Classification for Measuring the Impact of Open Innovation on Practice

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Abstract: The open innovation proposed by Chesbrough (2003a) had a heavy impact on practical business, and not just academia. However, the definition of open innovation is broad and ambiguous, with Chesbrough himself not providing a clear, specific example of open innovation practice (OIP). Thus, practitioners interpret it in many ways. Accordingly, to accurately measure the impact of open innovation, OIP must be classified into several types. This paper proposes two methods for classification. The first is whether the OIP of Chesbrough and that of the practitioner are aligned. From this perspective, OIP can be categorized in three ways: (a) what both Chesbrough and the practitioner call OIP; (b) what Chesbrough calls OIP, but not the practitioner; and (c) what a practitioner calls OIP but not Chesbrough. (a) can be clearly evaluated as the impact of open innovation, while more attention is required when interpreting (b) and (c). Second is the differentiation of whether activities that are currently implemented as OIP were started (i) before or (ii) after Chesbrough (2003a). (ii) can be seen as the impact of open innovation, though (i) is nothing more than changing the name of something that was previously just a
“practice” into “OIP.” If (i) is included in the impact of open innovation, there is a risk of exaggerating the assessment of open innovation.

Keywords: open innovation, measurement, open innovation practice, classification

Introduction

The concept of open innovation as proposed by Chesbrough (2003a) has had a major impact on academic research (Bogers et al. 2017; Elmquist, Fredberg, & Ollila, 2009; Lichtenthaler, 2011). This is clear from the number of papers on the theme of open innovation. Using Web of Science to search papers that include “open innovation” in the title generates 1,454 hits.¹ So, what is the impact of open innovation on practical business?

In the case of academic research, a count of the number of papers can be used to measure the impact of open innovation. However, the impact of open innovation on practical business cannot be measured in such a simple manner. Chesbrough’s definition of open innovation is broad and ambiguous (Dahlander & Gann, 2010; Trott & Hartmann, 2009). Further, Chesbrough himself did not provide a clear and specific example of open innovation practice (OIP), and thus, practitioners interpret OIP in many different ways. Accordingly, OIP must be categorized into several different types in order to accurately measure the impact of open innovation on practical business, that is, what practices of firms were prompted by Chesbrough (2003a) and done as open innovation. The purpose of this paper is to propose such a classification method.

Below, we first discuss what OIP is and try to confirm how

¹ Search conducted on March 7, 2019.
Chesbrough has defined or identified it, while verifying how practitioners have interpreted it. Then, two methods for classifying OIP are proposed to accurately measure the impact of open innovation.

What is Open Innovation Practice?

The definition of open innovation proposed by Chesbrough is broad and ambiguous. Many researchers quote the following as a definition of open innovation (Elmquist et al., 2009; Kuwashima, 2018a; Lichtenthaler, 2011).

Open innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology (Chesbrough, 2003a)

Open innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively (Chesbrough, 2006a)

According to these definitions, technological practices that a firm engages in through external partnerships can all be interpreted as open innovation. However, in the introduction to the open innovation special issue of Journal of Science Policy and Research Management published in 2010, Chesbrough states the following.

Since the term has become much more widespread since the publication of the book 8 years ago, the term has acquired other meanings, some of which are not consistent with the meaning given at the inception of the term. Open innovation is not simply outsourcing innovation or R&D. It is not simply a restatement of
open source software development. (Chesbrough, 2010a)

In other words, the phrase “open innovation” generally used by practitioners does not necessarily match the definition of Chesbrough. Open innovation practices (OIP) envisioned by Chesbrough are more specific (Chesbrough, 2010a).

The most helpful thing for practitioners to understand OIP would have been the figure of the famous funnel model in the Chesbrough’s papers and books. In fact, this figure is often used as a presentation material to explain open innovation. Many practitioners must have relied on this model to learn OIP. What must be noted here is that the examples of OIP included in the funnel model proposed by Chesbrough are extremely few in number.

Using Web of Science, a search of titles with the string “open innovation” and author “Chesbrough, H.” results in 26 articles. In addition to these, Chesbrough published three books (including those he co-edited) with “open innovation” in the title, including 2003’s landmark work entitled Open Innovation. In these texts, the figure of the funnel model is noted in two papers (Chesbrough, 2003b, 2012) and three books (Chesbrough, 2003a; Chesbrough, Vanhaverbeke & West, 2006, 2014). Table 1 shows OIPs that appear in the figures of the funnel model of each literature.

As can be seen in Table 1, there are only three examples of OIP described in the figure of the funnel model of Chesbrough (2003a), the book likely to have been read by the greatest number of practitioners: venture investing, technology in-licensing, and technology acquisition. The figure of Chesbrough, Vanhaverbeke,

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2 Search conducted on March 7, 2019.
3 In addition to these, Chesbrough published Open Business Models (Chesbrough, 2006b) and Open Services Innovation (Chesbrough, 2010b), both on open innovation. However, these two books do not include “open innovation” in the title, and were thus excluded from Table 1 to conform with the search results from Web of Science.
and West (2006, 2014) only has the technology insourcing as example of inbound practices, and adds out-licensing and technology spin-offs for outbound practices. Thus, only five or six specific examples of OIP are listed in the famous figure of the funnel model that plainly demonstrates open innovation. Even figures and tables in all 29 of Chesbrough’s works, apart from the funnel model, do not explicitly state what OIP is.

The first time Chesbrough showed OIP systematically was in a paper jointly authored with Brunswicker published in 2014’s *Research-Technology Management* (Chesbrough & Brunswicker, 2014). Chesbrough and Brunswicker (2014) conducted a survey to find out to what extent OIP is being done in large firms. Prior to conducting the survey, Chesbrough and Brunswicker identified 17 OIPs (Table 2). These 17 practices are listed in a table in Chesbrough and Brunswicker (2014). As a result, the examples of OIPs that could

| Year | Venture investing | Technology in-licensing | Technology acquisition | Technology insourcing | Out-licensing | Technology spin-offs |
|------|------------------|-------------------------|------------------------|----------------------|--------------|---------------------|
| 2003a | ○                | ○                       | ○                      | –                    | –            | –                   |
| 2003b | –                | –                       | –                      | –                    | –            | –                   |
| 2006  | –                | –                       | –                      | ○                    | ○            | ○                   |
| 2012  | –                | –                       | –                      | ○                    | ○            | ○                   |
| 2014  | –                | –                       | –                      | –                    | –            | –                   |

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4 It is assumed that venture investing, technology-in-licensing, and technology acquisition were all rolled into technology insourcing.

5 Chesbrough and Brunswicker (2014) attached a questionnaire in an e-mail to 2,840 large firms with sales in excess of $250 million in the US and Europe, and received responses back from 125 firms. They asked respondents to (1) assess the level of importance of 17 open innovation practices in 2011, and to (2) assess changes in the level of importance of OIP in the three-year period from 2008 to 2011.
be referred by practitioners have increased significantly.

What must be noted here is the method used by Chesbrough and Brunswicker (2014) to identify the 17 OIP in Table 2. According to that paper, they identified these practices through a review of the literature and discussions with open innovation practitioners. This means that Chesbrough himself did not clearly identify what practices were to be specifically called OIP until this survey.

Many practitioners with an interest in open innovation are thought to have focused on the famous funnel model when reading Chesbrough’s books and papers. However, they could not have obtained the fragmentary knowledge shown in Table 1 for specific examples of OIP. Thus, practitioners prior to the publishing of Chesbrough and Brunswicker (2014), or those who had not yet read the paper after publication, may possibly have made their own interpretations of OIP that differed from the definition or intent of

| Table 2. OIP in Chesbrough and Brunswicker (2014) |
|--------------------------------------------------|
| **Inbound Practices**                            |
| Consumer and customer co-creation               |
| Information networking                          |
| University research grants funding              |
| Publicly funded R&D consortia                    |
| Contracting with external R&D service providers  |
| Idea and start-up competitions                  |
| IP in-licensing                                 |
| Supplier innovation awards                      |
| Crowdsourcing                                    |
| Specialized services from OI intermediaries      |
| **Outbound Practices**                          |
| Joint venture activities with external partners  |
| Selling of market-ready products                 |
| Participation in public standardization         |
| Corporate business incubation and venturing      |
| IP out-licensing and patent selling              |
| Donations to commons or nonprofits               |
| Spinoffs                                         |
Chesbrough.

This may have given the following bias to Chesbrough and Brunswicker’s (2014) OIP survey. That is, Chesbrough and Brunswicker (2014) conducted a survey on the 17 OIPs shown in Table 2. These were what Chesbrough himself identified as OIP (in other words, those that Chesbrough formally recognized as OIP). However, they include the following two types.

(1) Practices implemented by practitioners as OIP  
(2) Practices not implemented by practitioners as OIP

When attempting to measure the impact of open innovation on practical business, it is possible that including (2) may lead to an exaggerated assessment.

Furthermore, as in (1), some of the practices currently implemented as open innovation may have started before 2003. When such practices are included, there is a risk that the impact of open innovation will be overestimated.

Classification of Open Innovation Practice

Based on the above, this paper proposes the following two ways to classify OIP to more accurately measure the impact of “open innovation” (Chesbrough, 2003a).

First is whether Chesbrough, the proponent of open innovation, and practitioners (or firms) call a certain practice OIP (Table 3). (a) comprises practices that both Chesbrough and practitioners call OIP, which can be clearly judged as the impact of open innovation. (b) comprises practices, on the other hand, that Chesbrough calls OIP, but practitioners or firms do not. For example, in-licensing (in Japanese, “dōnyū”) and out-licensing (“dōshutsu”) of candidate compounds for new drugs in Japan’s pharmaceutical
industry are typical examples.⁶ As Table 2 in the preceding section showed, in-licensing and out-licensing are both the main examples of OIP that have been listed from the early figure of the funnel model. However, to the pharmaceutical industry in Japan, they are everyday business activities, and no firm does this as open innovation per se.⁷ (c) are those cases that Chesbrough does not term OIP, but practitioners or firms do. For example, in Japan’s pharmaceutical industry in 2017, three major firms (Astellas, Daiichi Sankyo, and Mitsubishi Tanabe Pharma), announced the joint construction and use of chemical libraries as open innovation and started their activities.⁸ Nonetheless, this type of collaborative research and development among large firms was not included in the 17 examples of OIP given by Chesbrough and Brunswicker (2014). When analyzing the impact of open innovation on practice, it must be kept in mind that the results of the analysis will change

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⁶ See Kuwashima (2003, 2015, 2016) for more information on the characteristics of pharmaceutical research and development.

⁷ See Takahashi and Nakano (2003) for more information on general technology transfers in Japanese firms.

⁸ According to a press release from the three firms (Astellas, Daiichi Sankyo, and Mitsubishi Tanabe Pharma), this alliance created for the three companies to jointly create a chemical library and put it to use in promoting open innovation to increase the potential for new drug development (October 11, 2017 press release).
Another perspective is the method of classification based on whether OIP was started before or after 2003 (Table 4). It is important to differentiate whether the practices done by firms or practitioners as open innovation were started after, or before, the publication of Chesbrough (2003a). If it started before 2003, it is not a “new practice” motivated by Chesbrough (2003a). This means piggybacked on the open innovation fad and simply changed its name from “conventional practice” to “OIP.” For example, university–industry collaborative research has garnered attention in Japan in recent years as OIP and is often covered in the media (Kuwashima, 2018a). Firms and universities themselves publish this collaborative research on their websites as OIP. University–industry collaborative research is certainly included in the list of 17 open innovation practices by Chesbrough and Brunswicker (2014). However, university–industry collaborative research is a practice done in Japan for several decades, and was not stimulated by the open innovation of Chesbrough (2003a).

How to treat (i) depends on the purpose of the analysis, but to more closely measure the impact of open innovation it is reasonable to limit analysis target to (ii).

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9 See Yoda and Kuwashima (2019) for more information on the history of university–industry collaboration in Japan.
Conclusion

This paper demonstrates two methods for classifying OIP when measuring the impact of open innovation on firms and practitioners. By leveraging these methods of classification, it is possible to more accurately measure the impact of open innovation. However, in the end, what this paper proposes is only a conceptual classification, and it is necessary for analysts to make their own judgments and operations when actually using these methods. For example, the classifications in Table 4 (Classification of OIP (2)) as to whether an OIP started before or after Chesbrough (2003a) may change depending on the level of classification. An explanation using the example of university–industry collaborative research given in the prior section is in order. In Japan, traditional university–industry collaborative research implemented in the 20th century was done with short-term, small, individual contracts. In contrast, more recent university–industry collaborative research has been conducted with long-term large-scale comprehensive contracts, unlike the past. This new type of university–industry collaborative research began with the spread of open innovation around 2010 (Kuwashima, 2018a). Accordingly, if a determination is made with a focus on characteristics at a more specific level than the highly abstract “university–industry collaborative research,” the new type of university–industry collaborative research can be viewed as a “new practice” (ii) in Table 4) that appeared after Chesbrough (2003a). Whether it is reasonable to classify at a certain level will depend on the purpose of analysis and the intent of the analyst.

When measuring and analyzing the impact of open innovation on practice, sufficient care must be given to the impact of this determination on the results of the analysis.
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