

Title	Structure, Management and Performance of Drug Discovery Firms in Japan
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Description	一般講演要旨

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We focus on the performance of drug discovery firms (DDFs) and are testing vast set of financial and non-financial variables following a methodology that has been developed in Scandinavian countries. To this purpose we are creating a database (JABIT) which profiles performance measures for DDFs established in Japan and conducted a preliminary analysis on possible driving forces towards the innovation and economic success of selected DDF samples.

1. Introduction

In line with the current global economic turmoil and following Schumpeter's notion on the innate potential of new firms to innovation and economy (Schumpeter, 1912), it is inarguable that studying newly created knowledge-based firms is productive. Accordingly, movements to promote economic growth in developed nations such as the US and the UK has focused on commercializing scientific innovations into wealth creation (Leitch and Harrison, 2005).

Translating innovation into long-term successful endeavours proves to be a challenge to Japanese scientists and entrepreneurs. Most recent statistical data on the biotech sector indicates that there is an acute decline in the number of newly formed companies while many more others already in the business are bankrupted or struggling to raise enough capital for sustenance (Figure 1).

Research has however indicated that when the newly formed biotech companies are in a position to inherit certain resources from an outside source such as a university or a corporate firm, the odds for their success is highly maximized. Such resources include capital, intellectual property (IP), research facilities and personnel, to mention just a few.

We generally strive to generate a quantitative basis to evaluate the performance of Japan-based drug discovery firms (DDFs) using data from "JABIT", a synthesized database for Japanese DDFs in an accordance with the SCANBIT¹. In this paper we

specifically focus on an example set of nine DDFs to try and explore possible factors that make can make them succeed and which can be used as a yardstick for other entry firms in the Japanese biotech sector.

2. Theoretical Background and Hypotheses

Changed by the advancement in molecular biology during the 1950's with the discovery of DNA, biotechnology is a frontrunner in the field of knowledge creation. Consequently, the field has managed to attract a subsequent amount of literature in the social science field. Biotechnology is commercialised when entrepreneurship is combined with invention to create a new business venture. We have revised and adopt theories on parent-progeny imprinting that is the role of the founding conditions in shaping DDFs.

We have revised and adopt theories on parent-progeny imprinting, focusing on the role of the founding resources in shaping DDFs. Ferriani et al. (2012) call this "available social technology" when new firms originate as divisions of other organisations or when employees walk out with unique insights from a parent company. However, most of the literature based on evaluating the parent-progeny relationships has inadequately use statistical data. Our focus is on resource transferred and their relationship to the performance of the Japanese DDFs.

According to Muller (2001), the Japanese modern biotechnology development

¹ SCANBIT is a proprietary database developed and maintained by the Research Centre on Biotech Business at Copenhagen Business School and uses the firm as its unit of analysis SCANBIT, for all Danish, Swedish, and Norwegian DDFs,

integrates data on employment, patenting, project pipeline, investments, financial performance and a range of additional variables (Finn, 2008).

peaked in the 1990's when it received huge investment from the food and beverage enterprises, pharmaceutical and chemical companies. Rightly so, it was at the same time that the government saw its great potential and consequently made significant reforms that saw an increase amount of funding in the life science sector² (Müller and Fujiwara, 2002).

The task of carrying out scientific discoveries is a risky and costly process that relies on capital support from governmental funding and more often from venture capitalists. Some of the major venture capital funding dedicated to life sciences (such as investment funds run by Biotech Healthcare Partners or JAIC) has over the years been a core part of biotechnology commercialization in the nation. On the other hand, stock market (such as the Tocho Mothers of Tokyo Stock Exchange Market or the JASDAQ of the Osaka) has had a significant role for capital expansion by providing a strategy exit through initial public offering or IPO. A lot of data and statistics on funding and governmental strategies are open to the public making it easy to research on the roles of such factors in life science commercialization.

There is, however, a gap of literature dedicated to the field of biotechnology firms in Japan, particularly regarding how subsequent factors such as knowledge and resources transfer impacts entrepreneurial performance. This research is an attempt to cover this gap addressing the various issues.

3. Methodology

We adopted a case study approach and constructed a set of Japan-based DDFs that are listed to a stock market (Figure 2). We picked nine Japan-based DDFs listed to a stock exchange market for analysis: Carna BioScience (BS), CellSeed, Japan Tissue Enigneering Corporation (or J-TEC) and RaQualia, Chiome BS, SymBio Pharma, NanoCarrier, CanBas and MebioPharm.

We made use of both qualitative and quantitative data to review and make our comparisons. Our data involve an extensive set of data variables that we obtained from legit sources such as the Derwent Innovations IndexTM (Thomson-Reuters), the EDI-NET

(<http://info.edinet-fsa.go.jp/>) which profiles annual reports of public firms, Annual reports, company exposure such as published documents and company websites. We also conducted a few interviews with the management of selected DDFs in our short list above.

4. Results

First of all, the financial analysis for corporate values showed that six out of the nine observed DDFs with data in the stock exchange market have recorded positive growth over time. Furthermore, we succeeded to observe the number of patents applied so far as an assignee and the number of inventors with his/her affiliation. Career background for the management members of each of these selected DDFs was well described in its annual reports and company's exposure such as website.

Universities are well endowed with skilled scientists who need publications of their findings for advancement in the field. Through the comparison of the number of patents applied and the number of inventors we found that DDFs that have applied larger number of patents so far tend to be collaborated the larger number of inventors. Surprisingly, some of DDFs spun out from a company with close links to such university researchers have a lot to benefit in terms of commercialising their inventions. We found this interesting since even though J-TEC, RaQualia CellSeed, and Carna BS originated from corporate firms, still they find necessary to leverage patents inventions from university researchers.

Our analysis also revealed that not only all the board members from DDFs spun out from a corporate have substantial working experiences in the pharmaceutical and other industries, but also do the other outperformers in terms of the persistent creation of corporate value over time. More interestingly, although Chiome BS and Symbio Pharma that are not a part of corporate spin-out firms, these DDFs have had close ties with pharmaceutical companies for value creation. In the former case, the DDF has closed the first substantial deal with Chugai Pharma in which the CEO had accumulated his pharmaceutical business experience before venturing; in the latter the CEO has extensive pharmaceutical industrial expertise which benefits to the deal making in in- and out-licensing of the DDF's first pipeline product. These findings suggest that the

² A good example being the "Millennium Project" in 1999/2000 intended to assist the commercialization of technology.

transfer of managerial skills from the corporate business to DDFs is vital for their success in the field.

5. Discussion

Our findings not only support literature on the important role of DDFs, but it is also an opening for a good debate on which direction efforts to support biotech commercialisation in Japan. It is without doubt that small companies have an important role in developing the economy, but once the government succeeds in directing their effort in the right direction to the results will definitely amount to a lot. This can also address the question on how to connect the dots on how to turn the huge amount of inventions in Japanese universities into successful business commercialisation.

We have adopted a methodology developed from a team of Danish economists who developed a SCANBIT database and have used it to make huge contributions in the literature and real practices in Scandinavian countries. Most importantly, the dataset provide a good opportunity for us to expand our study and make comparisons beyond the Japanese scope. We strongly believe that such a data-driven approach is necessary to obtain more profound understanding of the situation of Japan-based DDFs and also to encourage robust and rational managerial support to these DDFs from the public and private partners.

This study is, however, not without any limitations. Not only did we have used only a limited number of Japan-based DDFs and variables for the analyses, but also we have not fully addressed other environmental boundary conditions surrounding the biotech business. For instance, currently the venture capital business in Japan owns a huge issue for new firm entering the biotech field in Japan because of a worse market sentiment for biotech firms by both individual and institutional investors and the prolonged strong currency rate that motivates even Japanese venture capitalists to make it less risky and more attractive to invest abroad. These issues are to be addressed in the course of our study in the future.

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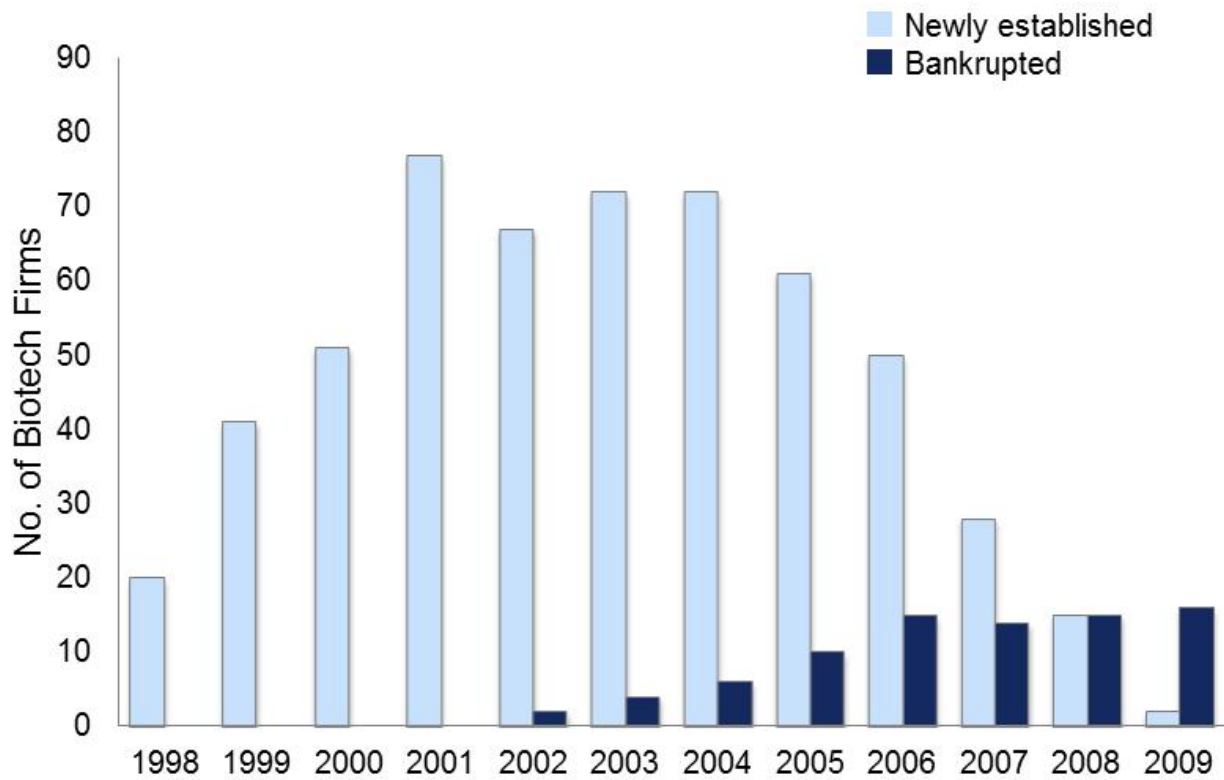


Figure 1. Statistics for the Japanese Biotech Firms (1998-2009)
 Source: Ministry of Economy, Trading and Industry of Japan (2010)

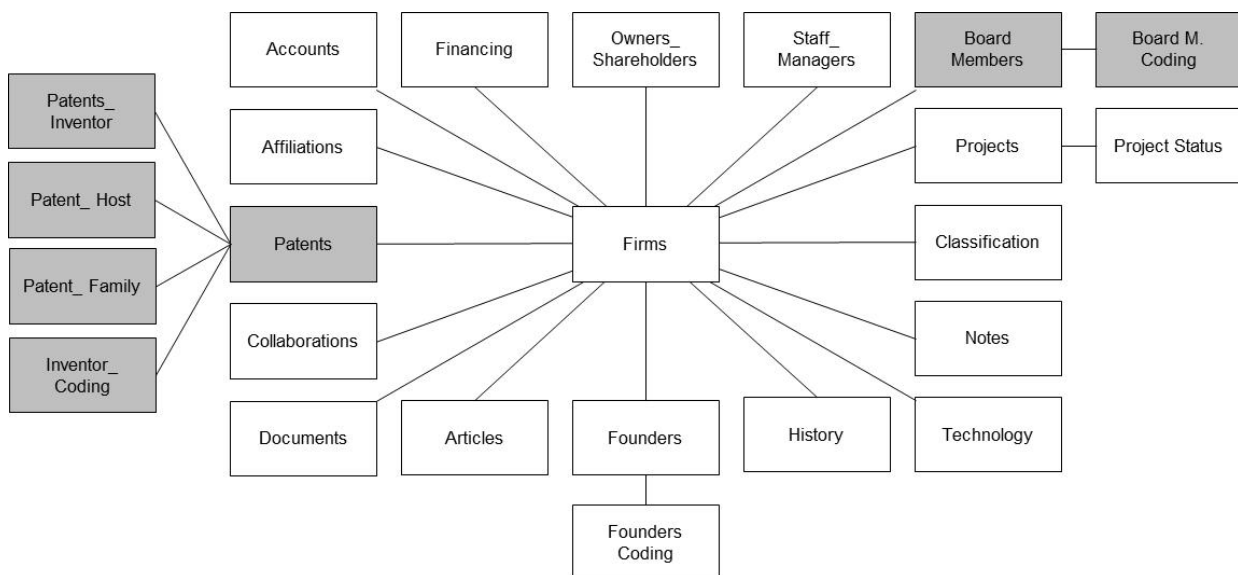


Figure 2. The Database Architecture
 Shaded boxes represent the element of interest in this paper.