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研究成果の概要(和文)：イノベーションは競争を経て普及されるが、多くの研究が実際には競争せず普及されていることを仮定している。本研究は両者のギャップを埋めるべく、競争プロセスに着目した調査を行った。また、多くの研究が、イノベーションの普及時または普及後に焦点をあてているのに対し、本研究はイノベーション普及の前段階、いわゆる形成段階でのイノベーション普及メカニズムの分析を行った。その結果、採用者は矛盾の中、ヒューリスティックに左右されながらイノベーションを利用することを検討・決定していることがわかった。さらに、“イノベーション”を公に議論する際、制度や機関(特にメディア)の果たす役割を明らかにした。

研究成果の学術的意義や社会的意義

The project contributes to the literature by focusing on the influence of heuristics and showing how institutions shape views on innovations. The findings of this project provide implications that are essential for the establishment of strategies that aim to manage the diffusion of innovations.

研究成果の概要(英文)：Despite the evidence that innovations are highly contested, most studies have assumed that innovations are diffused uncritically. This project aims to fill this gap by examining innovation diffusion as a contested process. In addition, unlike most studies that have focused on the commercialization or postcommercialization of innovations, this study analyzes the mechanisms of innovation diffusion from the precommercialization phase when pressures toward adoption and rejection of innovations start to form. The findings of the project suggest that given the conflicting views on innovations, adopters are influenced by heuristics in evaluating or making a decision on whether or not they will adopt innovations. In addition, the project also demonstrates the role of institutions, particularly media, in shaping public discourse on innovations.

研究分野：Management

キーワード：innovation diffusion heuristics

1. 研究開始当初の背景

Businesses and governments have strong incentives towards innovation diffusion. Once innovations are diffused, businesses are able to generate opportunities to create greater value and returns from their investments in innovations. Likewise, governments are very keen in promoting the diffusion of innovations as it will lead to the emergence of new industries. For example, South Korea has adopted the concept of ubiquitous cities and built the New Songdo City, through a partnership with U.S.-based Gale International in order to support adoption of and stimulate further investments in information, communication, and technology (ICT) innovations. However, not all innovations are adopted or uncritically diffused (Greve, 2011; Kennedy and Davis, 2012). It is widely accepted that the rate of innovation diffusion varies across countries. Alcantara (2015) has shown that while the number of countries adopting biotech or genetically modified crops is increasing over the years, there are some countries that are fast to adopt while other countries are rather slow and reluctant to adopt. Moreover, the diffusion of innovations in a regulated industry largely depends on government organizations' decisions.

The notion that innovations are embedded within broader institutional contexts is the guiding principle of several studies on the mechanisms of innovation diffusion. Institutions embody the "rules of the game" (North, 1990, p.3), laws, norms, and conventions that dictate the adoption or non-adoption of innovations by individuals or organizations (Scott, 2001). Hence, the differences in institutional contexts drive the extent and speed at which innovations are diffused. Kshetri and Alcantara (2015) explained that while ICT and social infrastructures have developed in emerging countries, the strong preference for localness and concerns related to reduction in control are important barriers to the diffusion of cloud computing among SMEs in these countries.

Despite the evidence that innovations are highly contested, most prior diffusion studies have examined situations in which innovations are adopted uncritically. In one of the few exceptions, Fiss, Kennedy, and Davis (2012) examined the diffusion of the golden parachute, which is a controversial corporate governance practice, and showed how the practice was modified as it was diffused amidst intense debate among stakeholders. This study contributes to the literature by examining conditions in which innovations are diffused at the early stage when relevant stakeholders have conflicting views toward adoption.

2. 研究の目的

This project aimed to make theoretical and empirical contributions by filling the following three gaps in the literature: most innovation diffusion studies have (1) assumed that innovations are diffused uncritically, (2) paid little attention to the role of heuristics and biases faced by stakeholders as decision makers and institutions that affect decision making, and (3) overlooked the precommercialization stage of innovations. In order to do so, this study theorized innovation diffusion as a process of contestation, identified stakeholders' heuristics and biases, and incorporated institutional factors that influence the adoption of innovations at the different stages of diffusion, including precommercialization.

3. 研究の方法

While the project mainly focused on the contested diffusion of a controversial innovation such as biotech or genetically modified crops, the project also explored the heuristics associated with the diffusion of brands acquired by companies from emerging countries, e-commerce businesses in an emerging industry, and native bee keeping in a nascent industry. The following methodologies have been conducted for these studies.

(1) To complement the innovation diffusion literature, I reviewed the literatures on bounded rationality and heuristics. Several studies on individual decision making fit within the analytical framework of bounded rationality (Kahneman and Tversky, 1979). Cyert and March popularize it in the field of organization science with their classic book *A Behavioral Theory of the Firm* published in 1963. An underlying tenet of bounded rationality is that while organizations and individuals are goal oriented, they are limited by their capabilities to process information and confronted by the need and complexities of interacting with their environments in their pursuit of goals. Heuristics are generally cognitive shortcuts or rules of thumbs used "for arriving at satisfactory solutions with modest amounts of computation (Simon, 1990, p. 11)." Some of the studies reviewed for the project were by Greve (1998); Guler, Guillén, and Macpherson (2002); and Lodge and Wegrich (2016).

(2) In order to test the project's hypotheses on the role of stakeholders' heuristics and institutions on the diffusion of innovations, both quantitative and qualitative data were collected and analyzed. In the study of consumers' heuristics, data were collected through an experimental research in Vietnam that had implications for the diffusion of brands acquired by companies from an emerging country. In the study of rivals' heuristics and the role of media as a social institution, the context of U.S. firms in e-retailing, e-commerce, or online shopping markets that went public from 1995 to 2001 was used. The data were updated until 2011 and were mainly collected from the Form-10k in the U.S. Securities and Exchange Commission Edgar database. The online shopping markets were relatively new at the point of 1995. For the study of diffusing native bee keeping in a nascent industry, an exploratory case study of Milea Bee Farm in the Philippines based on a key informant interviews technique was used. Finally, to jointly examine the role of heuristics and institution in the contested process of innovations, multiple data on the biotech or genetically modified crops industry were collected. Some of the data sources were the International Service for the Acquisition of Agri-biotech Applications database, the Freedom House and The New York Times news archives between 1985 and 2017 from the Lexis-Nexis database.

4 . 研究成果

The outcomes of the project can be summarized as follows.

(1) Through the empirical studies on consumers and rival's heuristics, the project provided evidence that the use of heuristics or cognitive short-cuts in evaluating a brand or an organization is socially embedded. Specifically, I found out that the negative effect of country of origin heuristic on the perceived value of brands acquired by an emerging country is stronger when consumers perceive the brand as a symbol of their local tradition and culture. This study is now under the 2nd round of review for journal publication. In addition, my study on rivals' evaluation of new e-commerce firms, which has been accepted for publication in Long Range Planning, indicated that while incumbents use heuristics or cognitive short-cuts based on the proximity of new firms to their cognitive frameworks (i.e., prototypes) in evaluating their potential rivals, their evaluation of firms with new business models (i.e., innovation) in emerging market segments is also influenced by the media. The more newspaper articles are reported on emerging market segments, the more incumbents become familiar with emerging market segments. This tendency weakens the influence of cognitive short-cuts and at the same time suggests the strong influence of media in shaping individuals and organizations' collective understanding.

(2) The study on the diffusion of native bee keeping in a nascent industry in the Philippines contributed to the innovation literature by focusing on how entrepreneurs diffuse an innovation in an industry where institutions are underdeveloped—stakeholders are largely unaware of the innovation, value chain and customer base do not exist, and regulatory systems are not in place. The case of Milea Bee Farm demonstrated that the conflicting views on bee keeping helped in innovating a sustainable practice of native bee keeping and revealed the role of cooptation, i.e. competitive cooperation, in diffusing an innovation in a nascent market. The founders of Milea provided free training on beekeeping to indigenous people and other small, local farmers who also sell honey and to local entrepreneurs who currently run or plan to build a bee farm. In doing so, Milea was able to create a stable supply chain and build positive reputation among customers and other stakeholders.

(3) My empirical study on the diffusion of biotech or genetically modified crops across industries, which was presented and published in the Proceedings of ANZIBA Annual Conference demonstrated the joint effect of heuristics and institutions in diffusing biotech or genetically modified crops, which commercialization took off in 1996. The study theorized that governments just like other organizations make decisions under the conditions of bounded rationality and thus are influenced by heuristics. Nonetheless, the influence of heuristics on governments' decisions is contingent upon the institutional environment. By analyzing the first approval of GM crops cultivation across countries between 1990 and 2016, this paper finds that the governments' decision to approve the cultivation of GM crops is influenced by heuristics based on the decision of other governments with which they have greater trade, the gap between country performance and aspiration, and their prior decision on GM crops field trials. Further, the paper found that the effect of these heuristics weakens when the government operates in an institutional environment with a decentralized government and strong civil liberties and political rights. These findings suggest the importance of non-market strategies that can

influence stakeholders' awareness and understanding in diffusing highly contested innovations across countries.

As indicated by my aforementioned studies, media as social institution plays a crucial role in shaping public discourse and influencing the categorical emergence and evaluation of innovations. Accordingly, I investigated how newspaper articles talked about biotech or genetically modified organisms between 1990 and 2018, which covered the pre-commercialization stage (1990-1995) of biotech or genetically modified organisms. I first collected articles on the two leading players in the industry: Monsanto and DuPont published by The New York Times. About 68% of the collected news articles mentioned DuPont while 37% mentioned Monsanto. Nonetheless, when these news articles were filtered

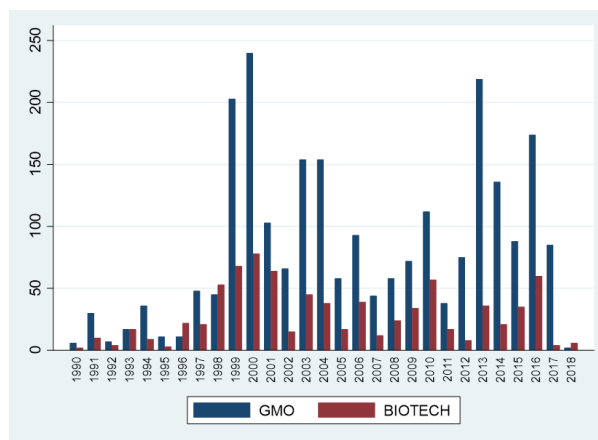


Figure 1. Frequencies of news articles, 1990-2018

using keywords related to biotech or genetically modified organisms, Monsanto was mentioned almost three times more than DuPont. In addition, the use of categories associated with genetic modification (e.g., “genetically modified food”, “genetically modified crops”, and “genetically engineered crops”) became more prevalent than categories associated with biotechnology (e.g., “biotech food”, “biotech crops”, and “bioengineered crops”) since 1999 (see Figure 1), which witnessed a spark in the number of articles published related to biotech or genetically modified crops. These findings suggest that news tend to focus on the dominant firm in public and social discourse and that media plays a significant role in constructing product categories.

5 . 主な発表論文等

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Society Annual Conference.

〔図書〕(計 件)

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〔その他〕
ホームページ等

6. 研究組織

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