The second stage of deal screening includes due diligence, which involves investigations conducted to evaluate and verify investment opportunities, and deal structuring, which determines the allocation of risk/return between startups and investors, as well as the relationship between rights and obligations.

INCJ maintains a robust due diligence framework. Specifically, INCJ organizes committees tailored for particular purposes, such as the Investment Committee, Monitoring Committee, and Individual Review Committee, to ensure systematic preparation. Furthermore, INCJ possesses extensive expertise in conducting multifaceted due diligence covering intellectual property, financial, and legal aspects.

"Regarding compliance with investment criteria,

we conduct qualitative evaluations through discussions in various committees and other forums, while also performing horizontal comparisons." (INCJ officer, Company A)

"The overall investment decision process is similar to private VCs, but the difference might be that INCJ follows a much more rigorous process leading up to the investment decision. Discussions are thorough, and the process is clearly explainable." (INCJ officer, Company B)

"They conducted a full range of due diligence covering legal, financial, and intellectual property aspects. They proceeded thoroughly with an investment of only several hundred million yen each. It felt like they were investing significant resources in due diligence." (Company C)

"At the time, no VCs in Japan were willing to commit to such a substantial amount of capital, so we understood that due diligence would take time and cooperated accordingly. Their investigations into intellectual property and other areas were meticulous." (Company A)

However, INCJ completed its due diligence at a pace comparable to that of other VCs.

"INCJ's due diligence took about five to six months, which was similar to the timeframe of other VCs." (Company C)

"I believe the due diligence period was standard. Since this was a technology company, we anticipated that it would take six months to complete. I recall that the due diligence began in March, and we received the investment by September." (Company D)

Regarding the impact investment aspect, INCJ's due diligence criteria include qualitative assessments of four factors: growth, innovation, alignment with society's long-term needs, and investees' likelihood of fulfilling management responsibilities.

Next, regarding INCJ's deal structuring, the following trends were observed:

First, they formed syndicates with multiple private VCs and corporate investors to conduct coordinated investments. They made efforts to create deals and assemble optimal investor groups

to foster startup development and open innovation.

Second, INCJ took calculated risks in deciding on large-scale investments and, in most cases, served as the lead investor.

“In our case, while existing private VCs invested tens of millions of yen, INCJ provided hundreds of millions of yen in funding, which became a catalyst for our leap forward.” (Company D)

“As a public-private investment fund with large investment amounts, we typically participate as the lead investor.” (INCJ officer, Company B)

(3) Characteristics of Deal Establishment

The third stage, deal establishment, encompasses investment management and exit.

A key characteristic of INCJ's investment management is that, in most cases, it actively engages in hands-on support by participating in startup management through external directors and similar roles.

“As a condition of investment, INCJ had a company-wide policy of dispatching external directors or observers to the board of directors to provide solid hands-on support close to the management.” (INCJ officer, Company B)

“In addition to external directors and external auditors, we dispatched observers to provide substantial hands-on support. We believe that we have supported them in every way possible.” (INCJ officer, Company B)

“We received daily support for management, governance, and various decision-making processes. While other investors supported us in development, INCJ provided strong support from the management perspective.” (Company B)

“We held regular meetings not only with the board of directors but also with observers to support the management of the companies where we invested. Specifically, we assisted with the hiring of personnel, cooperated in M&A deals, offered advice on organizational management, and facilitated introductions to other companies and information exchange.” (INCJ officer, Company A)

“We feel that we were nurtured by the excellent officers from INCJ.” (Company A)

“We had them attend board of directors' meetings

at least once a month, and we also maintained frequent contact and consultation with the assigned officers beyond that.” (Company D)

“Their thoughtful advice on stock options was a definite plus.” (Company D)

Finally, regarding the exit, as this was a fund with a March 2025 deadline, INCJ's holdings in all four companies (A through D) were sold to other parties.

2.7 Summary and Recommendations for Qualitative Research

Based on the results of the qualitative research, we summarize the achievements and challenges of INCJ's impact investment activities and propose recommendations to contribute to future impact investments.

INCJ's achievements are, first, that by investing in high-tech startups with significant social impact but also high risk during a cooling investment environment, it enabled the creation of these startups by helping them overcome the “river of doom” and “valley of death” (Auerswald & Branscomb, 2003).

“I believe that the timing of their investment at that point was the most impactful factor. Back then, many VCs had fund sizes of 2–3 billion yen, making it physically impossible for them to invest hundreds of millions of yen in a single company.” (Company C)

“It was a Series A investment in the hundreds of millions of yen. If INCJ had declined, this company would have been on the brink of collapse.” (INCJ officer, Company A)

“No other entity could have provided that amount at that Series A timing. Without INCJ, Company A would likely not exist today.” (Company A)

Second, INCJ's dispatch of external directors to portfolio companies significantly bolstered the credibility of these startups, whose futures were highly uncertain. This has proven to be beneficial for individual transactions and talent recruitment.

“When negotiating with suppliers in China and Taiwan, having INCJ—a Japanese public-private investment fund—as a backer translated into credibility.” (Company A)

“Overall, we feel that the reliability of our

business has increased.” (Company B)

“Recruiting talent is difficult for startups, but INCJ becoming a shareholder enabled us to hire high-caliber engineers, including those from major domestic electronics manufacturers and foreign companies.” (Company D)

Third, INCJ’s detailed and robust hands-on approach contributed to enhancing the startups’ organizational capabilities.

“(INCJ) provided strict guidance on governance and management, while the other VCs did not intervene to that extent. It was appreciated, and looking back, I feel we were nurtured.” (Company A)

However, this hands-on approach requires further investigation. As demonstrated by Mayer and Scheck (2018), the three aspects of support, monitoring, and reputation—where support and reputation positively impact investor appeal while monitoring has a negative effect—apply here. INCJ’s public-private investment fund structure tends to emphasize monitoring more than private VCs.

“With INCJ, there was a sense of reassurance that decisions would be made internally within a week. However, because INCJ’s funding source is taxes, there were cumbersome aspects, such as requiring prior approval for investments above a certain amount or for key personnel hires.” (Company D)

Fourth, INCJ’s investments facilitated optimal partnerships for open innovation within relevant startups and industries, with INCJ functioning as a coordinator.

“Our shareholders are very distinct individuals, and INCJ’s coordination with them was extremely helpful.” (Company B)

“We were able to assemble a group representing key players in Japan’s relevant industries, aiming for open innovation through all-Japan collaboration and mutual growth.” (INCJ officer, Company B)

“To pursue business synergy, we established a joint venture between Company D and a major corporation to jointly advance the business. This allowed us to build a relationship with the major corporation to jointly develop Company D’s

technology, and Company D also had its contractual concerns resolved, leading to acceptance by both companies.” (INCJ officer, Company D)

Next, we examine the issues.

First, it is highly likely that neither INCJ nor startups were conscious of impact investment and may not have recognized it in the first place. INCJ emphasizes social significance as a key criterion and premise for investment decisions, including “alignment with the long-term needs of society” in its investment standards. However, in the exit evaluations for Companies A to D, the section on “alignment with the long-term needs of society” primarily focused on whether the technology was “implemented in society”, indicating a relatively weak awareness of the impact investment approach. Furthermore, while various methods for impact investment, including quantitative measurement, have recently emerged (Epstein & Yuthas, 2014), awareness of these methods is also limited.

Second, several INCJ portfolio companies were challenging cases. Thus, an overwhelmingly short investment horizon was a significant factor. Alternatively, it may have been necessary to consider whether the fund structure was appropriate.

“Manufacturing businesses take time to become profitable. Conversely, most VCs (which have fund redemption deadlines) tend to demand profitability within the first or second year after investment. While a very small number of VCs have no deadlines, even in those cases, they might require returns of hundreds of billions of yen, even if it takes three to five years.” (Company A)

“(Assuming no risk factors) I believe Company D’s technical challenges could be resolved within the next 5 to 10 years. While INCJ setting an investment deadline is a standard practice for 99% of VCs, I personally think a public-private investment fund might have allowed for different approaches.” (INCJ officer, Company D)

2.8 Insights from Qualitative Research

To summarize the above qualitative research, we gained the following insights, which form the basis

for our quantitative research:

First, INCJ's support was substantial. In terms of both quantity and quality, it far surpasses private VCs in terms of providing funding (financial support), such as investment amounts and hands-on involvement. The investment amounts were calculated logically and objectively using meticulous due diligence.

Second, the interviews revealed that favorable impressions received from stakeholders, including investors, positively impacted startups' business operations.

"We used to describe our company as one that is 'doted on like a grandchild.' Even when we had shortcomings, people would cheer us on for our efforts. History was shaped by encounters with such individuals and the support they provided." (Company A)

"When I visited the company, I saw posters with great photos. I learned that a major advertising agency had created them for free. This left me with the impression that this company was genuinely cherished by many people." (INCJ officer, Company A)

"During our previous consultations, our technology was deemed inadequate. However, this time, the significant progress we have made was highly praised. This positive evaluation proved to be very advantageous when securing investment." (Company C)

These favorable impressions are expected to unconsciously influence the hands-on approach after investment. This study defines the degree to which startups are "loved" by investors as its "attachment level" to portfolio startups. It then quantitatively analyzes INCJ's attachment level and the outcomes of its support.

3 Quantitative Research

3.1 The Purpose of Quantitative Research

This quantitative research aims to clarify the relationship between funding, hands-on involvement, and investment outcomes, thereby deriving theoretical and practical implications for

future startup support.

Based on insights from the qualitative research process, we focused on investors' attachment levels to their portfolio companies (startups), a factor that has been previously overlooked. How does an investor's attachment to a portfolio company alter the network structure of these startups, and what outcomes does it lead to? We clarified this mechanism.

To this end, we constructed a two-step hypothesis model. First, INCJ's attachment level influences startups' networks through hands-on involvement. Second, we hypothesized that the way startups build their networks affects their outcomes. The theoretical basis for these two-step hypotheses is outlined below.

3.2 Theoretical Considerations

In addition to insights from qualitative research, the following studies serve as theoretical foundations supporting our hypotheses: (1) research on increased attachment levels among subjects, and (2) research on the relationship between startups' network position and outcomes.

(1) Research on the Development of Attachment Levels

How do people cultivate attachment toward an object? Research on changes in attachment levels toward an object can be found in contexts such as marketing, organizational behavior, and interorganizational relations.

Fournier (1998) demonstrated that consumers' attachment to a brand deepens through early exposure and the establishment of long-term relationships. The attempt to theorize the consumer-brand relationship by likening it to a human relationship enhances its applicability to this study.

Similar research findings exist for interorganizational relationships. Focusing on the cultivation of trust, which is complementary to attachment, studies demonstrate that trust building requires early, repeated transactions and the persistence of the relationship over time. The accumulation of this trust fosters more flexible,

informal, and trust-based inter-organizational relationships that transcend strict contractual terms (Gulati, 1995).

The deepening of attachment in the investment context will be examined in greater detail later. However, it can reasonably be regarded as being associated with the development of relational depth, as manifested in early engagement, repeated transactions, and long-term relationships. A critical determinant of venture capital success lies in the ability to demonstrate investment acumen by identifying promising ventures at an early stage and fostering their growth through concentrated support. Accordingly, in the case of INCJ, it is plausible that attachment tends to be relatively stronger toward startups discovered in the early stages, with which relationships are subsequently cultivated intensively.

(2) Research on Network Position and Outcomes

Various theories exist regarding the relationship between a startup's position within a network and its outcomes. Social network theory seeks to explain organizational and individual outcomes through the structure of relationships (nodes and links).

Occupying a structural hole is considered crucial for the outcome metrics essential for startup growth, such as innovation creation and exploratory learning.

Generally, firms occupying structural holes—spaces in the network with few connections to other organizations—are thought to act as intermediaries for information from different groups and possess a high capacity for innovation (Burt, 2004; Uzzi & Spiro, 2005). Moreover, structural holes provide easier access to heterogeneous and novel knowledge sources and external information, making them conducive to exploratory learning (March, 1991).

Structural holes relate to the position of a bridge between rare pieces of information across an entire network. However, it is challenging for startups to consciously position themselves in structural holes within the entire investment network. This is because startups find it difficult to act based on imagining securing a favorable position on a vast network beyond their own cognitive reach.

However, what about focusing on the ego network that the startup itself possesses?

Ego networks are networks that startups easily recognize and may be aware of; startups may control their position within these networks.

One metric for mediating information within ego networks is ego betweenness centrality (Everett & Borgatti, 2005). Ego betweenness centrality can be interpreted as an indication that a startup occupies a position that bridges individuals who are not directly connected. This places the startup in a position to mediate the flow of information and resources, thereby increasing its strategic importance within the network. Burt (1992) noted a high correlation between structural holes and betweenness centrality. Measuring whether a firm occupies such a bridging position allows us to assess its strategic importance in facilitating the flow of information and resources. Previous research has reported that within healthcare VC networks, higher investment success rates correlate with higher bridging capabilities among startups (Esposito, Gortan, Testa, Chiaromonte, Fagiolo, Mina, & Rossetti, 2022).

3.3 Hypothesis Derivation

Based on qualitative research and theoretical considerations, we focused on the investment stage and investment period to assess INCJ's attachment level toward its portfolio startups. Startups that received INCJ investment at an early stage and maintained a long investment period can be assumed to have a relatively high level of INCJ attachment.

Therefore, as detailed later in the variables section, we measured attachment level using a composite variable combining investment at an early stage and investment duration.

Previous research has consistently demonstrated that VC investment at an early stage significantly contributes to startup success (Engel & Keilbach, 2007; Chemmanur, Krishnan, & Nandy, 2011; Hellmann & Puri, 2002). While many studies on VC investment demonstrate the effects of VC entry, the research specifically highlights that early-stage VC

involvement is particularly effective for startups' growth. This effectiveness stems not only from capital provision but also from hands-on contributions such as external monitoring and network provision (Engel & Keilbach, 2007).

In particular, VC involvement during the early stages of startups is said to make a significant difference (Chemmanur et al., 2011).

Therefore, startups that received investment from INCJ at an early stage and maintained that investment over a long period are likely to have a high level of attachment to INCJ and may achieve better outcomes.

The mechanism linking INCJ's attachment level to corporate performance requires further investigation. While many studies increasingly focus on the hands-on aspects of VC investment, we hypothesize that INCJ's rationality is reflected in its funding, while its attachment is reflected in its hands-on involvement. Hands-on support encompasses various activities, one key example being the role of introducing and connecting other parties. The qualitative research interviews revealed instances in which INCJ connected its portfolio startups with other companies, as described below.

"We actually received introductions to various companies." (Company A)

"Although the industries were quite different, we actively introduced many companies that shared common interests. Since they were not competitors, we suggested that they exchange information as allies fighting together and made numerous introductions." (Company A's INCJ contact)

"There were also companies in competitive relationships, so INCJ skillfully coordinated and built a large network for us" (Company B). "Since INCJ is a public-private fund, they have extensive connections across various sectors. We asked them to facilitate numerous connections in terms of linking people." (Company C)

"The question of what kind of partnerships to form with other large corporations was important, so we discussed it frequently." (INCJ contact, Company D)

A particularly distinctive feature is INCJ's ability to connect people and companies that are likely to be useful across diverse sectors, regardless of the industry to which they belong.

Therefore, based on the discussion so far, we derive the following hypothesis:

H1: Startups receiving high attachment levels from INCJ establish network positions in which they mediate information within their own networks.

Previous theoretical studies demonstrated that startups that establish network positions within their networks achieve better outcomes. Other studies include Stuart, Hoang, and Hybels (1999), who argued that research on startup performance must consider the value of alliances and networks with external organizations. Baum, Calabrese, and Silverman (2000) demonstrated that the nature of a startup's alliance network significantly affects its early performance. Hallen (2008) highlighted that startups occupying favorable network positions enhance their potential for future funding and growth.

One outcome representing startup growth and exit is an IPO. Based on this, we propose the following hypothesis:

H2: When a portfolio startup establishes a network position that mediates information within its own network, it is more likely to achieve an IPO.

Regarding outcomes such as innovation and exploratory learning, firms occupying information-bridging positions have been shown to perform strongly (Gilsing, Nooteboom, Vanhaverbeke, Duysters, & Van Den Oord, 2008). For startups, patents demonstrate their innovation capability in generating new technologies and intellectual property, potentially serving as a signal of technical competitive advantage and future growth potential (Hsu, 2004). Furthermore, because startups have limited publicly available information, patents create a favorable impression on investors as externally observable technical achievements (Hsu,

2004) and can enhance a startup's viability (Kato, Onishi, & Honjo, 2022). In recent years, startups have been increasingly required not only to achieve economic success but also to create social value, such as addressing environmental and social challenges. This emphasis on social aspects may positively influence fundraising from investors within the context of impact investing and environmental, social, and governance investing (Bellucci, Fatica, Georgakaki, Gucciardi, Letout, & Pasimeni, 2023).

Social value is broad and difficult to grasp, but for technology-based startups, patents for technologies addressing environmental challenges, namely, green patents (GX patents), can serve as powerful indicators for visualizing social contributions. This study positions GX patents as an externally observable artifact, similar to patents, that reflects a startup's social innovation capabilities.

Therefore, we derive the following hypotheses:

H3-1: Portfolio startups that establish a network position that mediates information within their networks are more likely to generate patents.

H3-2: Portfolio startups that establish a network position that mediates information within their networks are more likely to generate green patents.

4 Data and Analytical Methods

4.1 Data Overview and Analytical Methods

Data sources include STARTUP DB, Value Search, the INCJ website, materials published by METI regarding INCJ's performance evaluations, and Patent Integration. All the data used is publicly available. The analysis covers unbalanced panel data from 2015 to 2021 for 190 investment cases across 49 companies from the 144 companies that INCJ invested in, for which the data were available. The initial period for each panel corresponds to the year in which INCJ began investing in that company; thus, the reference year differed even within the same panel. The analysis involved calculating network metrics from the investment network to startups using network analysis,

followed by a time-series analysis using a random effects model.

4.2 Network Analysis Method

First, for network analysis, we created annual network diagrams by linking all startups invested in by INCJ obtained from the STARTUP DB, along with companies that further invested in startups where INCJ had invested, using ties. The 2020 network diagram covers companies that began investing between 2016 and 2020, while the 2021 diagram similarly covers those investing between 2017 and 2021, focusing on startups that began to receive investments within the past five years. This approach was chosen for the following reasons: investment periods vary by startup but typically conclude within approximately ten years; moreover, publicly available information confirming the end of investments is sometimes unavailable during data collection. Therefore, considering that VC interest in startups tends to diminish over time (Hellmann & Puri, 2002; Sapienza, Manigart, & Vermeir, 1996) and that interviews indicated even "perpetual" VCs seek returns within three to five years, the network diagrams were created using a moderate five-year period. Furthermore, INCJ is not included in the network diagram because it has invested in all startups, excluding those in which INCJ portfolio startups have subsequently invested. Based on the annual network diagrams created in this manner, ego betweenness centrality and ego network density were obtained using the network analysis software UCI Net.

4.3 Dependent Variables

The dependent variable varies depending on the model used. To test H1, ego betweenness centrality, which indicates a startup's position in the network, served as the dependent variable.

To test H2, H3-1, and H3-2, this ego betweenness centrality was treated as the independent variable, while the final investment outcomes—the listed firm dummy, number of patents, and number of GX patents—served as dependent variables in the analysis.

The ego betweenness centrality was obtained from UCI Net. UCI Net's ego betweenness centrality was calculated based on Everett and Borgatti (2005) by measuring the total proportion of times the focal organization mediated the shortest path between pairs of organizations directly connected to it.

The number of patents represents the number of patents registered by each startup in the relevant year, obtained from Patent Integration.

The number of GX patents represents the number of GX patents that each startup registered in the relevant year. The number of GX patents includes patents belonging to all categories listed in the Green Transformation Technology Classification Table created by the Patent Office.

Finally, the listed firm dummy variable is set to 1 for the year in which the firm went public and 0 for all other years, based on data from Value Search.

All dependent variables are lagged by one year.

4.4 Independent Variables

The independent variables were attachment level and ego betweenness centrality, which were also used as the dependent variables. The attachment level was created by synthesizing these two factors to capture how investor support actions toward portfolio startups change according to the company's growth stage and the time elapsed since investment. Tian (2011) demonstrated that venture capital firms engage in strategic behavior by adjusting the intensity of support and capital injections according to the company's growth stage and passage of time to mitigate information asymmetry.

Based on this concept, the attachment level variable signifies that investors tend to engage more intensively when the company is at an earlier growth stage and immediately after investment. In other words, this study views this intensive engagement during the company's early stages as a key manifestation of investor "attachment" and created an operational variable to measure this "attachment level".

First, the stage level of startups consists of eight growth stages, with the seed stage being the earliest,

followed sequentially by Series A, B, C, D, E, F, and G. We coded the earliest seed stage as 8, decrementing the value by one for each subsequent stage; thus, Series G was coded as 1. Multiple studies have highlighted that investor support actions tend to decrease as the period after the investment progresses. Specifically, Sapienza et al. (1996) demonstrated that VCs actively provide hands-on support, such as management assistance, strategic advice, and monitoring, during a company's early stages. Furthermore, Hellmann and Puri (2002) showed that VC support gradually diminishes as a company gains autonomy and adopts professionalism. Furthermore, Uzzi (1997) noted that while embedded relationships yield collaborative benefits in the early stages, they may lead to excessive dependence and rigidity in the long term.

The number of years since the INCJ investment was obtained from documents evaluating the annual performance of INCJ Corporation from fiscal years 2018 to 2022, which METI publicly released. Based on the above, to measure the reduction in support activities, the number of years since the INCJ investment was converted to its reciprocal, and the attachment level was calculated using the following formula:

$$attachment\ level_{it} = stage\ level_i \times \frac{1}{INCJ\ Investment\ period_{it}} \quad Eq. (1)$$

i : startups

t : Observation point after investment commencement

4.5 Control Variables

We included annual sales and total funding raised as variables about the startups' financial situation, materials & chemicals dummy, electronic devices dummy, and healthcare & medical dummy as variables describing their industry affiliation. We included network density as a characteristic of the startups' networks and a COVID-19 dummy as a variable related to the social environment.

Total funding raised represents the total amount of support startups received from investors and was obtained from STARTUP DB. The industry classification dummies (materials & chemicals, electronic devices, healthcare & medicine) were obtained from the INCJ website.

Ego network density was obtained from the UCI Net dataset. A high value for this metric indicates that organizations linked to ego are highly interconnected, enabling direct information exchange without ego as an intermediary. Since high betweenness centrality often correlates with low ego network density, we controlled for ego network density to accurately estimate the effect of ego betweenness centrality (Everett & Borgatti, 2005).

The COVID-19 dummy variable was set to 1 for 2020 and 2021, when states of emergency were declared in Japan due to the novel coronavirus, and 0 for all other years.

Furthermore, ego betweenness centrality positively influences both the number of patents in Model IV and the number of GX patents in Model VI ($p < 0.01$), supporting H3-1 and H3-2.

5 Analysis Results

Table 3 presents the basic statistics and Table 4 lists the correlation matrix. The maximum absolute value of the correlation coefficient between the control and independent variables in the correlation matrix was 0.33, observed between the electronic devices dummy and the materials & chemicals dummy. This indicated that there were no multicollinearity issues.

Table 5 presents the analysis results from the random effects model. The dependent variable in Models I and II is ego betweenness centrality, in Models III and IV it is the number of patents, in Models V and VI it is the number of GX patents, and in Models VII and VIII it is a listed firm dummy. Models I, III, V, and VII were the baseline models with only control variables, while the other models added independent variables to the baseline model. In Model II, attachment level had a significant positive effect ($p < 0.01$) on ego betweenness centrality, supporting H1. Next, in Model VIII, ego betweenness centrality positively influences the listed firm dummy ($p < 0.05$), supporting H2.

Table 3: Basic Statistics

No Variables	Mean	S.D.	Min	Max
1 Ego Betweenness Centrality	99.01	8.60	16.67	100.00
2 Number of Patents	1.59	8.94	0.00	89.00
3 Number of GX Patents	5.51	13.71	0.00	97.00
4 Listed Firm Dummy	0.01	0.10	0.00	1.00
5 Sales (billion yen)	0.10	0.35	0.00	2.61
6 Total Funding Raised (hundred billion yen)	0.14	0.31	0.00	1.86
7 Materials & Chemicals Dummy	0.06	0.24	0.00	1.00
8 Electronic Devices Dummy	0.14	0.35	0.00	1.00
9 Healthcare & Medical Dummy	0.17	0.38	0.00	1.00
10 Ego Network Density	0.82	6.92	0.00	66.67
11 COVID-19 Dummy	0.41	0.49	0.00	1.00
12 Attachment Level	1.42	1.16	0.14	6.00

N=190

Table 4: Correlation Matrix

No Variables	1	2	3	4	5	6	7	8	9	10	11	12
1 Ego Betweenness Centrality	1											
2 Number of Patents	-0.08	1										
3 Number of GX Patents	-0.03	0.81	1									
4 Listed Firm Dummy	0.01	-0.02	0.12	1								
5 Sales (billion yen)	0.02	0.31	0.32	0.38	1							
6 Total Funding Raised (hundred billion yen)	-0.03	0.73	0.51	-0.04	0.20	1						
7 Materials & Chemicals Dummy	0.03	-0.02	-0.05	-0.03	-0.07	-0.06	1					
8 Electronic Devices Dummy	0.01	0.32	0.37	-0.04	0.06	0.33	-0.11	1				
9 Healthcare & Medical Dummy	0.05	-0.08	-0.12	0.09	-0.08	-0.06	-0.12	-0.19	1			
10 Ego Network Density	-1.00	0.10	0.05	-0.01	-0.01	0.05	-0.03	0.00	-0.05	1		
11 COVID-19 Dummy	0.09	-0.01	0.05	0.12	0.11	0.00	-0.04	0.03	0.01	-0.09	1	
12 Attachment Level	0.01	-0.10	-0.07	-0.01	0.02	-0.19	-0.12	-0.05	-0.01	-0.02	-0.23	1

N=190

Table 5: The Analysis Result of the Random Effects Model

No Variables	Dependent Variables	Ego Betweenness							
		Centrality		Number of Patents		Number of GX Patents		Listed Firm Dummy	
		I	II	III	IV	V	VI	VII	VIII
5	Sales (billion yen)	8.4276**	5.5031	8.9497**	10.0383***	1.7560	2.1270	0.2483**	0.2493**
		[3.9356]	[4.6195]	[3.8332]	[3.4686]	[1.0996]	[2.0153]	[0.1101]	[0.1101]
6	Total Funding Raised (hundred billion yen)	-2.1762	6.5848	10.0206***	-0.8610	14.0851***	4.0265***	-0.0866**	-0.0965**
		[2.6448]	[4.0715]	[3.6187]	[2.4829]	[2.5749]	[0.8214]	[0.0351]	[0.0393]
7	Materials & Chemicals Dummy	0.5281	7.2336	0.9527	0.7312	1.0913	0.7426	-0.0121	-0.0123
		[5.3188]	[5.8956]	[2.0552]	[2.1994]	[0.7892]	[0.5344]	[0.0155]	[0.0158]
8	Electronic Devices Dummy	-7.7732*	-8.2125	7.5495	6.4967	1.6896	0.4694	0.0161	0.0151
		[4.5445]	[6.0409]	[4.8702]	[4.7416]	[1.2031]	[0.5354]	[0.0430]	[0.0434]
9	Healthcare & Medical Dummy	3.0422	3.9220	-1.7867	-1.8354	-0.1173	-0.2127	0.0684	0.0688
		[3.7687]	[4.4738]	[1.6099]	[1.5634]	[0.8087]	[0.4785]	[0.0886]	[0.0891]
10	Ego Network Density	-0.1987*	-0.1394	0.1332	27.0384***	0.1306	25.1900***	0.0001	0.0244**
		[0.1064]	[0.1035]	[0.2141]	[0.4054]	[0.1597]	[0.4405]	[0.0004]	[0.0121]
11	COVID-19 Dummy	19.3492***	25.5326***	-0.9433	-0.5297	-0.9174	-0.4147	0.0014	0.0016
		[4.2106]	[4.7554]	[1.4353]	[1.2158]	[0.7664]	[0.3463]	[0.0247]	[0.0248]
12	Attachment Level		10.4543***						
			[1.5353]						
13	Ego Betweenness Centrality				21.6462***		20.1526***		0.0196**
					[0.3247]		[0.3530]		[0.0096]
	Constant	76.4657***	57.5398***	2.3830	2,161.3991***	-0.9810	-2,015.3225***	0.0163	-1.9389**
		[3.1412]	[5.6539]	[1.7628]	[32.2960]	[0.6530]	[35.1495]	[0.0199]	[0.9653]
	Number of Observations	190	190	190	190	190	190	190	190
	Number of Firms	49	49	49	49	49	49	49	49
	R-squared (within)	0.086	0.29	0.062	0.45	0.036	0.86	0.16	0.16
	R-squared (between)	0.17	0.09	0.38	0.41	0.76	0.89	0.17	0.17
	R-squared (overall)	0.09	0.19	0.24	0.44	0.40	0.88	0.19	0.19

Standard errors in brackets *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

6 Discussion

This study attempted to clarify, through a mixed qualitative and quantitative approach, how the emotional aspect of investor “attachment”—previously overlooked in INCJ’s startup support as a public-private investment fund—influences investment outcomes through hands-on involvement.

The quantitative research results support all the two-stage hypothesis models presented in this study. Specifically: First, it was demonstrated that the higher INCJ’s “attachment level” (operationalized by early-stage investment and investment duration) to its portfolio companies, the more likely those startups were to establish a strategically important position within the ego network (high ego betweenness centrality) by mediating other stakeholders (H1 supported).

This corroborates the qualitative finding that “INCJ personnel actively introduced various companies and individuals to portfolio companies”. The statement from Company A’s case, “They were not competitors, so I introduced them quite a bit, thinking it would be good to exchange information as allies fighting together”, symbolizes how attachment promotes intermediary behavior.

Second, it became clear that startups that built an important strategic position (high ego betweenness centrality) within their ego networks, mediating with other stakeholders, tended to achieve results such as IPOs (supporting H2), patent creation (supporting H3-1), and green patent creation (supporting H3-2). In qualitative research, as Company B stated, “The various shareholders were very unique, and INCJ was very helpful in coordinating between them.” INCJ functioned as a coordinator between diverse stakeholders, helping startups become nodes for information and resources. Such strategic positions facilitated access to diverse knowledge and opportunities from outside, leading to innovation creation (patents) and IPOs.

The theoretical contribution of this study lies in introducing the new perspective of “attachment” to

research on the effects of venture capital support and demonstrating that its impact leads to outcomes through the mechanism of “network structure formation.” While previous studies have focused on the presence or content of support, this study shows that the emotional aspects of investors who motivate support can determine its quality, particularly the nature of network-building assistance. As symbolized by Company A’s term “grandchild power”, the “appeal that makes one want to support” inherent in startups fosters attachment from investors, suggesting that this can become a crucial driving force for business growth.

In practice, supporting startups requires more than just funding and hands-on involvement; investors must also help portfolio companies build their networks. Public-private investment funds such as INCJ should leverage their neutral position and extensive networks to facilitate strategic connections between startups and other players across different fields and industries. This support allows startups to expand their ego networks, establish intermediary positions within the ecosystem, and gain new knowledge and opportunities for collaboration. For startups, this underscores the importance of refining their technology and business plans. In addition to consciously cultivating trust-based relationships with investors, establishing such supportive ties early is critical. This early foundation enables investors to develop an “attachment” to startups and to provide sustained, active support for their growth.

7 Conclusion

This study examined the relationship between startups and venture capital firms, specifically the impact of investor “attachment” on investment outcomes, based on case studies of investments by INCJ, a public-private investment fund. We adopted a mixed-methods approach, drawing insights from qualitative case studies that “investor attachment qualitatively enhances hands-on involvement” and then quantitatively verified this.

The analysis revealed the following. First, startups with a high level of “attachment” from INCJ had established a strategic network position that bridged diverse investors and companies. Second, a network position established in this manner has a significant positive impact on corporate performance, such as the realization of IPOs and the creation of patents and green patents.

The contribution of this study lies in incorporating the emotional aspect of investor “attachment”, which tends to be hidden behind rational investment decisions, into the investment effect model and demonstrating that its impact is manifested through the mechanism of “network structure mediation”. This shows that the essence of hands-on support for startups lies not only in providing advice, but also in how investors utilize their network capital for the benefit of their investees.

However, this study has some limitations. For example, the attachment level indicator is an indirect construct that needs to be reinforced through qualitative interviews and observational data. Furthermore, the subject of this study is limited to Japanese public-private investment funds, and expanded verification involving private VCs and cases in other countries is required.

Nevertheless, the novelty and originality of this study lie in its empirical verification of a two-stage model: attachment brings about changes in the network structure through hands-on involvement, which, in turn, leads to outcomes (IPOs, patents, and green patents). While previous studies focused on the rationality of investment and financial aspects, this study shows that emotional factors can directly lead to practical outcomes. It also suggests that investors’ emotional involvement and trust-building are important factors in forming network structures in startup support.

【Acknowledgments】

This research was made possible through the generous support and cooperation of INCJ, Ltd. We extend our heartfelt gratitude to Mr. Koichi Ashida for his meticulous assistance and to Mr. Shinji

Oshige and Mr. Yutaka Hamano for participating in the interviews.

We also received invaluable insights from representatives of the four startups who kindly agreed to be interviewed.

Furthermore, for data collection and aggregation in the quantitative research, support was given by two undergraduate students from the Akitsu Oe Laboratory in the Faculty of Business Administration at Tokyo University of Science. Without the dedicated efforts of Mr. Hibiki Yabe, who gathered vast amounts of data from diverse sources and organized the dataset to construct the panel data, this study would not have taken shape. Mr. Shuhei Chiba provided technical support for data aggregation. I extend my heartfelt gratitude to both.

All the responsibility for the content of this study lies solely with the author. This research was supported by the Japan Venture Society “INCJ Research Project” and by JSPS Grants-in-Aid for Scientific Research JP23K17561, JP23K20627, and JP24K05036.

【References】

- Agrawal, A., & Hockerts, K. (2021). Impact investing: Review and research agenda. *Journal of Small Business & Entrepreneurship*, 33(2), 153–181. <https://doi.org/10.1080/08276331.2018.1551457>
- Auerswald, P. E., & Branscomb, L. M. (2003). Valleys of death and darwinian seas: Financing the invention to innovation transition in the United States. *The Journal of Technology Transfer*, 28(3), 227–239. <https://doi.org/10.1023/A:1024980525678>
- Baum, J. A., Calabrese, T., & Silverman, B. S. (2000). Don't go it alone: Alliance network composition and startups' performance in Canadian biotechnology. *Strategic Management Journal*, 21(3), 267–294. <https://doi.org/10.1002/>
- Bellucci, A., Fatica, S., Georgakaki, A., Gucciardi, G., Letout, S., & Pasimeni, F. (2023). Venture capital financing and green patenting. *Industry and Innovation*, 30(7), 947–983. <https://doi.org/10.1080/13662716.2023.2228717>
- Borrello, A., Bengo, I., & Moran, M. (2024). How impact investing funds invest in social-purpose organizations: A cross-country comparison. *Corporate Social Responsibility and Environment*

- Management*, 31(2), 879–894. <https://doi.org/10.1002/csr.2605>
- Burt, R.S. (1992). *Structural holes: The social structure of competition*. Harvard University Press.
- Burt, R. S. (2004). Structural holes and good ideas. *American Journal of Sociology*, 110(2), 349–399. <https://doi.org/10.1086/421787>
- Chemmanur, T. J., Krishnan, K., & Nandy, D. K. (2011). How does venture capital financing improve efficiency in private firms? A look beneath the surface. *The Review of Financial Studies*, 24(12), 4037–4090. <https://doi.org/10.1093/rfs/hhr096>
- Engel, D., & Keilbach, M. (2007). Firm-level implications of early stage venture capital investment—An empirical investigation. *Journal of Empirical Finance*, 14(2), 150–167. <https://doi.org/10.1016/j.jempfin.2006.03.004>
- Epstein, M. J., & Yuthas, K. (2014). *Measuring and improving social impacts: A guide for nonprofits, companies and impact investors (1st ed.)*. Routledge. <https://doi.org/10.4324/9781351276245>
- Esposito, C., Gortan, M., Testa, L., Chiaromonte, F., Fagiolo, G., Mina, A., & Rossetti, G. (2022). Venture capital investments through the lens of network and functional data analysis. *Applied Network Science*, 7(1), 42. <https://doi.org/10.1007/s41109-022-00482-y>
- Everett, M. G., & Borgatti, S. P. (2005). Ego network betweenness. *Social Networks*, 27(1), 31–38. <https://doi.org/10.1016/j.socnet.2004.11.007>
- Fournier, S. (1998). Consumers and their brands: Developing relationship theory in consumer research. *Journal of Consumer Research*, 24(4), 343–373. <https://doi.org/10.1086/209515>
- Freireich, J., & Fulton, K. (2009). *Investing for social and environmental impact: A design for catalyzing an emerging industry*. Monitor Institute, 1–86. <https://www.cdfifund.gov/system/files/documents/investing-for-social-and-environmental-impact-monitor.pdf>
- Gigante, G., Sironi, E., & Tridenti, C. (2023). At the frontier of sustainable finance: Impact investing and the financial tradeoff: Evidence from private portfolio companies in the United Kingdom. *Sustainability*, 15(5), 3956. <https://doi.org/10.3390/su15053956>
- Gilsing, V., Nooteboom, B., Vanhaverbeke, W., Duysters, G., & Van Den Oord, A. (2008). Network embeddedness and the exploration of novel technologies: Technological distance, betweenness centrality and density. *Research Policy*, 37(10), 1717–1731. <https://doi.org/10.1016/j.respol.2008.08.010>
- Gulati, R. (1995). Does familiarity breed trust? The implications of repeated ties for contractual choice in alliances. *Academy of Management Journal*, 38(1), 85–112. <https://doi.org/10.5465/256729>
- Hallen, B. L. (2008). The causes and consequences of the initial network positions of new organizations: From whom do entrepreneurs receive investments? *Administrative Science Quarterly*, 53(4), 685–718. <https://doi.org/10.2189/asqu.53.4.68>
- Hehenberger, L., Mair, J., & Metz, A. (2019). The assembly of a field ideology: An idea-centric perspective on systemic power in impact investing. *Academy of Management Journal*, 62(6), 1672–1704. <https://doi.org/10.5465/amj.2017.1402>
- Hellmann, T., & Puri, M. (2002). Venture capital and the professionalization of start-up firms: Empirical evidence. *The Journal of Finance*, 57(1), 169–197. <https://doi.org/10.1111/1540-6261.00419>
- Höchstädter, A. K., & Scheck, B. (2015). What's in a name: An analysis of impact investing understandings by academics and practitioners. *Journal of Business Ethics*, 132(2), 449–475. <https://doi.org/10.1007/s10551-014-2327-0>
- Hsu, D. H. (2004). What do entrepreneurs pay for venture capital affiliation?. *The Journal of Finance*, 59(4), 1805–1844. <https://doi.org/10.1111/j.1540-6261.2004.00680.x>
- Islam, S. M. (2022). Impact investing in social sector organisations: A systematic review and research agenda. *Accounting & Finance*, 62(1), 709–737. <https://doi.org/10.1111/acfi.12804>
- Kato, M., Onishi, K., & Honjo, Y. (2022). Does patenting always help new firm survival? Understanding heterogeneity among exit routes. *Small Business Economics*, 59(2), 449–475. <https://doi.org/10.1007/s11187-021-00481-w>
- March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science*, 2(1), 71–87. <https://doi.org/10.1287/orsc.2.1.71>
- Mayer, J., & Scheck, B. (2018). Social investing: What matters from the perspective of social enterprises? *Nonprofit and Voluntary Sector Quarterly*, 47(3), 493–513. <https://doi.org/10.1177/0899764017749889>
- Ormiston, J., Charlton, K., Donald, M. S., & Seymour, R. G. (2015). Overcoming the challenges of impact investing: Insights from leading investors. *Journal of Social Entrepreneurship*, 6(3), 352–378. <https://doi.org/10.1080/19420676.2015.1049285>
- Sapienza, H. J., Manigart, S., & Vermeir, W. (1996). Venture capitalist governance and value added in four countries. *Journal of Business Venturing*, 11(6), 439–469. [https://doi.org/10.1016/S0883-9026\(96\)00052-3](https://doi.org/10.1016/S0883-9026(96)00052-3)
- Singhania, M., & Swami, D. (2024). Impact investing:

- Scientometric review and research agenda. *Business Ethics, the Environment & Responsibility*, 33(3), 251–286. <https://doi.org/10.1111/beer.12599>
- Stuart, T. E., Hoang, H., & Hybels, R. C. (1999). Interorganizational endorsements and the performance of entrepreneurial ventures. *Administrative Science Quarterly*, 44(2), 315–349. <https://doi.org/10.2307/2666998>
- Tian, X. (2011). The causes and consequences of venture capital stage financing. *Journal of Financial Economics*, 101(1), 132–159. <https://doi.org/10.1016/j.jfineco.2011.02.011>
- Uzzi, B. (1997). Social structure and competition in interfirm networks: The paradox of embeddedness. *Administrative Science Quarterly*, 42(1), 35–67.
- Uzzi, B., & Spiro, J. (2005). Collaboration and creativity: The small world problem. *American Journal of Sociology*, 111(2), 447–504. <https://doi.org/10.1086/432782>