

# Science & Technology Research Funding and Output Management (JSTにおける研究成果マネジメントの現状)

*Data as an evidence of research output  
(funder's perspective)*

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# Talk outline

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1. R&D evaluation in Japan
2. R&D evaluation in JST funding programs
3. Topic : FMDB (management and analysis of funding data for “data-driven management”)

# 1. R&D evaluation in Japan

## Guideline documents related to R&D evaluation

### ① “General Guideline for Research and Development Evaluation”

「国の研究開発評価に関する大綱的指針」 (**Cabinet Office**)

- Guidelines under which ministries formulate their own guidelines

### ② “Guideline for Research and Development Evaluation of MEXT”

「文部科学省における研究及び開発に関する評価指針」 (**MEXT**)

- Guidelines for evaluations of **all programs/projects under MEXT budget**

### ③ “Guideline for design and evaluation of mid- to long-term target of National Research and Development Agencies”

「研究開発成果の最大化に向けた国立研究開発法人の中長期目標の策定及び評価に関する指標」(**CSTI**)

- Issued for newly established category of Independent Administration Agency

# “Data” as an evidence in evaluation

- Data in evaluation : in what context?
- “.... When conducting mid-term and ex-post evaluation of research project, it is necessary to set variety of viewpoints such as validity of research process, secondary effect, outreach activity, development of research foundation or contribution to talent fostering, in addition to evaluating attainability to research target.”  
....

(excerpts from Section 3.2.1.5.6 of MEXT guideline)

# But..... (lessons learned)

- “..... Use of quantitative information such as paper citation index or number of patents filed, is valuable in order to ensure the objectivity(客観性) of evaluation. However the utilization of quantitative metrics needs care, because an excessive use of quantitative metrics may lead to misguided evaluation and eventually undesired influence to research activity..... In particular it should be noted that impact factor is not necessarily a measure of paper quality, and that it is essential to pay enough attention when it is referred in evaluation....”

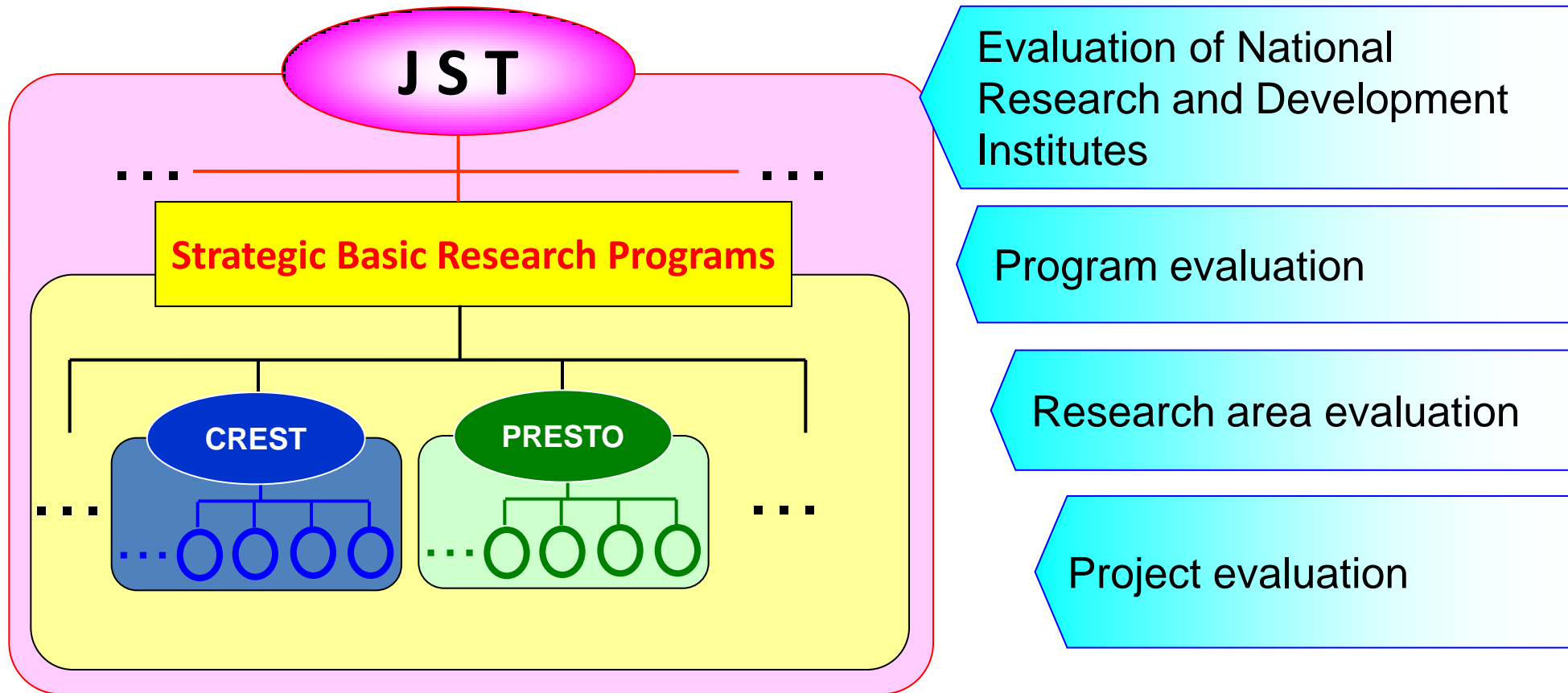
(excerpts from Section 3.2.1.5.6 of MEXT guideline)

# Implications

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- Research data can/should be treated as an “evidence” to show output/outcomes/impacts of research.
- In case of journal papers, indicators such as “n. papers” may be used as an indicator of activity (output), “n. highly-cited papers” as quality (outcome/impact).
- When “data” is used as an indicator in R&D evaluation, a metric (number of datasets issued, frequency of citation, etc.) and meaning (quality of data, impact to community/society) needs to be defined.
- Possible “negative effect” should also be considered.

## 2. R&D evaluation in JST funding programs

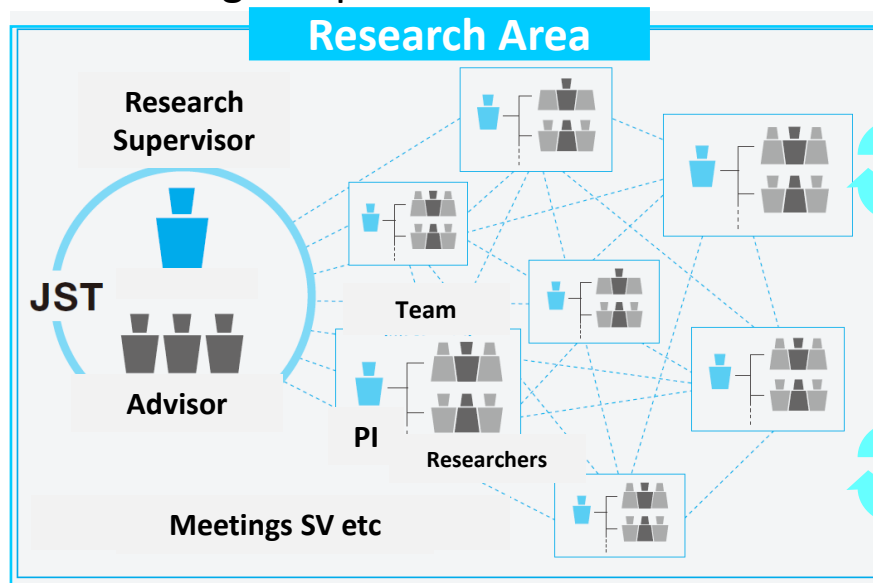


# CREST/PRESTO program

## Strategic Objectives by MEXT

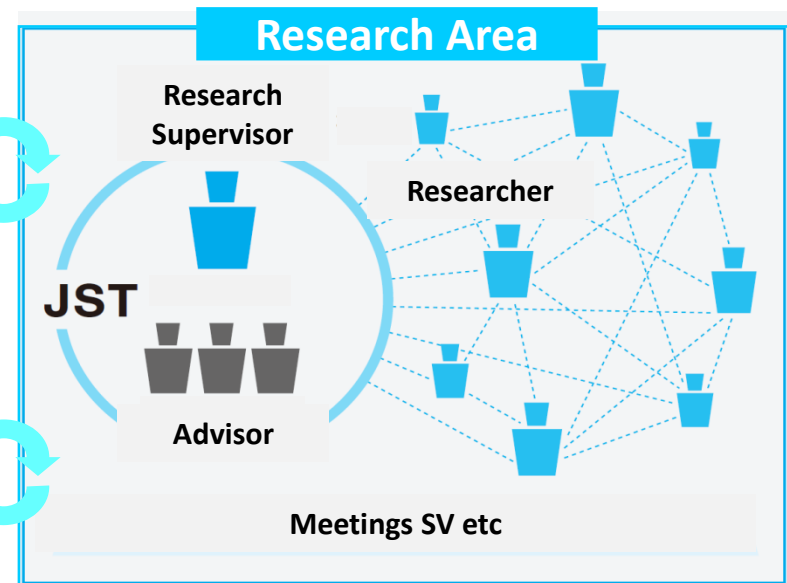
### CREST Team Oriented

Pursuing Team-Oriented Research that Strives to Generate High-Impact Seeds of Innovation.



### PRESTO Individual Basis

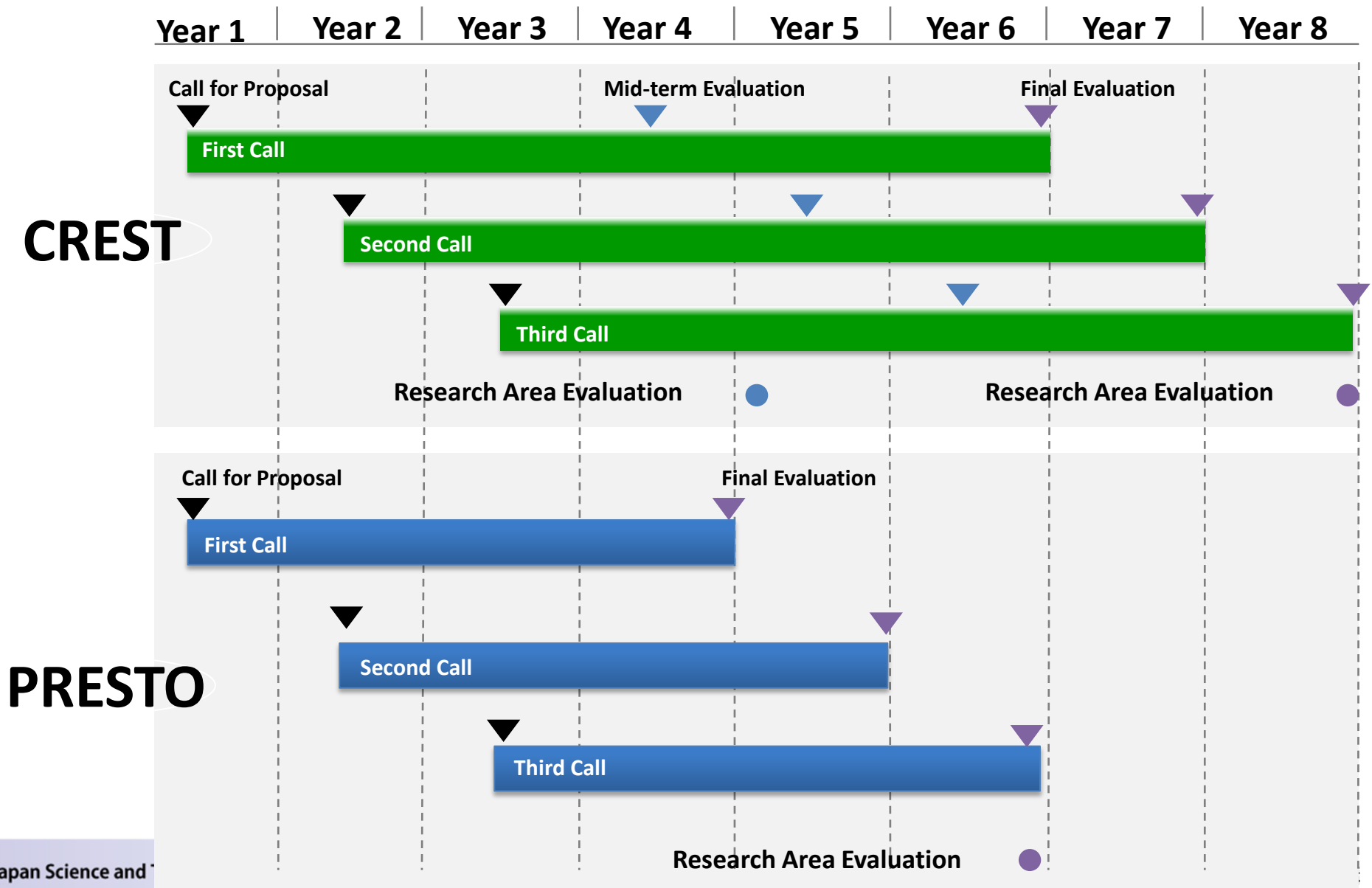
Promoting Individual Research to Nurture the Seeds of Future Innovation.



Research Type	Budget per year	Total Budget	Research Period
CREST	¥30 - 100 Million /yr	¥150 - 500 Million	~ 5.5 years
PRESTO	¥10 Million /yr	¥30 - 40 Million	~ 3.5 years



# CREST/PRESTO program



# Evidence collected from progress report

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- Journal papers
- Conference proceedings/presentations
- Patents
- Awards, press coverage, other public relations
- Scope for realization
  - Licensing, collaboration with industries, startup company
  - Public funding
  - Policy papers
- Other output

# Evaluation criteria (CREST ex-post)

## (1) Research output/outcomes

- Attainability to research target / unexpected developments and results / publication status (papers, oral presentations, patents)

## (2) Contribution to Strategic Target, society, economy and science and technology.

- Academic impact and qualitative superiority to competing research / contribution to Strategic Target and social impact / economic impact such as a possibility to create new industry / expectation for continuation of research

## (3) Research management

- Leadership of the Principal Investigator / adequacy and efficiency of budget execution / development of research networks

## (3) Others

- Career-path development of young members / outreach activity

# How is “publication performance” considered in evaluation ?

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- CREST/PRESTO program is a “target oriented” where social and industrial impact is expected.
- Publications are considered a measure of academic impact, which is also an important criteria.
- Its interpretation is “larger number of citation means higher impact to academic community.”
- There sometimes are negative reaction from review panel; “paper citation is not always an indicative of good result or higher impact, since too much weight on paper writing sometimes leads to neglecting research.”

# Implications

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- When “data citation” is used as an evidence, a logic that connects observed quantity (e.g., number of citation) and research output/impact has to be established.
- In analogy with paper citation, a negative-effect should be considered.

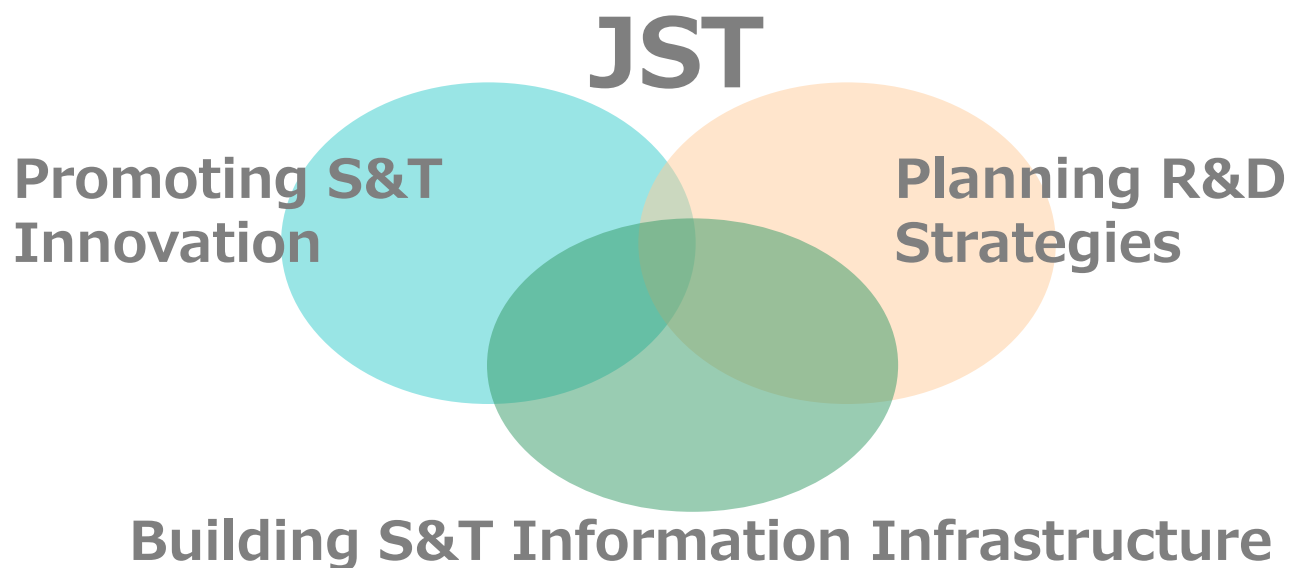
### 3. Topic : FMDB

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- FMDB (Funding Management Database) is a database of funding data such as award status, project details (members, budget, etc.), document archives (progress report, evaluation report), etc.

# Concept of FMDB

- FMDB is developed taking advantage of three dimensions of JST; planning R&D strategies, promoting S&T innovation and building S&T information infrastructure.
- FMDB storages and utilizes the internal expertise to maximize effect and efficiency of JST funding for creating S&T innovation.



# Aims of FMDB

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- **Creation of innovation by maximizing the effect of JST funding**
  - To combine social values and research activities (for JST, for Japan)
  - To visualize research outputs and outcomes through the approach toward industry.  
(International collaboration, academic-industry collaboration, evaluation portfolio)
  - To differentiate from other funds and to develop branding JST funding programs
- **Continuous utilization of know-how on R&D management as a “Virtual Network Research Institute”**
  - To organize knowledge base to improve and evolve JST funding programs
  - To plan a reform of funding programs based on stored knowledge
  - Sustainable accumulation and utilization of success and failure stories
  - To Support program management for POs and JST staffs and to foresight the future research trends.
- **Transparency and Accountability (for public)**
  - Outreach of research activities and research results.



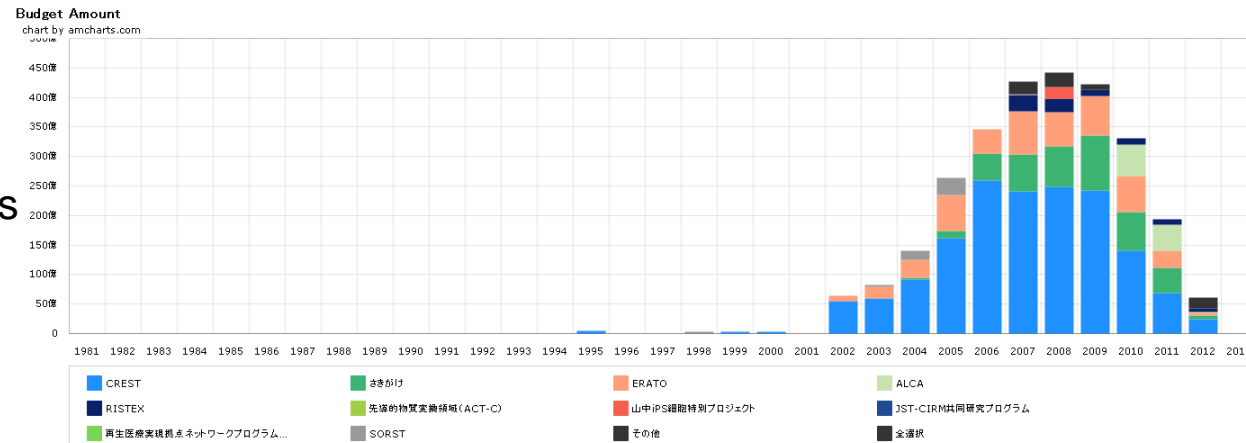
# Example

- Overview of the JST Strategic Basic Research

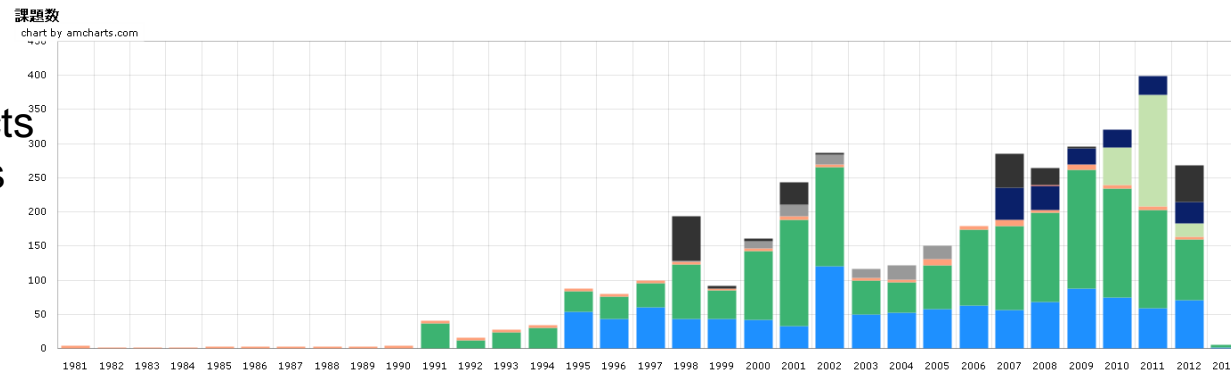
> [FIMDB beta version](#) > [Research Program Map](#) > 戦略的な研究開発の推進 > 戦略的創造研究推進事業

- Show the situation of each program. -> [Show the research list](#)

Budget Amount  
of each Programs

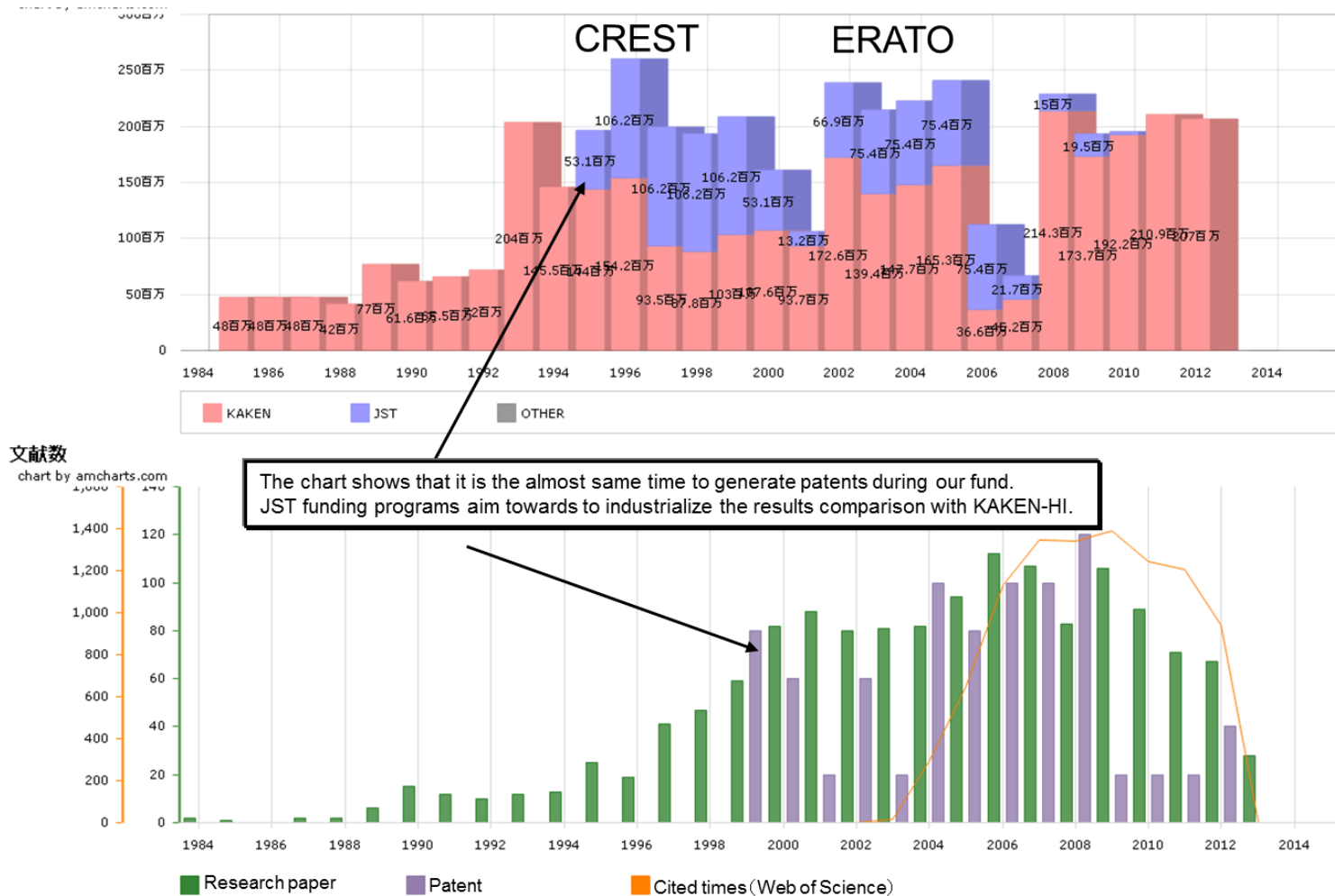


Number of Projects  
of each Programs



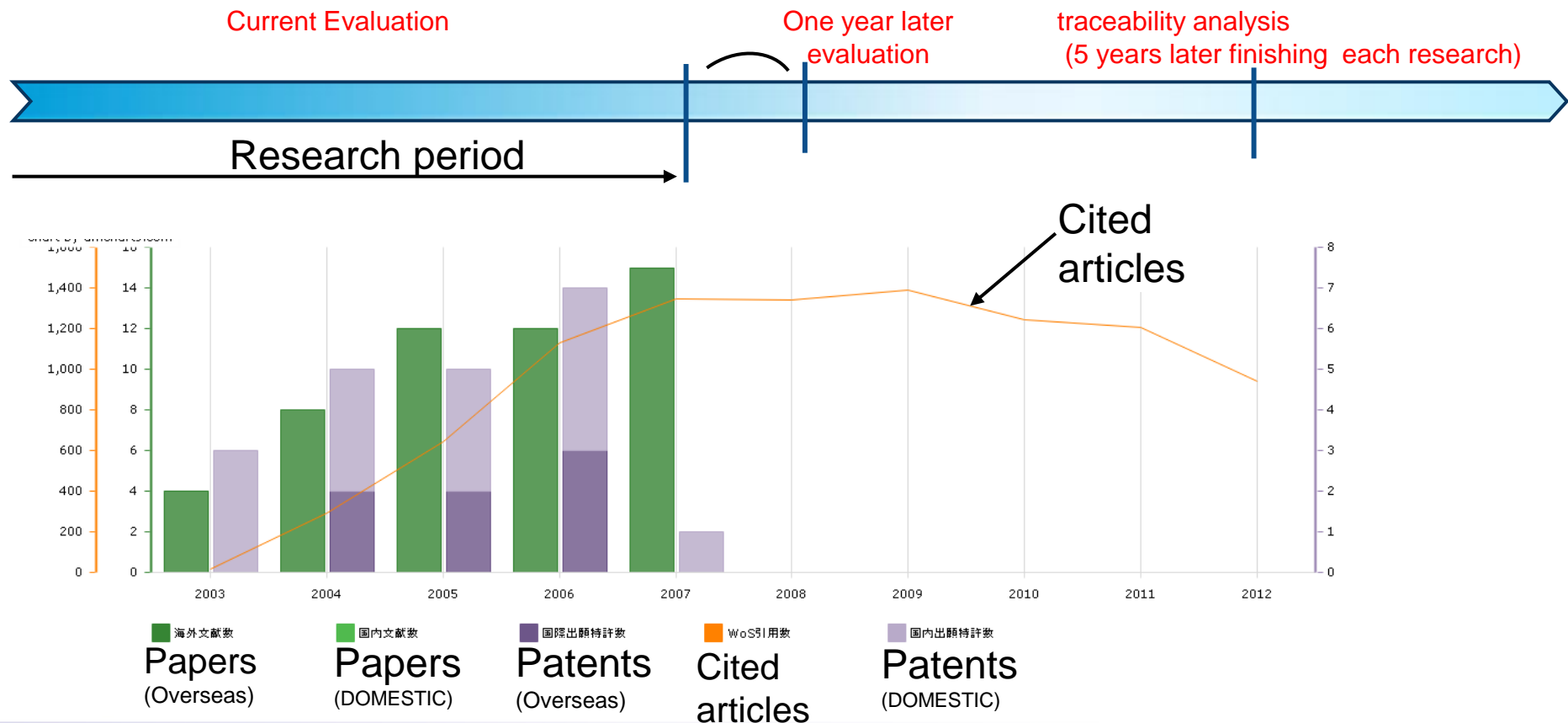
# Example

- Detailed information of the researchers (per each researcher )



# Example

- To manage each research efficiently and to visualize their progress and outputs/outcomes (per each researcher)



# Summary

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- Possible use of research data as an evidence in R&D evaluation is discussed by referring to guidelines from administrative body.
- The treatment of paper citation in project evaluation of JST's Strategic Basic Research Programs is shown, to give an idea of how data citation is treated in evaluation.
- As a recent topic of R&D management in JST, a system overview of FMDB is presented, as well as its use case.

# Topics NOT presented today

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- Management of data produced by funded project, by scientist, by funding agency, by research institutes....
- Approach to “data-driven science”
- Data repository and data journal from funding agency’s perspective.