

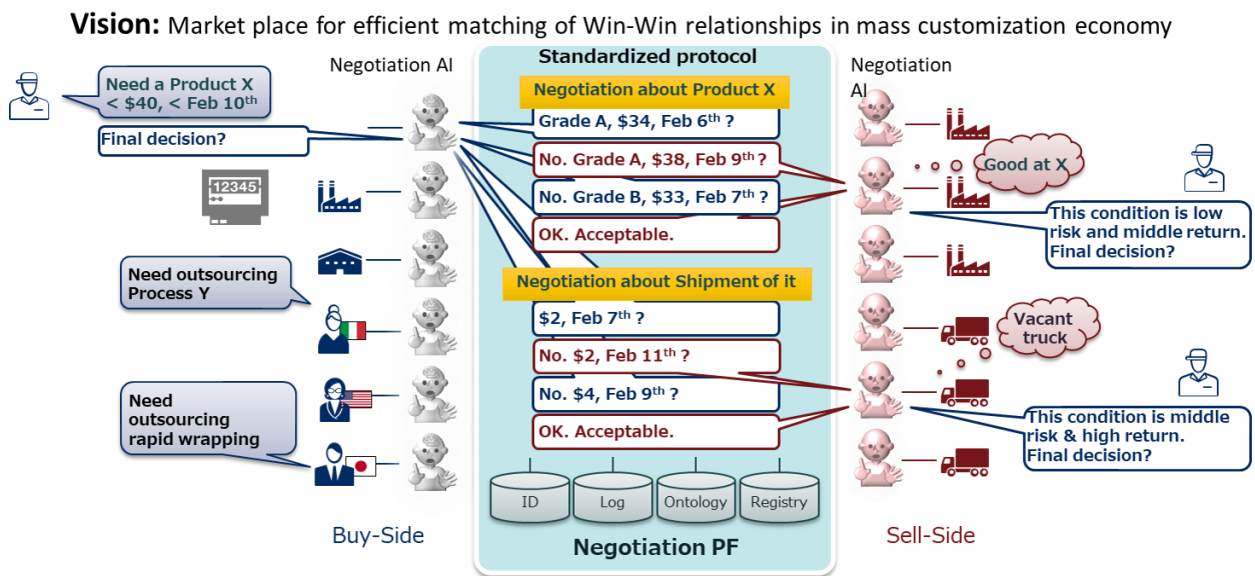
Adoption of “Inter-AI cooperative fundamental technology” in NEDO business  
-Improving operational efficiency in manufacturing and physical distribution sites  
through negotiations using AI-

Tokyo, January 21, 2019 - NEC Corporation(NEC; TSE: 6701), Oki Electric Industry Co., Ltd.(OKI; TSE: 6703), Tokyo University of Agriculture and Technology (R&D manager: Associate Professor Katsuhide Fujita for the Institute of Engineering at Tokyo University of Agriculture and Technology), Toyota Tsusho Corporation(Toyota Tsusho ; TSE : 8015), and the University of Tokyo (R&D manager: Associate Professor Koji Tsumura for the Graduate School of Information Science and Technology at the University of Tokyo), in collaboration with Professor Hiroko Kudo for the Faculty of Law at Chuo University, Professor Kiyoshi Izumi for the School of Engineering at the University of Tokyo, Associate Professor Takanobu Otsuka for the Graduate School of Engineering at Nagoya Institute of Technology, and the National Institute of Advanced Industrial Science and Technology, were adopted for the public offering business run by the New Energy and Industrial Technology Development Organization (NEDO) regarding “inter-AI cooperative fundamental technology,” the R&D item for the “2nd period of Cross-ministerial Strategic Innovation Promotion Program (SIP)/Cyberspace fundamental technology utilizing big data and AI.” We will work on R&D under the theme of “Improvement of efficiency and flexibility of value chain through inter-AI cooperation.”

As the utilization of AI progresses in a variety of fields in society, the adjustment of interest that cannot be undertaken by a system is required. However, the use of inter-AI cooperative technology enables the creation of significant value. For example, each company that operates a manufacturing system or a physical distribution system on a value chain has AI as an agent. Through the coordination and cooperation of each company’s AI, it becomes possible to immediately find a transaction partner and transaction conditions that are advantageous for both the ordering party and the order receiving party. This enables the efficiency and flexibility of inter-company transactions throughout society to be improved while increasing the profits for each company.

In this R&D, it is assumed that AI searches for candidate partner companies from hundreds or thousands of companies through a negotiation platform and also searches for price and delivery deadlines that are agreeable for both the ordering party and the

order receiving party. The search for transaction conditions is implemented through negotiations, that is, the mutual presentation of transaction conditions and the answering of acceptability using standardized protocols\*, data format, and vocabulary definition. If conditions that are agreeable to both sides are found, the final judgment of whether to conclude an agreement is left to human users. The finalized agreement is implemented at a manufacturing site or a physical distribution site.

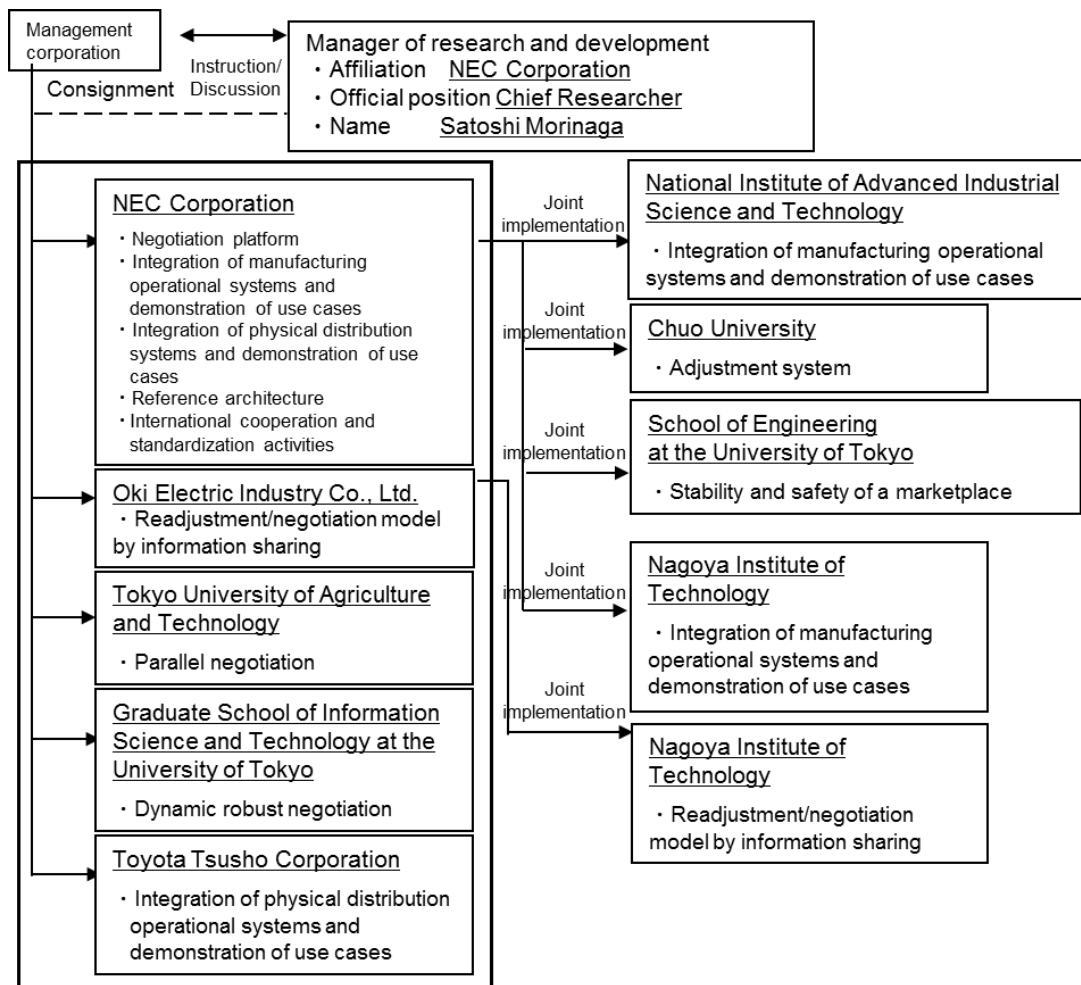


This R&D develops a principle, foundation, and system necessary for implementing inter-AI cooperation in society, integration technology with an operational system, a variety of protocols, and reference architecture (typical system configuration). Further, the targeting and refinement of use cases are implemented through the participation of companies and groups other than the proponents as an advisor. We will work on international standardization and the establishment of a marketplace to encourage the dissemination of the results of the R&D.

NEC, OKI, Tokyo University of Agriculture and Technology, Toyota Tsusho, and the Graduate School of Information Science and Technology at the University of Tokyo will work jointly on this R&D from FY2018 to FY2022. With this R&D, we will aim to improve the efficiency and flexibility of a value chain through inter-AI cooperation and increase the industrial competitiveness of Japan.

[Outline of roll allocation for each organization]

- NEC: Overall control, development of a negotiation platform, and implementation of overall behavior in manufacturing and physical distribution use cases
  - National Institute of Advanced Industrial Science and Technology: Modelization and design of manufacturing use cases in companies on the order receiving side and the presentation of the best form of a next-generation manufacturing information system
  - Chuo University: R&D of business, social, and legal rules for the implementation of inter-AI negotiation in society
  - Professor Kiyoshi Izumi for the School of Engineering at the University of Tokyo: R&D of the detection and control technology of malicious intentions and abnormalities to improve the stability and safety of the inter-AI negotiation table
  - Nagoya Institute of Technology: Implementation of a series of behaviors in companies on the order receiving side for manufacturing use cases
- OKI: Development of readjustment and negotiation use cases for a plan by information sharing in physical distribution and the implementation of overall behavior
  - Nagoya Institute of Technology: Adjustment of a cross-sectional optimum plan and the development of negotiation technology in the above use cases
- Tokyo University of Agriculture and Technology: R&D of parallel negotiation technology for a value chain
- Associate Professor Koji Tsumura for the Graduate School of Information Science and Technology at the University of Tokyo: Development of a dynamic and robust automatic negotiation mechanism from the viewpoint of control theory
- Toyota Tsusho: Extraction of challenges in physical distribution, design of use cases, and demonstration experiment of physical distribution use cases



\*Protocols: Procedures and terms for communication between computers

\*The company names and product names described in this press release are generally the trademark or registered trademark of each company.