

Report on Algorithms/AI and Competition Policy (Summary)

The Study Group on Competition Policy in Digital Markets

March 2021

the Study Group on Competition Policy in Digital Markets

- ✓ This report summarizes the result of discussion at the eight meetings held between July 2020 and March 2021 by the "Study Group on Competition Policy in Digital Markets."

Member List of the Study Group on Competition Policy in Digital Markets

Chairman	YANAGAWA Noriyuki	Professor, Graduate School of Economics, the University of Tokyo
Deputy Chairman	NAKAGAWA Hiroshi	Team Leader for AI Utilization in Society and Legal System Team, RIKEN Center for Advanced Intelligence Project
	ISHII Kaori	Professor, Faculty of Global Informatics, Chuo University
	OKINA Yuri	Chairperson of the Institute, Japan Research Institute
	KURODA Toshifumi	Associate Professor, Faculty of Economics, Tokyo Keizai University
	SAKIMURA Natsuhiko	Executive Partner, Tokyo Digital Ideas, Co., Ltd
	TANAKA Michiaki	Specially Appointed Professor, Graduate School of Business Administration Field of Study: Business Administration, Rikkyo University
	TSUCHIDA Kazuhiro	Professor, School of Law, Waseda University
	WAKUI Masako	Professor, Graduate School of Law, Kyoto University

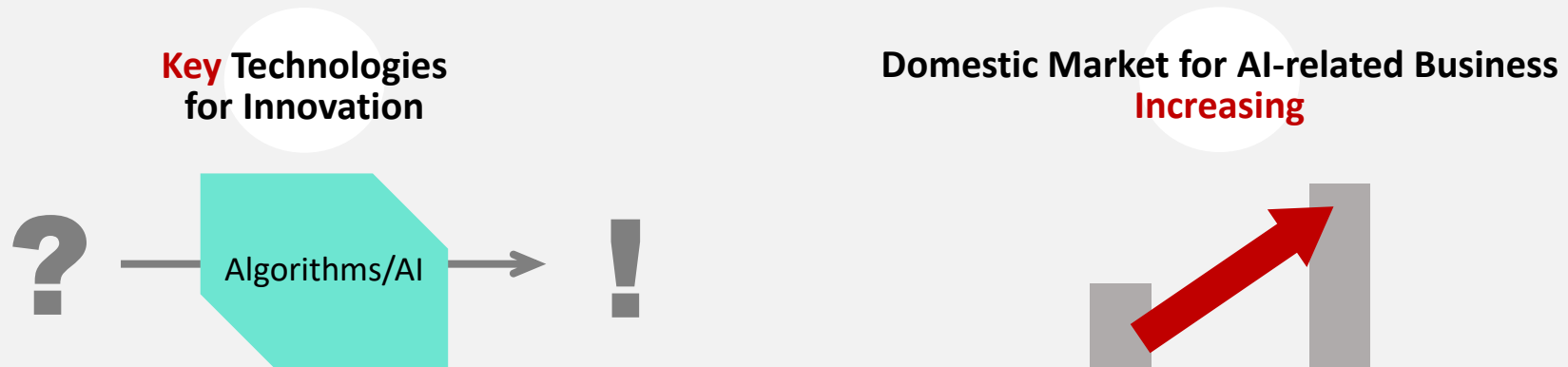
(As of 8 March, 2021)

Increased Importance of Algorithms/AI in Business

Algorithms/AI (Artificial Intelligence) are key technologies for innovation in digitalization. The domestic market for AI-related business has been increasing.

➔ In order to promote competition policy in digital markets,

it is important to understand the changes in business activities and in competitive environments brought by algorithms/AI.



Background for Discussion on Algorithms/AI

Algorithms/AI could streamline business activities and/or increase consumer convenience, which would bring significant benefit to the society.

➔ On the other hand, there have been foreign competition cases in which algorithms and AI were used for anti-competitive conducts. Also, many organizations, including foreign competition authorities and OECD, have focused on the topic to publish research papers and/or to hold a roundtable discussion.

Features of the Report

This report summarizes the result of the study group's comprehensive discussion on the challenges/issues regarding algorithms/AI and competition policy, and a report of this kind has not been produced or published in Japan before.

➔ Its main purpose is to inform the JFTC of the recent changes in competitive environments brought by algorithms/AI and to help the JFTC to properly address the risk to competition associated with algorithms/AI.

Definitions

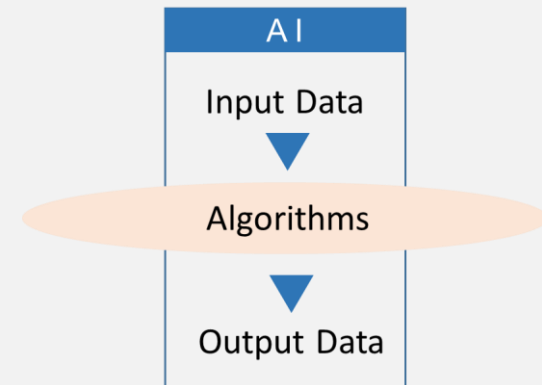
Algorithms

a sequence of computational steps that transform the input into the output

AI

any computer program which performs in the same manner as thinking process of human beings, or any information processing/technology, the performance of which human beings would consider intelligent.

Relation Between Algorithms/AI and Data



➔ The study group discussed issues regarding algorithms/AI which it considered could have important impact on competition at this time. e.g. ranking, personalization

- ✓ With the development of digitalization and e-commerce, more firms use algorithms to collect information about competitors' prices and/or to automatically set their prices for various purposes.
- ✓ Those algorithms could promote price competition among firms. On the other hand, there is a concern that they may lead to concerted price settings depending on how those algorithms are used.
- ✓ In algorithmic concerted practices scenarios, there are some cases where "communication of intention" between competitors are not evident.

Four scenarios of concerted practices by Algorithms/AI

1

Monitoring Algorithms

2

Parallel Algorithms

3

Signaling Algorithms

4

Self-Learning Algorithms



In general, the current Antimonopoly Act could properly deal with most of the algorithmic concerted practices cases.

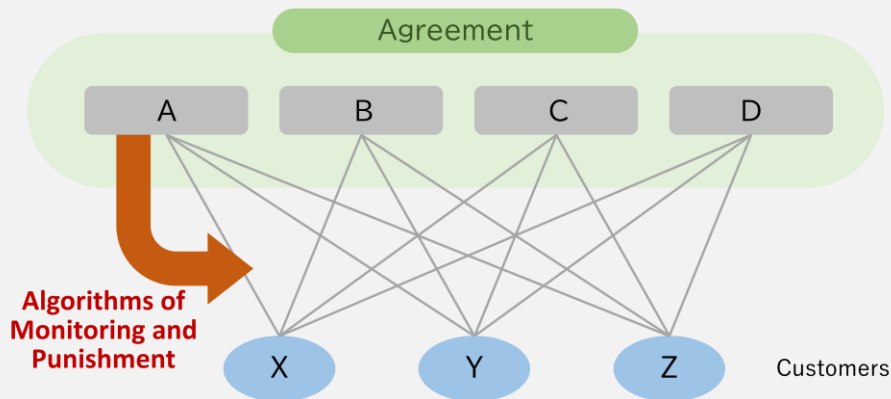
However, the JFTC needs to follow relevant technological developments and the way those new technologies are employed in businesses as well as relevant cases, with regard to concerted practices by self-learning algorithms.

Algorithms/AI and Concerted Practices

Part 2-1 (cont'd)

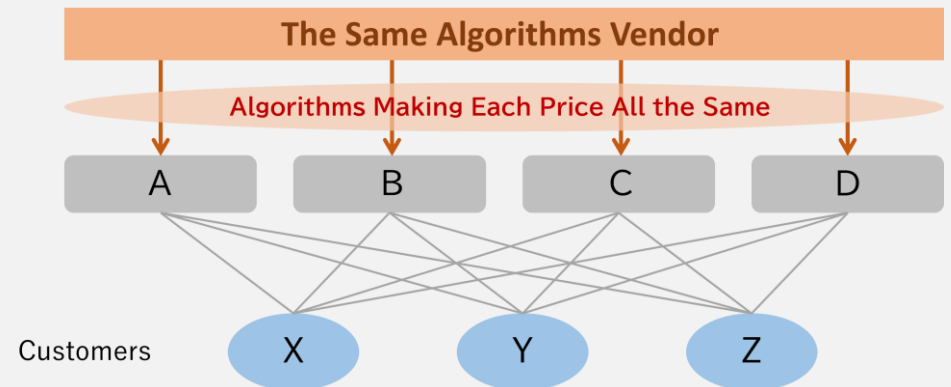
1

Monitoring Algorithms



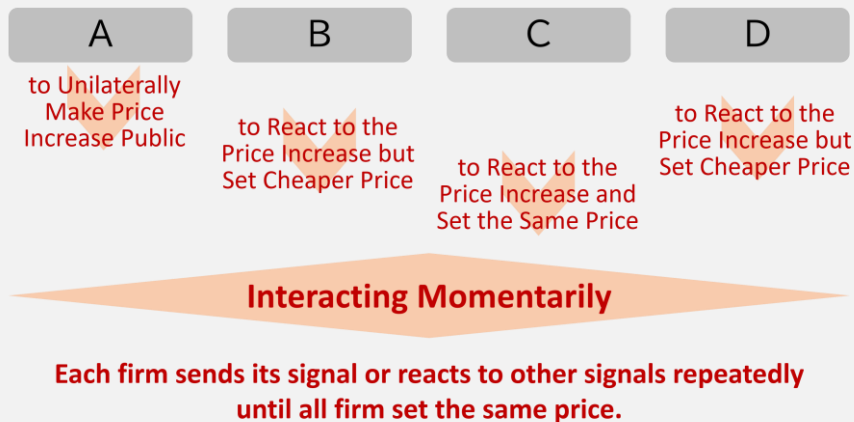
2

Parallel Algorithms (Hub-and-Spoke Arrangements)



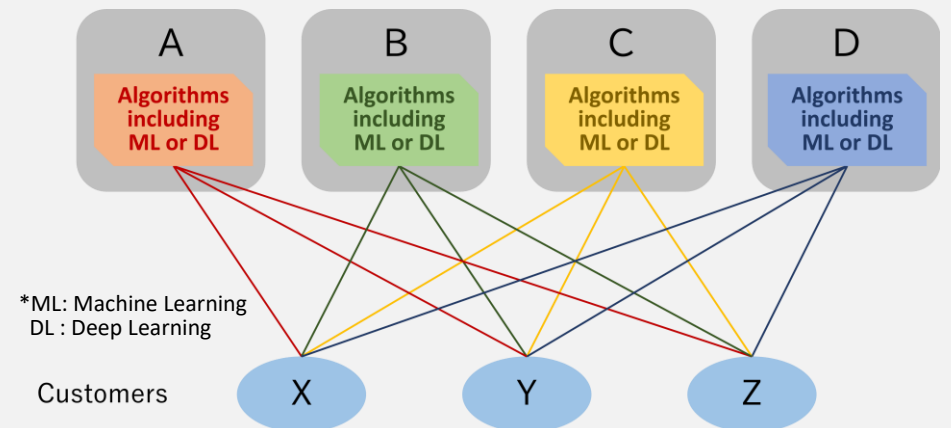
3

Signaling Algorithms



4

Self-Learning Algorithms



Ranking Manipulation

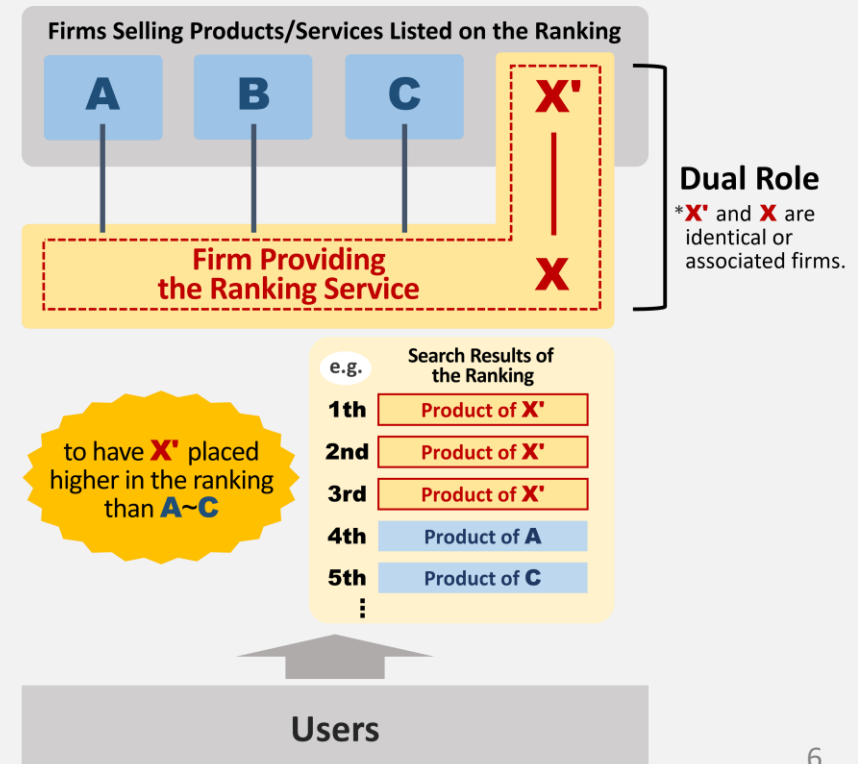
Part 2-2-1

- ✓ Many firms have provided various services using ranking. Those rankings are provided as a method to help consumers to efficiently choose products/services that fit the needs of each consumer.
- ✓ If a particular service using ranking is an important channel for sales in the market, it is crucial for business users of the service to have their products/services placed higher in the ranking, when it comes to competition.

Cases Where Competition Could Be Restrained Related to Ranking

e.g.

a case where an influential firm in a market interferes with transactions between its competitors and their customers by manipulating the order of the ranking it provides to have its own products/services placed higher in the ranking and so on.



Methods to Investigate the Performance of Algorithms

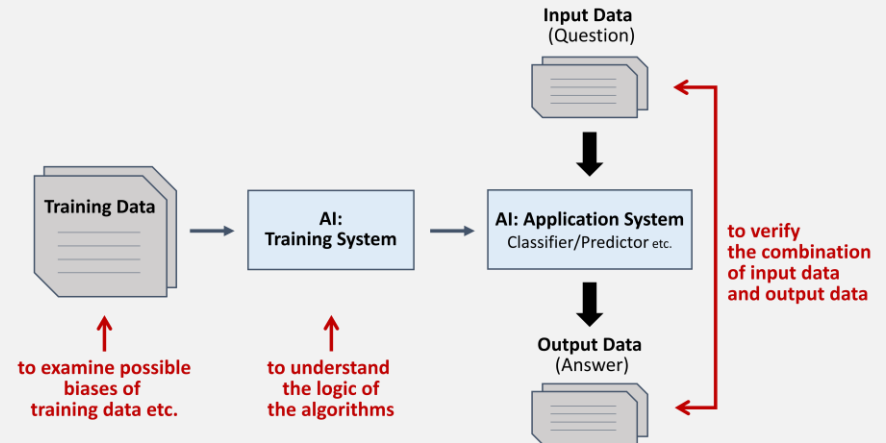
Those methods include

e.g.

To examine possible biases of training data

To understand the logic behind the algorithms from internal documents or source code

To verify a combination of input data and a corresponding output data



As it is often the case that firms operate their business across borders in digital markets, it is important for the JFTC to co-operate with foreign competition authorities in addressing the investigation of the performance of algorithms.

- The JFTC needs to strictly address anti-competitive conducts manipulating ranking algorithm.
- It is desirable that the JFTC develops relevant expertise by actively co-operating with external experts and by training its own employees, in order to build capability to prove anti-competitive conducts involving complex algorithms.


- ✓ With digitalization, firms are able to collect vast amount of consumer data and to analyze the data by algorithms/AI to carry out more precise personalization.
- ✓ Personalization can lead to consumer interest but be seen as **discriminatory treatment between consumers**.
- ✓ An example of business activities using personalization is "personalized pricing." It is considered that digital markets have features/conditions under which personalized pricing could be engaged in more easily.

When Personalized Pricing Could Be Problematic in Terms of Competition Policy

Personalized pricing is a way of price discrimination which differentiate prices based on the features of individual consumers, etc.

Price discrimination could expand output. Also, price discrimination is generally seen in the market. Therefore, prohibiting personalized pricing altogether is inappropriate.

It could be problematic under Antimonopoly Act when an influential firm in a market sets low prices only to customers of its competitors to exclude the competitors from the market.



In the future, the JFTC **needs to pay attention to changes in firms' pricing associated to the technological change relevant to personalization.**

Also, it is important for the JFTC to co-operate with the relevant authorities to address problems regarding personalized pricing, where necessary.

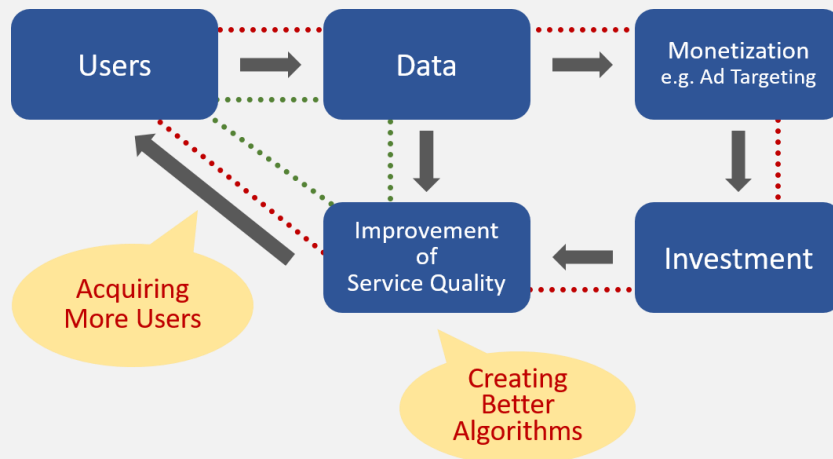
Competitiveness and Algorithms/AI

Part 2-3

- ✓ Discuss the factors which could contribute to the competitiveness of algorithms/AI, in terms of data and AI technology stack.

1 Data

An Example of Competitiveness Stemming from Data
(e.g. Data-Driven Network Effect)

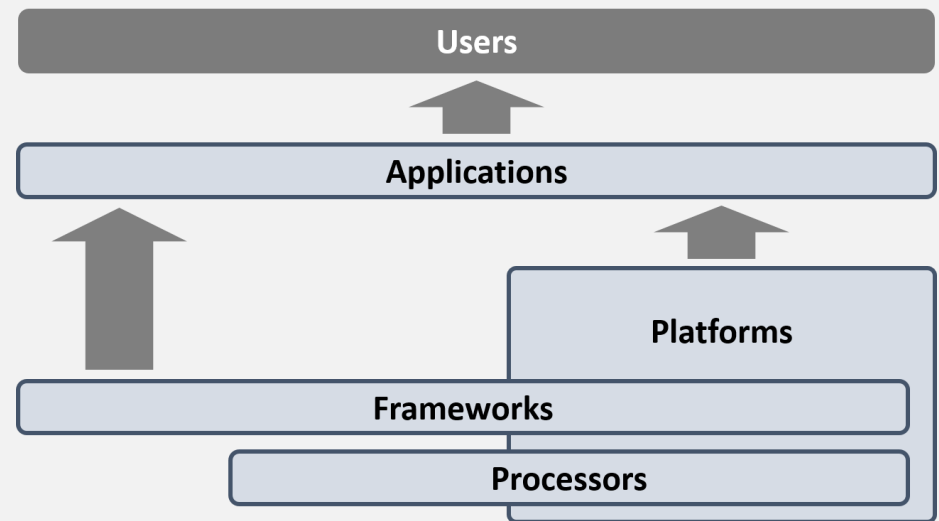


Source: OECD(2016) "Big data: Bringing competition policy to the digital era" p. 10 Figure 1. (Revised by JFTC)

As data could increase the quality of algorithms/AI, there can be a cycle in competition utilizing algorithm/AI that a firm with a certain number of users can acquire more customers.

The JFTC needs to pay attention to anti-competitive conducts on the background of the feature.

2 AI Technology Stack



Source : Ministry of Internal Affairs and Communications "White Paper 2019: Information and Communications in Japan" (in Japanese) p. 87 (Revised by JFTC)

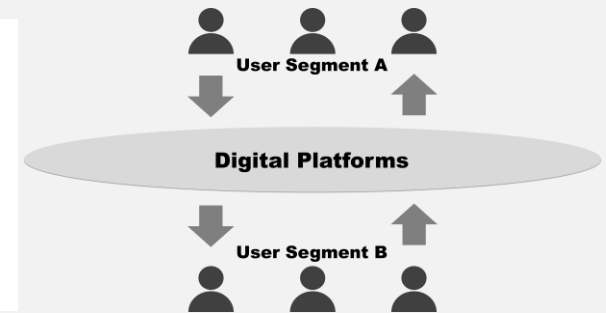
The technology base of AI applications is a multi-layered system. The JFTC needs to pay attention to market trends regarding the AI technology stack, which could have impact on the competitiveness of AI.

For example, it would be important for the JFTC to have cross-layer perspectives when it looks at relevant markets: e.g. an influential firm in a market of one technology layer may leverage its position in the market to distort competition in another market of a different technology layer.

Issues Regarding Algorithms/AI and Digital Platforms

Part 2-4

- ✓ Based on the discussion above, the chapter (part 2-4) discusses the issues regarding algorithms/AI which theoretically relate to digital platforms.
- ✓ Digital platforms have a structure which is prone to have some issues discussed above become apparent, due to the characteristics such as 1) multi-sided market and network effect, 2) low marginal cost and economy of scale.



1 Ranking Manipulation

When a digital platform operator obtains a monopolistic or oligopolistic position due to network effect etc., its service using ranking is an important channel for sales for business users to get access to their customers and the ranking can have large influence on competition between business users etc. → conducts such as self-preferencing are the one's concerned about.

2 Personalization

A digital platform operator is able to collect a large amount of data which is important for competition due to its structure. It is possible that algorithm/AI enables a digital platform operator to effectively identify customers of its competitors etc. and set low prices only to the competitors' customers etc. to effectively exclude its competitors from the market.

3 Concerted Practices by Algorithms/AI

As a digital platform operator tends to be oligopolized due to network effect and economy of scale etc., the JFTC needs to pay attention to hub-and-spoke type of concerted practices

4 Competitiveness stemming from accumulation of data etc.

When data-driven network effect etc. works, it is important for firms to have a certain scale and/or a certain number of users when it comes to competition. Therefore, the JFTC needs to pay attention to conducts which unjustly prevent competitors for acquiring the necessary scale.

- ✓ The study group expects that this report will lead to more discussion regarding algorithm/AI and competition policy among domestic and foreign relevant agencies and experts on digital matters etc.
- ✓ Based on the report, the study group expects that the JFTC actively addresses problems associated with algorithm/AI regarding the Antimonopoly Act and competition policy.

For example, it is desirable that the JFTC conducts the following actions:

e.g.

- ✓ To develop and accumulate expertise in algorithm/AI by actively co-operating with external experts and by training its own employees.
- ✓ To continuously participate in international discussion on the topic and to actively co-operate with foreign competition authorities.