Attitudes towards Research
-- In order to upgrade skills and advance better research efficiently

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1.   Each researcher's potential is essential.
As measures to properly follow the rapid socioeconomic changes and technical innovation in the recent years, multi-sector collaboration, industry, academia and government cooperation, and open innovation are often mentioned.   However, these are only methodologies.   Management of collaboration with other organizations, determination of the effectiveness of various technologies, and proper incorporation of technologies are possible only when based on the ability / potential of individual researchers.
In the 2017 NILIM Report, R&D procedure for raising "productivity" in R&D was described. In this report, I would like to describe the mechanism and points of attention for enhancement of the potential of individual researchers.

2.   Necessity for mechanism of cultivating potential
How to enhance the potential of researchers --- this is a very tough issue.   Previously, it was possible to cultivate skills by observing behaviors of seniors, studying steadily, and repeating failures, but such "leeway" is decreasing.   Such method is dependent on the experiences and know-how of individual researchers and a mechanism of skill improvement need to be established as an organization.
As part of the effort to improve research management on the whole, NILIM started a system to visualize, share, and hand down experiences and know-how. As one of the activities under this system, "Attitudes towards Research" based on the experiences of senior researchers were described in the Research Policy revised in November 2017.   Another activity is to hold "Experiences / Know-how Handover Seminar" to share hard work stories of researchers in NILIM.

3.   "Attitudes towards Research" --- Visualize common points of attention
"Attitudes towards Research" generalized and specified points of attention and devices that are difficult to come to the fore and aims to serve as a basic manual for young and middle level researchers to apply the contents to their fields and consider them efficiently / effectively. In NILIM's internal evaluation, etc., it has also begun to be used as a tool for research

guidance and discussion centering on the viewpoints described herein.   In accordance with the flow of research, the points are described below.
1)   Set a subject of research accurately.
Many of NILIM's researches are based on requests from administration and sites and all of them are not always accurate requests.   Such requests should not be accepted as they are but it is desirable to be able to speak concretely administrative needs, necessity of research, and technical issues in their own words.
In addition, research findings are reflected in standards, etc. and function in the real world as a system combined with various institutions, etc.   It is desirable to make a habit of recognizing the position of research theme from a broad view in the frame of related policies on the whole.
Further, various adjustments are essential for social implementation of researches and findings.   Thinking on both sides, i.e., observing facts on the site and conceiving realistically while grasping them in a bird's eye view as a policy, will lead to various assumptions automatically and facilitate actions to take in the future.
2)   Draw up a necessary and feasible research plan
Research plan reflects objectives in a specific hypothesis and element issues and provides a road map showing the structure to reach conclusion, and is therefore required to be technically consistent and feasible.
Skills to make a research plan are brushed up by visualizing (make a table of contents for) thinking process. Additionally, it may seem to be cumbersome work to research existing studies and hear the opinions of third parties but it leads to identification of issues that should be focused on and prevention of a "blooper." It should be recognized as an effective means to supplement the knowledge that cannot be covered by a single person.
3)   Perform research steadily along with the plan.
Next, reflect the research plan in annual action plan. Specify the conclusion that should be obtained for the present and proceed with the plan by making a monthly schedule specifying what research, test, and analysis are made and when.   However, everything may not progress as planned.   Sometimes, it may proceed to next step after undertaking what is possible

or search for direction of solution after repeating failures.　　Trial and error is also important as experience value.

Care should be taken so that results obtained are objectively interpreted and conclusion is not unreasonably deduced from limited knowledge.

Note that data literacy (ability to analyze phenomena from values) is cultivated through observation of reality and hands-on experiences with tests, analysis, etc.

In the end, knowledge obtained is used for modeling and generalized as a written procedure. In such case, if a thought experiment by conceiving various scenes of utilization is repeated, practical applicability and effectiveness will be made clear.

4)　Evaluate the results obtained and adjust findings

The mission of NILIM is to support policy making and sites but it is also required as researchers to document research findings and grounds systematically together with derivation process as papers or books.　　This would be understood as reasonable when such information is considered necessary for hand-over of research findings and support for operation of standards, etc.

Further, since the value of good research findings is dependent on social recognition, external presentation and publicity should be considered as a primary operation in research.　　Preparation for that purpose will also lead to upgrading the ability to present researches.

5)　Advance utilization of findings and social implementation

NILIM cannot end up with "We have obtained research findings and hope they are widely used." It is unavoidable that we are responsible for involvement until their use is rooted in administration and sites.

However, there is a limit to what researchers can do. Draw an implementation process for research findings, identify entities concerned, consider sharing of roles based on each jurisdiction / fields of expertise, and make coordination.　　It is possible to learn these skills by listening to the voices of administration and sites and exercising imagination about practical work. It should also be understood that participation in social implementation as a person concerned will lead to finding matters to be improved and new issues.

4.　Hand-over of experiences and know-how

While "Attitudes towards Research" is a written procedure that generalized experiences and know-how, it is also necessary to provide opportunities to speak experiences in specific hard work and devising means. Stories based on actual experience are full of reality and memory of listening to stories remains clearly. Since we are generally reluctant to speak our device and failures to others, it is necessary to build a system that facilitates derivation thereof as an organization. In addition, since speakers make considerable efforts to tell their thought, speaking their experiences has led to their skill improvement an unexpected byproduct,

5.　Conclusion

Skill improvement focused on researchers has been so far described by introducing some systems in NILIM. There would be many contents common to general researches in housing and social capital fields.　　I hope this would be of any help to those concerned.

☞Research policy
http:// www.nilim.go.jp/lab/bcg/
busyoukai/kenkyuhoushin/00index.htm

1. Determine research subject
1.　Grasp policy / on-site needs and recognize problems.
2.　Identify and specify issues.
3.　Establish object of research.
4.　Clarify related policies and draw a bird's-eye view.
5.　Determine the processes from research to implementation and hurdles.

2. Draw up a research plan.
1.　Establish a persuasive logic leading to conclusion.
2.　Draw up / brush up a research plan.
3.　Review the present status of existing studies / technologies.
4.　Identify the issues that need to be verified by researchers and select a verification method.
5.　Organize　the "selling points" of research

5. Utilization of findings and social implementation
1.　Explanation of findings. Adjustment with administration and site for implementation.
2.　Dissemination activities (seminar, training seminar, symposium, etc.)
3.　Trial and social experiment
4.　Effect measurement and grasp of improvement points

3. Implement research
1.　Establish a research system.
2.　Establish targets of each fiscal year and task items required.
3.　Tasks (experiment, site survey, data analysis, etc.)
4.　Interpret results, discuss with others, and review the research.
5.　Generalize and formulate results, such as modeling and mathematization.
6.　Verify practical applicability and effectiveness.

4. Evaluate results and summarize findings
1.　Summarize research reports and write reports and papers.
2.　Evaluation by a third party and reporting to the committee, etc.
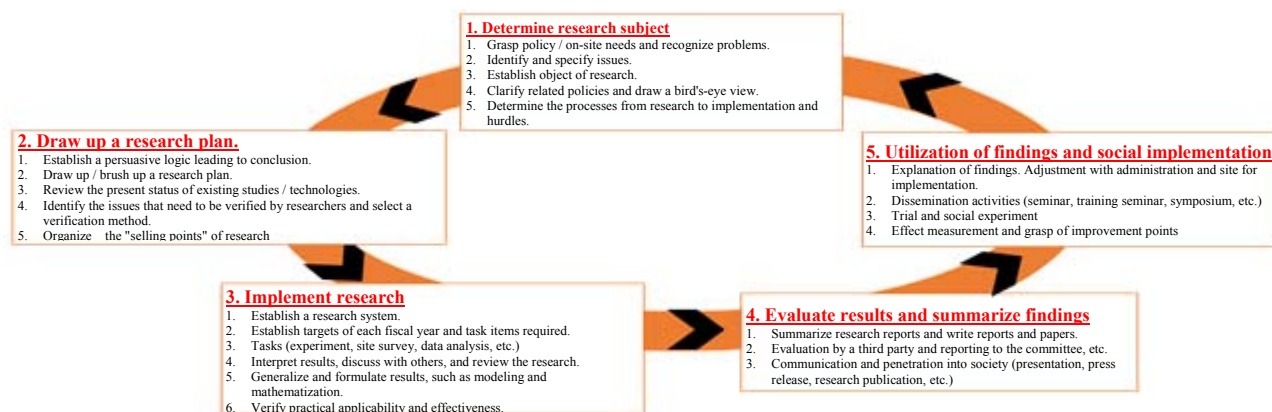3.　Communication and penetration into society (presentation, press release, research publication, etc.)

Fig. Basic Action Process and Points of Attention for Researches