

Intellectual Property and Management Theories

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[Abstract] This paper aims to identify what kind of opportunities we have in incorporating intellectual property (IP) elements in management theories, as well as in policy issues. Intellectual property issues and policy oriented issues force us to conduct interdisciplinary research, and there is a critical difference in methodology between them. Based on this, I find that “sticking to organizational issues” is the core elements in management theories. Here, the criteria that connect IP to organizational issues is “codifiable vs. non-codifiable.” And what organizations need to keep or include inside of them are non-codifiable IP (non-measurable IP in spite of measurement efforts). Global patent system can also be supported by a theory that derived from a fundamental question by Ronald Coase : “why organization emerges.”

[KEYWORD] Management Theory and Intellectual Property Organization Social Science Methodology
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1. Introduction

This paper aims to identify what kind of opportunities we have in incorporating intellectual property (IP) elements in Management Theories¹. I also seek opportunities in incorporating management theories in related policy issues. The underlying questions are that : what we can solve in incorporate IP elements in management theories ; whether such management theories also help induce policy issues, implications, or verify policy-oriented hypothesis. In this paper, I stand on an assumption that IP is one of management resources.

I find that “sticking to organizational issues” is the core in management theories. Here, the criteria that connect IP to organizational issues are “codifiability vs. non-codifiability.” (See, Kogut, B. and U. Zander, 1993).

This notion is originally derived from a question set by Coase, R. (1937) : why an organization emerges. And what organizations need to keep or include inside of them are non-codifiable IP (non-measurable IP in spite of measurement efforts). Based on them,

- 1) Companies can change their organizational capabilities by configuring external IP with internal IP accumulation ;
- 2) Companies can determine their organizational structure, such as integration, alliances, and so on ; here, what must not be outsourced is non-codifiable IP², that is : early stage science IP and know-how.
- 3) We can actively utilize such management theories in contributing to policy issues.

On the other hand, I identify the following difficulties :

- 1) Current issues that are arising from science –

based business and innovation policies push us to collaborate with natural scientists. However, methodologies of social science are distinctly different from those of other sciences (see, Rudner, R.S. 1966). As a large part of intellectual property professionals are trained in natural sciences, it is quite difficult to nurture mutual understandings in a deeper level ;

- 2) Traditionally, a large part of management decisions has been derived from “art” based on their experiences, while “science“ constitutes of a repeated feedback cycle of “hypothesis–prediction–test” that enables others to reproduce outcomes ;

In this paper, I try to resolve these contradictions.

Here, management theories can be divided into three disciplines–management of economic discipline, that of sociology discipline, and that of psychology discipline. In this paper, I discuss issues mainly along with Management of Economic Discipline. It is because 1) I can find IP elements implicitly at the early stage of this discipline, 2) the underlying assumption of this paper is that we regard IP as a corporate resource, whereas scholars in other disciplines tend to use intellectual property as a data for their hypothesis verification.

This paper consists as following chapters : first, I will discuss the distinction of social science/management theory methodologies from those of natural sciences in order to nurture better understandings each other. Second, I discuss how management theories contribute to policy-oriented prescription theories. Finally, I will mention a concluding remark with implications.

2. Uniqueness of Social Science Methodology

2.1. Management theory, Social science, and Scientific Method

Social sciences include economics, management

theories, law, etc. In sum, a set of sciences that are not natural sciences. When I see a typical natural science methodology, I can find the same feedback loop as that in social sciences :

The above figure is included in a standardized college-level textbook of biology. When I see the figure, I can find consistency between the methodologies that are used in natural sciences and social sciences in a broader sense.

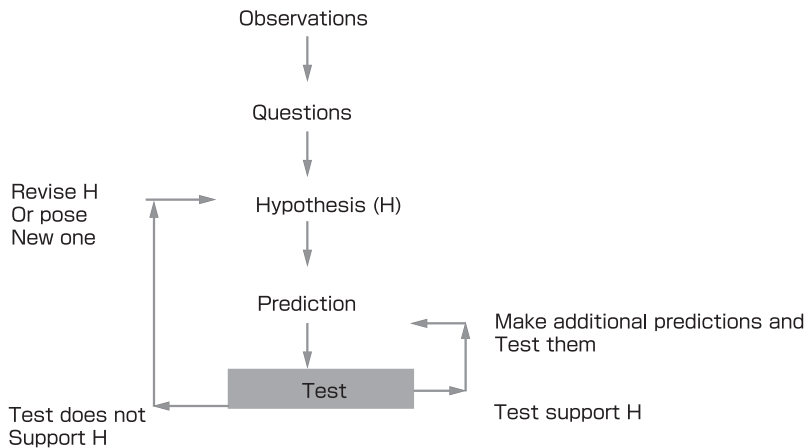
When I focus on management theories, I can find differences in the followings :

1. In exploring management theories, we observe human behaviors reflected in organizations that are partly affected by human emotions and perceptions, where as natural scientists observe natural phenomena that are not affected by human emotions nor perceptions.
2. In management theories, we need to develop experimental conditions by using several tools at the verification phase.
3. In order to develop experimental conditions, we often need to create operational definitions. We frequently use words same as those used in general conversations for this purpose whereas whose meanings are completely different each other. This make things complicated.
4. Robustness of the tests is not as strict as natural sciences.

2.2. Discovery Phase Issues

When we think about the observation phase, methods that social scientists use seem to be misleading for natural scientists. In management theories, we often collect a certain organization’s case, interview people, etc. Some of us even accompany a certain individual during a certain period. During this period, we must do these by “suppressing our emotions” in order to remove perception biases. It may be easier for people who have a direct experience in the observing field or similar experiences in different fields to be aware of research questions (Rudner, R.S. 1966). At the same

Fig. 1 Scientific Method



Source : Campbell and Reece ed. (2002)

time, such direct and indirect experiences often tend to make perception biases. Here, social scientists try to complement their possible biased perceptions by thoroughgoing observations.

Difficulties are :

It needs long-term trainings and practices to make thoroughgoing observations by suppressing ones emotions ;

It is often very annoying for those who are observed ;

People tend to misunderstand that the observing social scientists have no specific opinions, since they are suppressing their own emotions ;

People also tend to misunderstand that the observing social scientists have the same character as observed subjects.

With these difficulties, social scientists need to extract specific research questions through steady recording of facts, outside appearances, and perceptions of parties who are involved in. Then, social scientists move forward to set hypothesis.

These observation methods look different from those of natural sciences. However, I have come to notice that both are essentially the same. In 2007 and 2008, I traced perceptions and behaviors of an inventor of proanthosyanidin, together with the company's

strategies and organizational change. Based on my observation, the inventor, Ariga, T. perceived that the most difficult part of the whole processes from idea-hypothesis setting through clinical trials was the extraction of the specific effective compound, proanthocyanidin, from complicated natural products. Then, isn't it the same that we extract specific research questions and set hypothesis from complicated events that are affected by imperfect human perceptions and behaviors ?

Rudner, R.S. (1966) also mentions that the differences seen in the discovery phase are not fundamental differences.

2.3. Validation Phase Issues

As for the validation or justification phase, social scientists confront with more difficulties. I will describe the difficulties by focusing on management theories, especially those of economic discipline.

The critical difficulty that management theories confront with is how to structure an experimental condition. In case of behavioral social science, they have been traditionally experimenting human behaviors by recruiting subjects and building a specific space. For example, they test subjects (often university students) by gathering them in a certain experimental space, as-

signing them specific roles, and examining how they react to a certain stimuli. They select samples so that they can build an experimental situation where “all the other things are equal.” Results of such experiments show direct effects from which we can infer more universal events. It is said that the origin of social sciences existed in the behavioral science.

However, we cannot experiment subjects directly in all the social sciences, because 1) when subjects are human beings, some of experiments can become problematic in an ethical sense, and 2) when subjects are organizations or whole economy, it is impossible to ask such organizations or economy as a whole to involve in experiments.

Then, in many cases, methodologies used at the verification phases are :

1) Statistics

From small sample through large sample

Non-linear and linear statistics through artificial intelligent algorithm

2) Case Observations

In the past, it was difficult for us to handle, in statistics, a small sample and those whose distributions are at a glance scattered. In these days, thanking for the advance of statistics, computer and application software, we can handle small samples, and those that do not follow normal distribution, extract meaningful patterns from at-a glance scattered data, and even handle emergence.

However, difficulties are :

1) It is hard to build a situation that “all the other things are equal,” and

2) Parameters used are proxy variables.

Those difficulties make us need a technique and interpretation ability to acquire a robustness of the test. In addition, as the variables are proxy ones, results do not necessarily show details of the concrete reality.

Then, those who are involved in management theories often add cases, or use cases solely, to test the validity of hypothesis.

Here, discussions often center around the qualifica-

tion and number of cases used : whether or not the cases used represent typical ones from which we can infer more universal facts ; whether or not we can verify hypothesis through one or two cases.

Here, the number of cases often depends on the availability of internal data. For example, Mayer, K. and N. Argyres (2004) tested a hypothesis that “a formal contract strengthen trust” by using a single in-depth case on an alliance between software companies in California and Tokyo. In this case, their paper’s contribution to the field was to propose an objection evidence to the transaction theory in which people regard contract as a tool to resolve opportunistic behaviors among related parties. He brought a sociology origin viewpoint in the field of management of economic discipline. Although we need to accumulate more case evidences, the in-depth analysis by using internal time series description on contract was strong enough to be the verification evidence.

Natural scientists will find difficulties to support this kind of idea. What I recently found is that, for many of them, a company description is no more than the company’s advertising.

According to Rudner, R.S.,

“To hold that the social sciences are methodologically distinct from the nonsocial sciences is to hold—the startling view that the social sciences require a different logic of inquiry. To hold such a view, moreover, is to deny that all of science is characterized by a common logic of justification in its acceptance or rejection of hypotheses or theories.” The above notion falls “within the area of philosophical interest called the context of validation, or the context of justification, in contrast to that area of empirical inquiry which is called the context of discovery.”

3. Management Theories and Intellectual Property

3.1. Incorporating Intellectual Property in Management Theories

I can find elements of IP in literatures that are classified into management of economic discipline at their early stage.

- 1) Management of economic discipline originally started with the industry structure analysis in the field of economics. Michael E. Porter's seminal strategy concepts of "positioning" "competitive advantage" (1985) are extensively used not only in corporate strategies but also in nations' strategies (Porter, M.E., 1990). It is said that we can find its origin in the industry analysis. Porter, M.E. (1985) did not necessarily include IP in his analysis. However, IP managers are familiar with the positioning concept, since they need to identify a good positioning for IP to be created. They also compare the positioning of IP already created with their competitors' IP, globally.
- 2) Transaction cost theory is derived from "theory of the firm" initiated by an economist, Coase, Ronald (1937). Coase, R. (1937) set a specific question on why organization was generated. According to him, people create organization and internalize goods when transaction costs become higher in the market transaction. Then, Williamson, O. (1975) developed "transaction cost theory" by proposing a concept of "opportunism." According to him, organizations internalize resources that are not traded in the market, that is, company proprietary asset. Since such assets are difficult to measure for the governance purposes, opportunistic behavior of related parties will involve in. Chandler's time series analysis on evolving processes of large American corporations, (Chandler, A. 1977) can be also re-

garded as in line with it.

Here, what I stress is that firm-specific know-how and very early stage IP are the typical IP organization should internalize.

Such organization specific IP determine the organization structure, that is, vertical integration including merger and acquisition, while companies can use IP external to their core by alliance. Companies can also spin-out new businesses that include novel IP external to their core.

Agency theory and incomplete contract theory, among others, were derived from this discipline as management theories. Finding links with IP in them is the future subject.

- 3) Wernerfelt, B. and Remelt, R.P. (1984) initiated resource based view that regards organization specific resources as competitive advantage of the organization. Penrose, E. (1954) can be an implicit origin of this school. In Penrose, E. (1954), she proposed that unused resources are a source of future organizational growth. She explicitly included IP in such resources. Teece et. al. (1997) also included IP in corporate resources explicitly, and proposed to configure external resources with firm-specific resources.

We can obtain implications from it that we can utilize university IP and combine them with organization specific resources in order to advance our capabilities.

Resource based view including dynamic capability view is helpful for firms to motivate managers to identify their firm-specific IP and utilize them in combination with internal and external resources. One the other hand, resource based view often generate misunderstandings. First, in terms of science, natural scientists, and even a part of social scientists, find it difficult to understand that they can acquire a repetitive feedback loop in the resource-based view. It is because evidences for verification are usually cases

that describe internal resources of firms. Second, although they describe internal resources of firms, a perspective that management scientists have for the verification is often quite different from perspectives that practitioners have. Misunderstandings generated in such manners make discussions never merge each other.

3.2. Policy Objectives and Management Theories

Management theories that are derived from industry analyses are extensively used in policy discussions (For example, Porter, M.E. 1990). So, I will here discuss other kinds of management theories of economic discipline.

In social sciences, we also need to discuss “objectives” and “prescription.”

In so-called deductive logic in the field of social sciences, we place a specific “objective” before “observations.” We induce a feedback loop to test whether results support the “objective.” In social sciences, the objective is a specific “policy” objective. For example, “stimulating innovation,” “promoting utilization of university IP” “fastening the process of technology transfer” are examples of policy objectives.

Here, an issue derived from it is whether or not we can discuss prescription in sciences.

In the past, it was regarded that discussing prescription was not science matters, or scientists must not discuss remarks such as whether we “should” increase productivity, or whether we “should” promote innovation. In these days, discussing prescription came to be accepted in social sciences.

For example, there is a prescriptive policy remark that “we should promote the path towards global patent system.” Examples include notions by Arai, Hisamitsu, former WIPO (World Intellectual Property Organization) Advisory Commission, among others (See, Arai, H. 1999). For this prescriptive policy remark, I can build the following hypothesis : internalizing transaction costs derived from market incompleteness

(national border) stimulate cross-border innovation efforts. In other words, a global patent system that internalizes transaction costs derived from market incompleteness helps facilitate cross-border joint R&D.

Currently, we can find that scientists conduct R&D jointly and simultaneously from different countries by using advanced information technology. For example, I observed in 2007 that nano-bio-IT scientists in Palo Alto and Europe observed cells through a high voltage microscope at Osaka University, that a scientist in Osaka operated it. We could see similar research arrangements prevailing in Palo Alto. What scientists confront with was the nation specific patent registration, identification of location of invention, as well as differences of rules. These difficulties generate burden upon scientists who involve in joint research projects. Based on the transaction cost theory, such burden refers to “transaction costs” on joint innovation efforts. Then, I can infer a hypothesis that such transaction costs on joint innovation efforts will be resolved when scientists could register their invention at a supra-national institution as a part of global patent system. It is because such supra-national institution has an effect to internalize national borders.

At present, we do not have exactly the same supra-national institution that can be observed directly. However, we can observe similar policy examples such as Patent Prosecution Highway. Then, we can accumulate evidences for verifications on the way to the global patent system.

4. Concluding Remark and Implications

In this preliminary research paper, I started with discussing distinctive differences of methodologies between those of social sciences and natural sciences. As intellectual property issues and policy-oriented issues force us to conduct interdisciplinary research, I found it critical at first to nurture mutual understand-

ings by identifying and discussing critical methodology differences.

Then, I argued how we can link intellectual property elements to existing management theories ; especially theories that derived from a question on “why organization emerges.”

Based on the above mentioned, I proposed opportunities for social scientists in the field of management theories to involve in policy-oriented issues. Here I used the prescriptive remark on global patent system as the example.

From my viewpoint, the supra-national system will contribute to internalize market incompleteness. It implies that such organization or system will resolve burdens on global research efforts and advance joint research. Setting hypothesis on concrete strategies and organizational/institutional forms will follow as a next step. Institutional devices such as Patent Prosecution Highway will be used for this purpose.

I find that fundamental research questions on why organization emerges (Coase, R. 1937) is still useful for intellectual property issues and policy issues currently exist. Questions that arise from organization and market have abundant opportunities for solving intellectual property, science business, and related policy issues.

NOTE

- 1 Opinions expressed in this paper are the author's personal and independent opinion.
- 2 The vertical integration process of currently large American corporations is explicitly mentioned in Chandler, A. (1977). On the other hand, IP managers may perceive their link to management in “marketing” and “finance.” Both needs evaluation of IP itself. Such evaluation requires in-depth science and technology and legal knowledge, and not necessarily relate to organizational management. So I do not discuss it here.

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