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Empirical analysis of the effect of Japanese university spinoffs' social networks on their performance

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ABSTRACT

Entrepreneurial firms have "liability of smallness" and "liability of newness". A university spinoff, a type of entrepreneurial firm, also lacks internal capital such as financial capital and human capital. Therefore, it is crucial for university spinoffs to utilize external capital, especially social capital, which can provide them important resources.

In this study, by using data from Japanese university spinoffs, we empirically examine the effect of university spinoffs' external advice networks on their performance. We focus on nonredundancy in their networks and on the influence of the strength of ties to nonredundant contacts in both business and private aspects. Our results show that nonredundancy in university spinoffs' networks affects their performance positively, and the impact is enhanced by the tie closeness of business relationships and the tie weakness of private relationships. Thus, this study provides not only an insight about university spinoffs' performance but also an additional perspective on the social network theory by adopting the interaction between structural embeddedness and relational embeddedness.

1. Introduction

Recently, in the studies of entrepreneurial firms, social capital has received considerable attention as an important factor in these firms' survival, performance, and development. Compared to established firms, entrepreneurial firms have handicaps such as "liability of newness" [1] and "liability of smallness" [2] and are characterized by a lack of internal capital such as financial capital and human capital [3]. Therefore, it is noted that entrepreneurial firms require useful external capital, especially social capital. For example, Lin et al. [4] remark that social capital can be regarded as a major wedge to mobilize environmental resources to overcome obstacles and threats during the entrepreneurial process and reveal that social capital actually moderates the effects of entrepreneurial strategies and resources on high-tech new ventures' performance.

For university spinoffs, regarded as a type of entrepreneurial firm, social capital is also important. Because university spinoffs usually utilize technologies created by basic research within universities, it is necessary for them to have well-developed business skills and enough money in order to overcome the "technology push" problem and adapt their technologies to market properly [5]. Nevertheless, in many cases, university researchers who are out of touch with business manage their university spinoffs [6], and university spinoffs are likely to face financing difficulties [5]. Therefore, it is crucial for university spinoffs to construct profitable social networks in order to acquire social capital. Mowery and Shane [7] suggest that the unique setting of university-based technology transfer and commercialization may increase the significance of social capital. Nicolaou and Birley [8] also remark that the network underpinnings of the spinout phenomenon are of prime importance in elucidating the various outcomes that result and ascertain the influence of

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social networks in the university spinout phenomenon. Indeed, Shane and Stuart [9], using data from 134 firms founded to exploit MIT-assigned inventions, demonstrate that university spinoffs with entrepreneurs having direct and indirect relationships with venture investors are most likely to receive venture funding and are less likely to fail, and that receiving venture capital funding is the most important determinant of IPO. However, up to now, the relationship between social capital and university spinoffs' performance has not been studied sufficiently.

With respect to social capital, researchers have long been discussing two conflicting theories of social networks [10]. Coleman [11,12] insists on the positive effect of network closure, since dense networks facilitate trust and cooperation among actors. On the other hand, Burt [13,14] asserts that dispersively connected networks are significant in order to achieve the competitive advantage. In order to amalgamate these two distinct theoretical views, we adopted the interaction between relational embeddedness – defined as characteristics of relationships [15] – and structural embeddedness – defined as characteristics of the relational structure [15] – from the embeddedness perspective that firms are embedded within the social context [13,16]. Gulati illustrates these two types of network embeddedness as follows ([17], p. 296):

> "Relational embeddedness or cohesion perspectives on networks stress the role of direct cohesive ties as a mechanism for gaining fine-grained information… Structural embeddedness or positional perspectives on networks go beyond the immediate ties of firms and emphasize the informational value of the structural position these partners occupy in the network."

This study integrated the social network theory with research on university spinoffs. In this study, using data from 79 out of 1352 Japanese university spinoffs to which our questionnaire survey was sent, we conducted empirical analysis on the effect of university spinoffs' external advice networks on their performance. As the independent variables, we focused on nonredundancy – structural embeddedness – in their networks and the impact of tie closeness in the business aspect and tie weakness in the private aspect – relational embeddedness – to nonredundant contacts. As the dependent variable, we constructed a stable performance indicator by amalgamating three performance variables, i.e., sales volume, employment, and competitive capabilities.

2. Theory

Social capital is defined as "the sum of resources, actual or virtual, that accrue to an individual or a group by virtue of possessing a durable network of more or less institutionalized relationships of mutual acquaintance and recognition" [18]. While there are differences in emphasis because of the specificity of each research agenda, most studies coincide with this general definition [10].

Although social capital includes the various resources available through social networks, such as wealth, power, influence, and emotional support [19], with respect to the effect of social capital on entrepreneurial firms' performance, the informational advantage has particularly been focused on. Because people prefer to depend on other people rather than documents for information, social networks are important for acquiring information [20]. In particular, entrepreneurial firms that entail uncertainty must constantly seek out information that provides them new opportunities for upgrading and renewing their competitive capabilities. Thus, the difference in firms' capacities to access useful information through their social networks is a key source of variation in entrepreneurial firms' performance [21]. Indeed, McEvily and Zaheer [21] examine the effect of job shop manufacturers' networks that they rely on for advice on managing their business and reveal that useful networks provide competitive capabilities. Hence, as social capital, we focus on "external advice network," i.e., the outside network on which firms rely in order to acquire knowledge about management matters.

While social capital has become a ubiquitous metaphor [10] and there are diverse styles of argument [11,22,23], social capital theorists agree that actors who are better connected to social networks have the competitive advantage [15,22]. However, there are two paradoxical arguments about what it means to be "better" connected [22]. As the traditional concept, Coleman [11,12] suggests that dense and closed networks are valuable. Coleman notes that network closure can enhance trust which allows the proliferation of obligations and expectations among members in such a network, decrease the opportunistic behavior and the uncertainty of their exchanges, and facilitate cooperation among them.

On the other hand, Burt's structural holes theory [13,14] insists on the advantage of dispersive network structure. Burt defines a structural hole as the absence of ties between contacts [24]. By bridging structural holes, actors can benefit from establishing ties that bridge these otherwise unconnected actors [13,24]. Because Burt's concept was used to explain individual career mobility, in researching firms' external advice networks, in order to explain firm-level outcomes, researchers develop the concept of structural holes and define "nonredundancy" as the extent to which the contacts in a focal firm's external advice network are not linked to one another [8]. While the argument of structural holes takes into account secondary and more contacts, the argument of nonredundancy considers only primary contacts. However, actors having networks with rich nonredundancy are likely to have better brokerage opportunities as well as actors having networks with structural holes.

Which is profitable, network closure or a network with rich nonredundancy? It seems to depend on the content of the networks, that is, the nature of exchanges between actors. For example, Podolny and Baron [25], attempting to reconcile these opposite views, investigate how social networks in the workplace affect intraorganizational mobility. They disaggregate social ties into five specific ties and indicate the advantage of networks with rich structural holes for conveying resources and information and the disadvantage of networks with rich structural holes for transmitting identity and expectations.

With respect to a network for acquiring information, such as an entrepreneurial firm's external advice network, the advantage of Burt's structural holes theory for information access is frequently advocated [13,22]. Burt suggests that when actors have nonredundant networks, they can reach a