

Plenary Session 1 :



The Management of the Moonshot and new Policy-making in STI

Dec. 17, 2019

UEYAMA, Takahiro

Executive Member of Council for Science, Technology and
Innovation (CSTI), Cabinet office, Japan

0: CSTI Background

I. THE MOONSHOT: A NEW MISSION-ORIENTED R&D PROGRAM AND CSTI

II. INOVATIVE MANAGEMENT OF MOONSHOT R&D PROGRAM

III. CONTENTS OF MANAGEMENT SYSTEM: ITS DESIGN AND EVALUATION METHODS

IV. ADVANCED RESEARCH DATA MANAGEMENT

O: CSTI Background

The Council for Science, Technology and Innovation (CSTI) is the leading governmental organization for STI policies in Japan.

Science and Technology Basic Plans:

1st Basic Plan(1996-2000), 2nd Basic Plan(2001-05), 3rd Basic Plan(2006-10), 4th Basic Plan(2011-15)

5 th Basic Plan (2016-20)	<ul style="list-style-type: none"> • Aim to transform Japan into “the most innovation-friendly nation” • Propose a concept of “Society 5.0” that realizes a “Super Smart Society” • Combine public and private sector R&D investment of at least 4% of GDP; government R&D investment of at least 1% of GDP
---	--

- Declares as its mission transforming Japan into “the most innovation-friendly nation in the world
- “mission-oriented” and “High-Risk High-Impact” research and development such as FIRST and ImPACT as you see in the next section.



The Moonshot Program will be one of the most important symbolic policy. Developing the Moonshot to experiment as a canvas for new STI policies, the CSTI will lead the intellectual challenge of creating a global model of STI policy to nurture “Disruptive Innovation” through government funding.

The Japanese government's new emblematic R&D enterprise that the CSTI designates to organize Japan's state-of-the-art scientific and engineering technologies into more disruptive techno-social innovations.

Serious Problems:

The world is faced with big transformations such as global warming and environmental disruption that are commonly understood but difficult to reach an agreement about the solution

Such as ... *Expanding population and future scarcity of food that are seemingly not urgent but will seriously damage the wealth of the world; shrinking the boundary between human and non-human that has been accelerated by the advancement of AI technology; declining birthrate and aging society that are prevalent in most of the leading countries but no other country than Japan has experienced at the similar level of gravity; and so forth.*

II. INOVATIVE MANAGEMENT OF MOONSHOT R&D PROGRAM

(1)The Policy Dilemmas for Mission-oriented Research and Development

How best might the public money promote such mission-oriented programs including disruptive and risk-taking innovations?

Policy dilemmas in planning the Moonshot R&D Program

The challenge, the “dilemma” for disruptive innovation is that current governmental research funding, which maintains accountability to tax payers, prefers to support stable research and development (R & D) that is expected to be 100% successful. Our challenge is to resolve this contradiction, **to find ways to fund potentially risky but potentially high-reward disruptive innovation, through prudent policy management.**

One way to promote seemingly contradictory “government-funded disruptive innovation” is to re-frame the innovation challenge, to see it not as an “uncertainty” but as a “portfolio risk,” which would permit the government, like private companies, to make strategic, risk hedging decisions. How do we solve the contradiction between challenges to a Moonshot Goal that include one great success over many failures, and support of government-funded R&D that expects to be 100% stably successful?

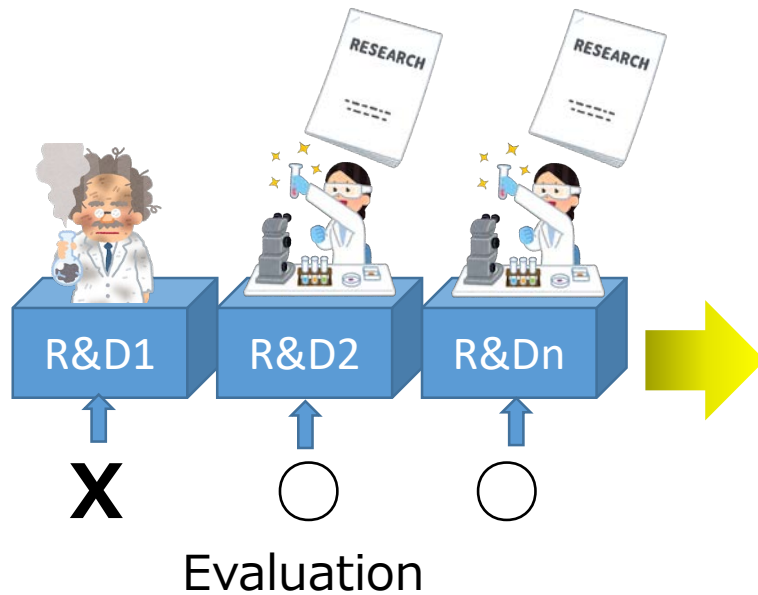
Innovative management systems of research and development is required.

III. CONTENTS OF MANAGEMENT SYSTEM: ITS DESIGN AND EVALUATION METHODS

Innovative Evaluation System:

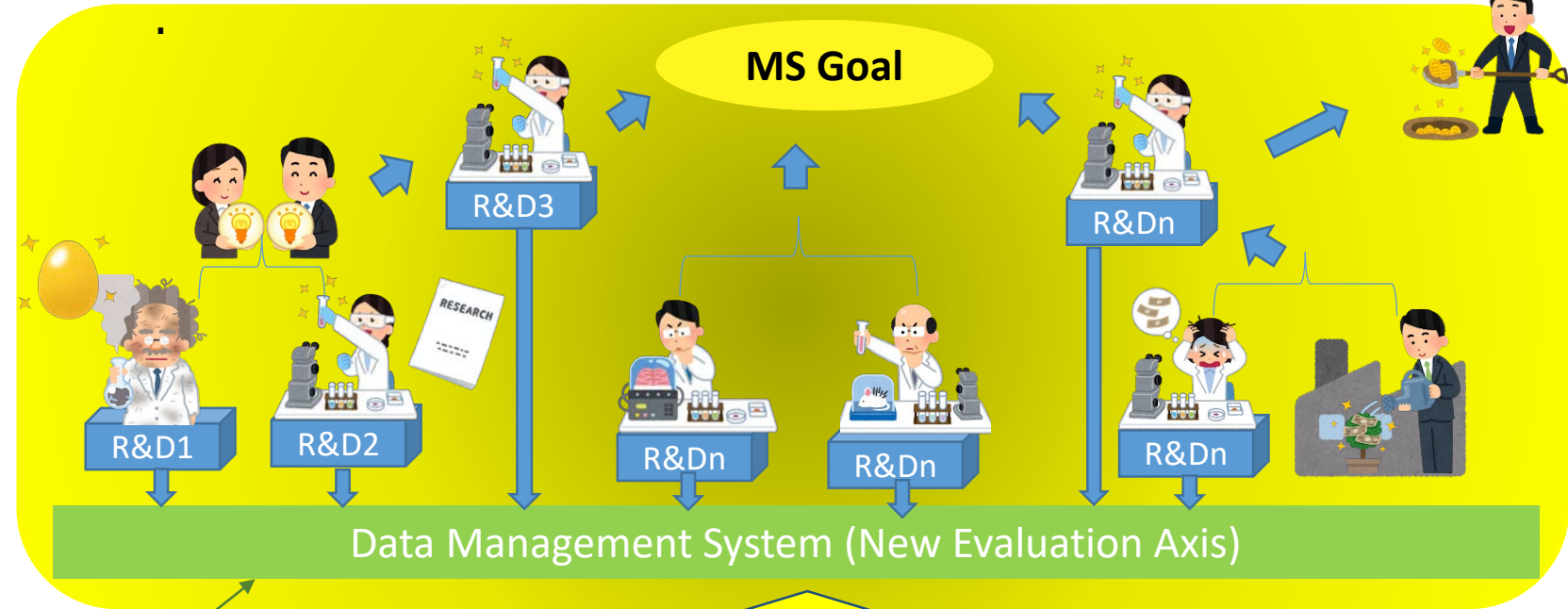
- Evaluate each approach only in the context of the overall process for the Moonshot Goal. This makes it possible to overcome failure as an experience and instead use it as a seed for new challenges. Therefore, we must first of all develop an overall scenario and an overarching goal. Create new evaluation standards to provide different values for each package. This would include an Advanced Data Sharing and Data Management system

“Mono” Evaluation System



MS Evaluation

“overall scenario and process to overarching goal”

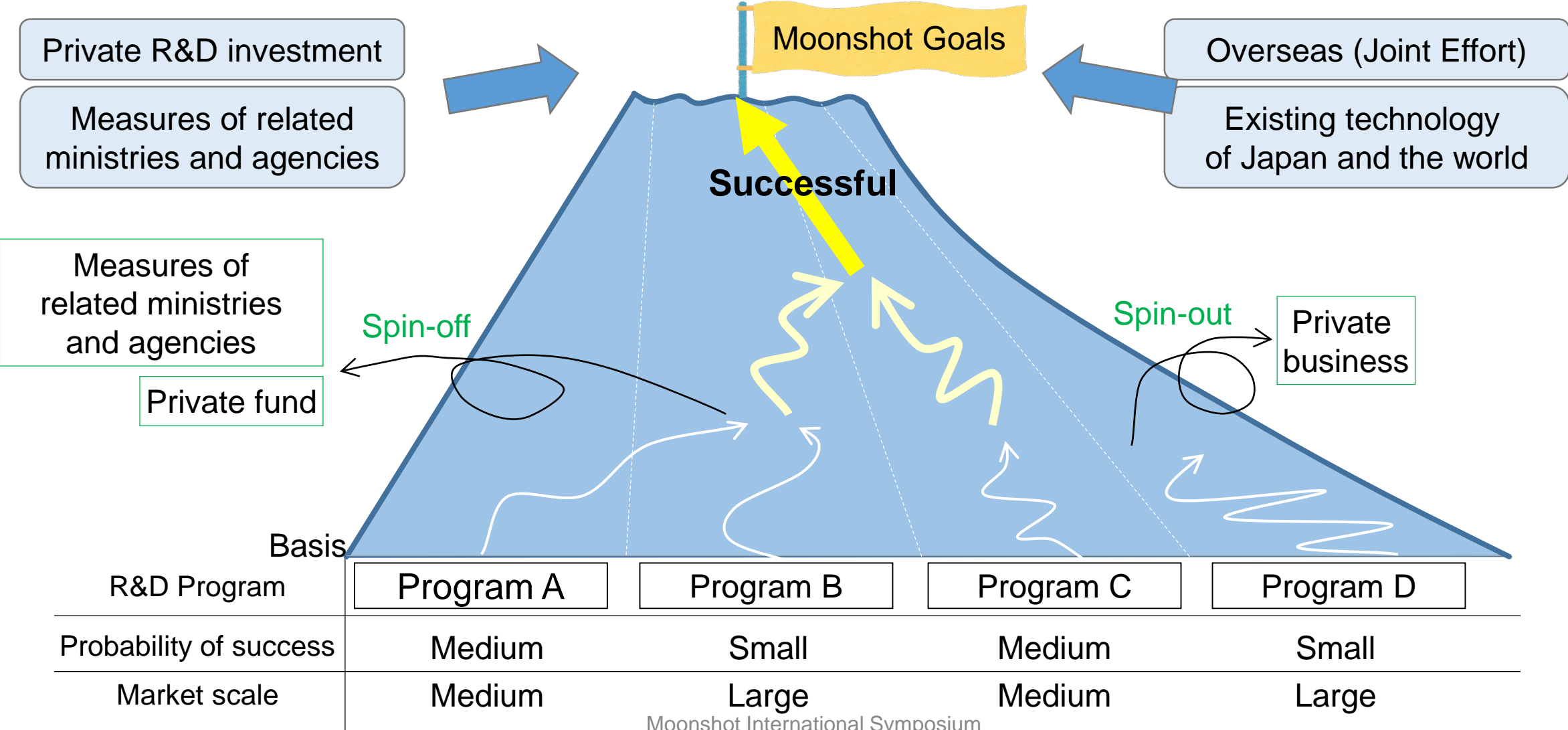


“I have not failed. I've just found 10,000 ways that won't work.”
— Thomas A. Edison

That are the values

○ Evaluation

Portfolio Approach to Program Management:
 Create an R&D portfolio system as a package for one Moonshot Goal, that is, evaluate these various approaches as a single package, no evaluation for each individual approach.



Integrity:

Establish consistency and integrity in global standards: Moonshot goals are often on a global scale, so international standards and fraud prevention procedures would be vital in safeguarding the integrity of both domestic and international R&D and to facilitate researchers' collaboration and data sharing.

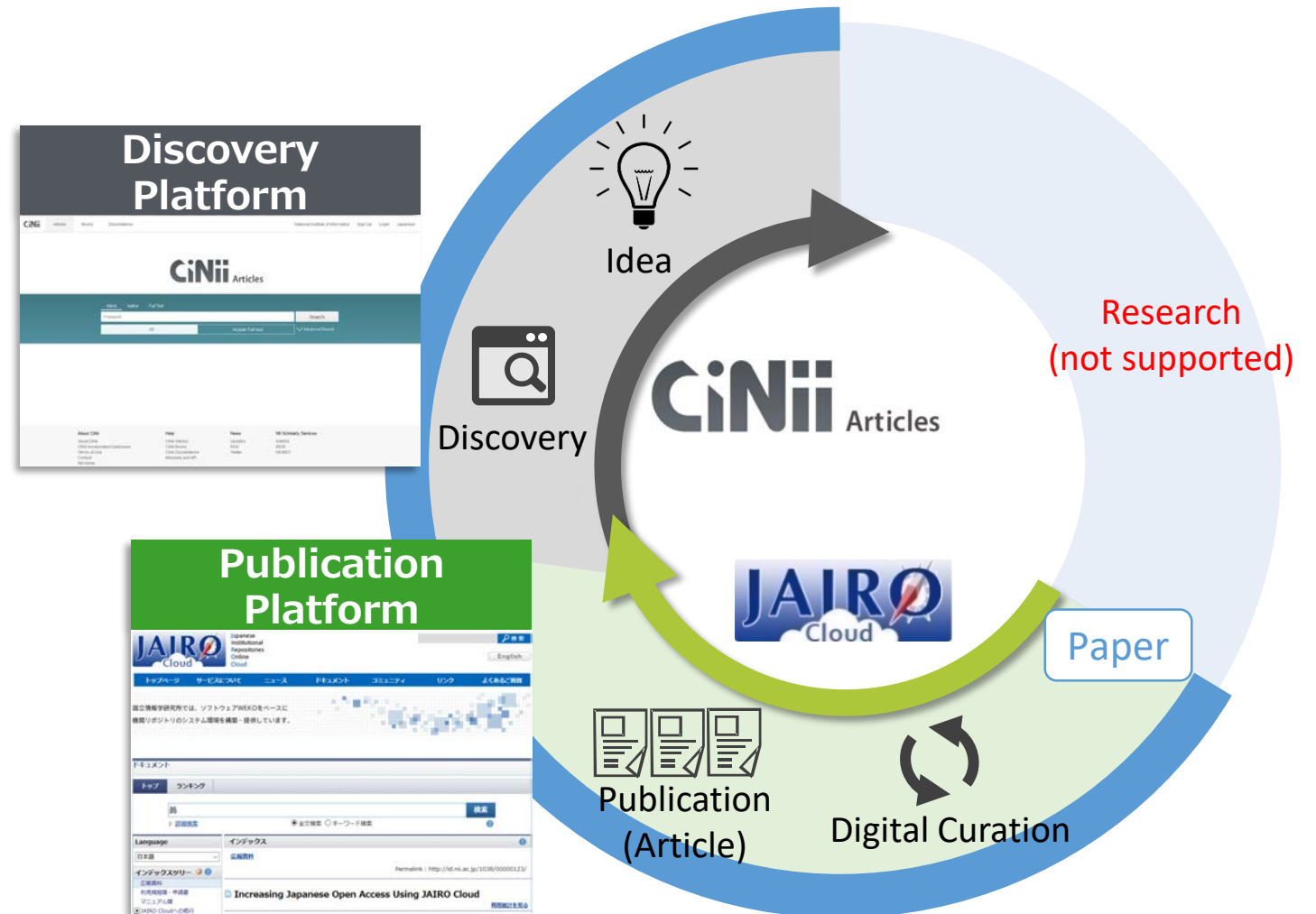
ELSI: Ethical, Legal, and Social Issues

STI often causes major regulatory revisions when apply to society for safety and security operation. If there is any regulatory barriers or problems to implement the results of program in the real world, PDs have to report fundamental idea of the reform of the future social system to the government of Japan.

IV. ADVANCED RESEARCH DATA MANAGEMENT

Cloud computing and open sharing of research outputs is increasingly important, especially in the era of Big Data and digital transformations. What is needed, then, is a secure and systematic way to share research process and its results.

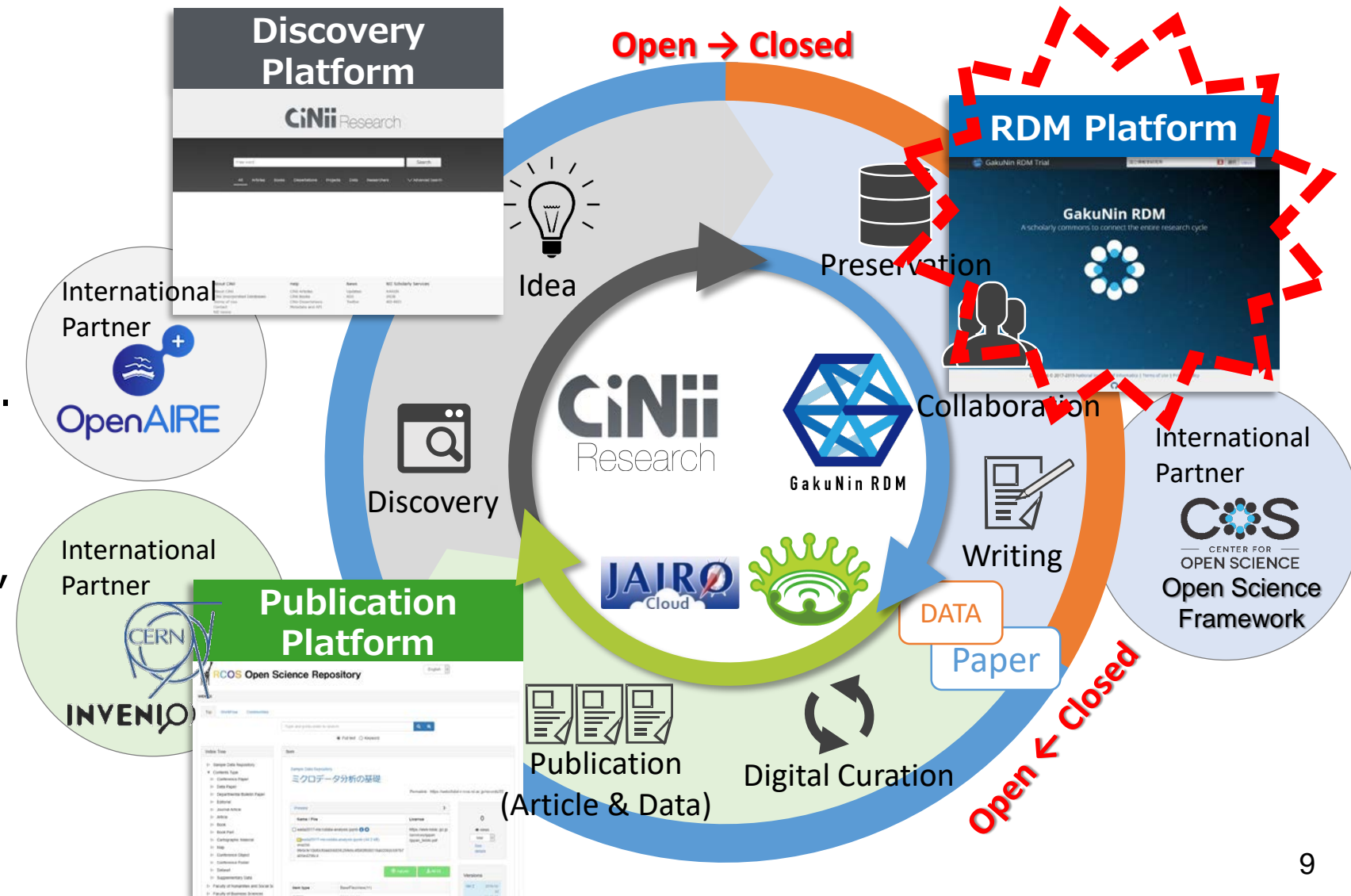
Infrastructure System for Journal Article



IV. ADVANCED RESEARCH DATA MANAGEMENT

The Infrastructure for Open Science Based on “Open-Close Strategy”

- We plan to provide a systematic methodology for assessing the whole Moonshot R&D package: marshaling research ideas, coordinating them into the collaborations with other researchers and outside stakeholders, and so on.
- We will achieve this through an advanced data management, which is closely related with the Open Science Framework that the EU and other countries are creating.



- Introducing a new management style in promoting disruptive innovations by means of government funding
- comprehending the program as a whole package, taking a portfolio approach to program management
- creating an evaluation system to accept unexpected failures,
- building a new view to science integrity and reciprocity, and launching a platform of data sharing and open science
- becoming assets for the CSTI, and will provide a powerful impetus to create the next Basic Plan for Science, Technology and Innovation in 2021.