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Evaluating Performance in Cooperative Research: The Standardized Criteria

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ABSTRACT— This qualitative research study aimed to develop standardized criteria and indicators for assessing the performance and cost-effectiveness of cooperative research. The study reviewed relevant concepts and theories from a variety of sources including documents, articles, books, textbooks to identify potential criteria and indicators. These were then refined and validated through expert reviews in both assessment methodologies and the cooperative domain. The research results found that the final set of standardized criteria and indicators, which are based on the OECD and the VFM standard criteria and indicators for assessing cost-effectiveness, in conjunction with the objectives of the funding agencies, consist of six dimensions: 1) Relevance, 2) Effectiveness, 3) Efficiency, 4) Outcomes, 5) Impact, and 6) Sustainability.

KEYWORDS: Evaluation Criteria, Evaluation methodologies, Indicators, Research project, Cooperative

1. INTRODUCTION

The National Research Council of Thailand and the Office of the Royal Society defined the definition of "research" as a systematic and rigorous process of acquiring knowledge that is guided by disciplinary principles and methodologies. It involves the formulation of concepts or theories, the collection and analysis of data, and the interpretation of data to generate new knowledge. Additionally, research can lead to the creation of new insights by synthesizing existing knowledge with new information [1], [2]. The Organization for Economic Cooperation and Development (OECD) delineated research into three specific categories: Firstly, 'basic research' encompasses theoretical inquiries or laboratory analyses intended to uncover novel insights pertaining to theoretical propositions and observable phenomena. Secondly, 'applied research' is focused on uncovering novel knowledge with precise goals for application, utilizing or adapting insights and methodologies derived from foundational research. Lastly, 'experimental development' constitutes a systematic endeavor that utilizes insights from research and existing knowledge to innovate new materials, products, or tools for implementing new processes, systems, or services, or for enhancing existing entities [3].

The National Research Council of Thailand delineated 12 distinct academic disciplines for research purposes. These encompass a broad spectrum including Physical and Mathematical Sciences, Medical Sciences, Chemistry, and Pharmacy Sciences, Agricultural and Biological Sciences, Engineering and Industrial Research, Philosophy, Law, Political Science and Public Administration, Economics, Sociology, Information Technology and Communication Sciences, and Education. Within each disciplinary domain, distinct methodologies are employed to conduct research. For instance, in the domain of Medical Sciences, experimental research methods, involving controlled experimentation and systematic observation, are extensively utilized. Sociology, on the other hand, relies heavily on survey research methodologies,

incorporating instruments such as surveys, interviews, and observational techniques. Additionally, branches like Philosophy may lean towards employing documentary research methods. However, these methodologies are not mutually exclusive; rather, they may be employed in tandem depending on the appropriateness for the specific data and objectives of the research [4].

Wanee Kamket explained that the execution of research endeavors yields multifaceted benefits, directly impacting researchers by fostering the refinement of their cognitive capacities, particularly in cultivating systematic and analytical thinking. Concurrently, such endeavors indirectly benefit the organizations housing these researchers. The outcomes of research serve as invaluable resources aiding managerial decision-making processes within these organizational frameworks. Additionally, the societal and national contributions of research are evident. Certain research initiatives offer informative feedback to society, notably large-scale endeavors with substantial financial investments, necessitating thorough assessments to gauge their effectiveness, efficiency, and impact. Moreover, specific research pursuits bear future-oriented societal advantages, particularly those aligned with policy development. These endeavors anticipate broader societal benefits beyond immediate applications [5].

Furthermore, Pichit Ritcharoon illustrated that research initiatives hold profound significance for sponsors and authorities involved in endorsing and facilitating research projects. The comprehensive evaluation of research quality not only enlightens those directly engaged in various research domains but also instills a profound understanding of a project's relevance and fosters confidence in research endeavors. This heightened understanding, in turn, augments the prospects for increased support and resource allocation within pertinent research sectors [6].

The Thailand International Cooperation Agency provided an explanation that the process of conducting an Ex-post Evaluation, aimed at assessing project performance following its completion, mandates the establishment of standardized criteria and indicators. These form the bedrock of a systematic, universally acknowledged framework essential for a comprehensive and coherent evaluation. These evaluative measures encompass multiple criteria and indicators, serving as a structured apparatus to appraise both the outcomes and impacts of the undertaken project [7]. Moreover, Airawee Wiraphanphong, The Chartered Institute of Public Finance and Accountancy and Chatsumon Phruthipinyo asserted that the scrutiny of Value-for-Money (VFM) holds paramount significance in the assessment of various project initiatives. This analytical approach adheres to global standards, emphasizing the evaluation of efficiency, effectiveness, outputs, impacts, and sustainability. Extensive studies conducted within the OECD have underscored the widespread adoption of VFM as a preliminary assessment tool across a diverse spectrum of projects [8- 10].

The Development Assistance Committee (DAC), established by the OECD delineates five core criteria for project evaluation. These criteria encompass Relevance, Effectiveness, Efficiency, Impact, and Sustainability [11]. ALNAP and Chianca explained that in the realm of diverse research endeavors, the application of DAC criteria proves instrumental in achieving the most comprehensive assessment of research project outcomes. A nuanced elucidation of these dimensions is as follows [12], [13]: (1) relevance: This dimension scrutinizes the alignment of the research project with the requisites and priorities outlined by the research funding entities, encompassing adherence to national policies. (2) effectiveness: It evaluates the extent to which the research project attains its stipulated objectives or expected outcomes. (3) efficiency: This evaluation focuses on the alignment of the research project with its designated goals and benchmarks, appraising both qualitative and quantitative outcomes with consideration to assessments fortified by comprehensive data and financial allocations. (4) impact: This facet delves into the ramifications resulting from the research project and the utilization of its findings, encompassing both intended and unintended consequences, examining positive and

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negative effects at regional and household levels, and (5) sustainability: It assesses the project's sustainability and continuity beyond the termination of research funding, analyzing its capacity to persist without support from the original funding bodies.

In the realm of economic research, notably in the domain of cooperative studies, a multitude of funding agencies play a pivotal role in facilitating research initiatives. These sponsorships are geared towards eliciting comprehensive outcomes and far-reaching societal and economic impacts, underscoring the pivotal importance of leveraging research outputs for both commercial and public gains. Therefore, scholars and experts will acquire genuine understanding of the outcomes and impacts derived from diverse studies. Additionally, standardized measures and indicators are employed to assess the performance and cost-effectiveness in cooperative research, specifically. Researchers have thus examined guidelines for assessing cooperative research within the topic " Evaluating Performance in Cooperative Research: The Standardized Criteria". The primary aim of this research is to formulate standardized criteria and indicators essential for assessing the efficacy and intrinsic value of research initiatives within the cooperative domain. These standardized criteria and indicators are intended for future use and to be considered for subsequent evaluations of such cooperative sphere.

2. METHODS

The research pursued a qualitative approach, systematically employing a research process to delineate criteria and indicators (Figure 1):

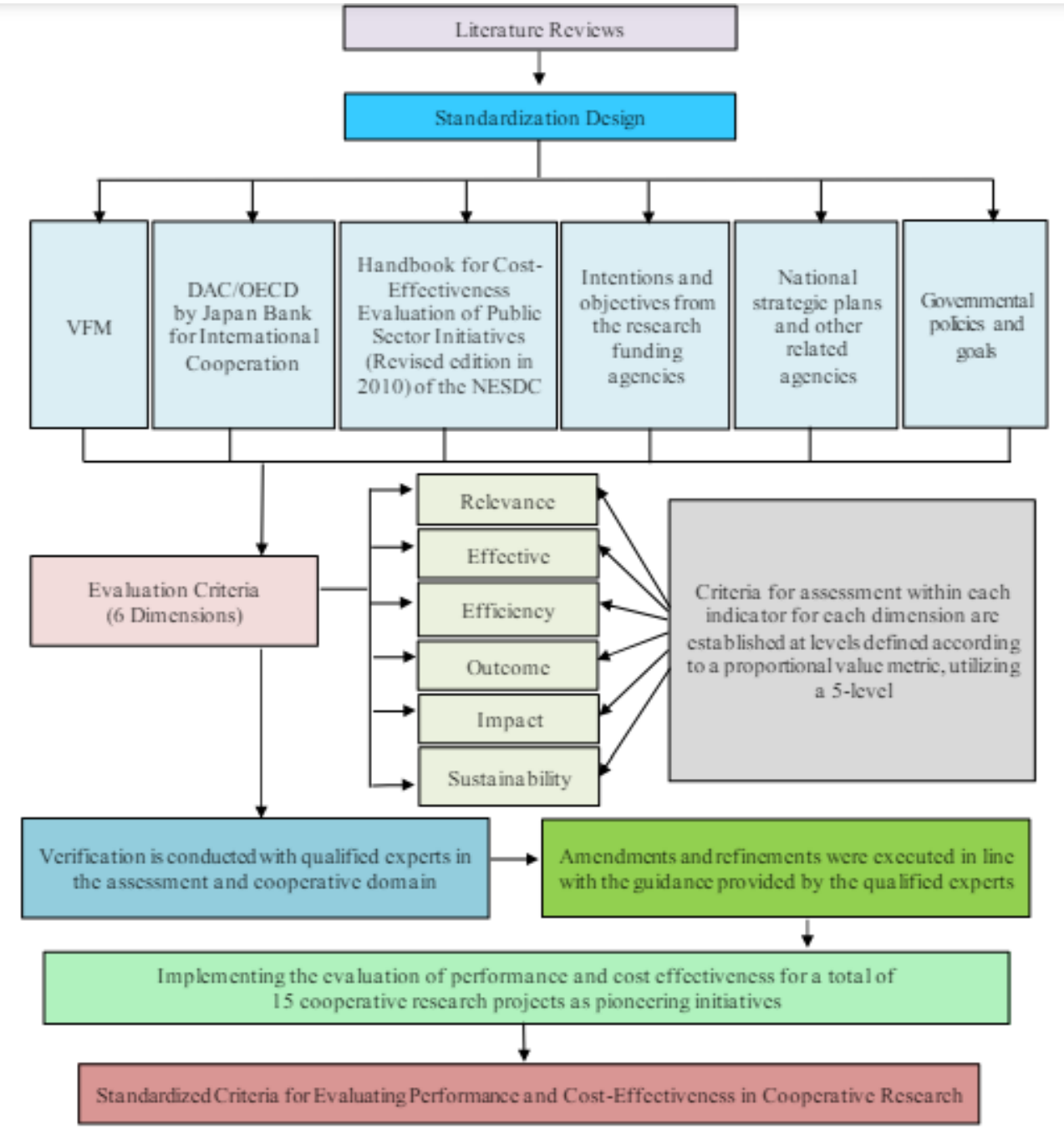

Figure 1. The Research Process

2.1 Literature Review: Researchers extensively surveyed concepts and theories from a spectrum of sources such as documents, articles, books, and relevant data sources. This comprehensive review aimed to formulate criteria and indicators essential for evaluating research in the domain of cooperatives.

2.2 Performance Assessment: Emphasis was placed on evaluating the outcomes and impacts of cooperative research. This involved:

Design of Outcome and Impact Assessment Criteria: The research framework encompassed a comprehensive array of assessment criteria related to economic, social, and environmental aspects pertinent to this study. These criteria were aligned with international standards and indicators, particularly focusing on the evaluation

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of VFM. This evaluative analysis centered on efficiency, effectiveness, outcomes, impacts, and sustainability. Additionally, it integrated evaluation criteria specified by the DAC under the aegis of the OECD. The framework drew upon the assessment criteria delineated by the Japan Bank for International Cooperation and the "Handbook for Cost-Effectiveness Evaluation of Public Sector Initiatives" (Revised Edition 2010) issued by Office of the National Economic and Social Development Council [14]. These criteria were consistently applied in tandem with the intentions and objectives of the funding agency, aligning cohesively with the strategic plans of the nation and pertinent governing entities.

Evaluation Criteria for Cooperative Research: This study incorporates a six-dimensional framework for evaluating cooperative research efforts, encapsulating the following core facets:

Relevance: This dimension pertains to evaluating the alignment of the research initiative with (1) national economic and social development plans, (2) governmental policies, and (3) the strategic objectives of research funding bodies.

Effectiveness: Within this dimension lies an assessment of the extent to which the research outputs align with the predetermined objectives and primary goals set forth in the research plan.

Efficiency: An evaluation of the degree to which the research initiative aligns with the preset objectives. In this context, it draws insights from pertinent Key Performance Indicators (KPIs) focusing on economic aspects encompassing three composite indicators: (1) Cost-effectiveness (C-cost): entailing cost-saving measures and resource efficiency, (2) Timeliness (T-time): adherence to set timelines, and (3) Quality (Q-quality): the quality of produced outcomes.

Outcome: Assessment of the derived benefits resulting from the effectiveness of implemented activities within the research project. This evaluation covers changes observed among target groups in terms of knowledge enhancement, competencies, behaviors, networking attitudes within the partnership community, and the expansion of opportunities in trade and marketing, among others.

Impact: Evaluation of the broader consequences resulting from the research implementation and the utilization of its outcomes across diverse realms including economic, social, environmental, quality of life, and management domains.

Sustainability: This dimension assesses the sustained continuity of research post-termination of funding support. It gauges sustainability across three dimensions: (1) Economic, (2) Social, and (3) Environmental aspects.

2.3 Subsequently, the established criteria and indicators underwent rigorous scrutiny by qualified experts in both assessment methodologies and the cooperative domain. This scrutiny aimed to verify their academic precision, linguistic suitability, credibility, inclusivity, and contextual appropriateness concerning cooperative research endeavors.

2.4 Amendments and refinements were executed in line with the guidance provided by the qualified experts. These adaptations were then implemented in appraising the performance and worth of 15 cooperative research ventures. Consequently, these criteria were formalized as the Standardized Criteria for Evaluating Performance and Cost-Effectiveness in Cooperative Research.

3. RESULTS

The researchers have established standardized criteria, evaluation methodologies, and indicators used in assessing the performance and cost-effectiveness based on international standards, specifically focusing on financial analysis, known as the VFM. This involves defining various metrics to evaluate the research outcomes according to standard criteria in each aspect. The specific details may vary across research projects based on the research objectives, industry types, or business sectors involved, as well as the economic and societal contexts. Therefore, the method for designing the evaluation of outcomes and impacts, covering aspects such as economics, society, and the environment presented in this work, draws upon international standard criteria and indicators for assessing value for money. This approach aligns with the goals and objectives of funding organizations supporting research, comprising six standard criteria, namely: 1) Relevance, 2) Effectiveness, 3) Efficiency, 4) Outcome, 5) Impact, and 6) Sustainability. The detailed description is provided in Figure 2.

3.1 Relevance

The evaluation framework considers the relevance of research to the constitution, government policy statements, national economic and social development plans, public needs, societal issues, academic advisories, and pertinent legislations, comprising Acts or Royal Decrees.

The metrics for assessing relevance include the alignment of research objectives, outcomes, and impacts with the national economic and social development plan, governmental policies, objectives, and the strategic directives of funding agencies.

3.2 Effectiveness

The evaluative framework for effectiveness underscores a comprehensive consideration of factors such as goal attainment, participatory engagement, stakeholder satisfaction, and the risk landscape associated with the research endeavors.

The metrics used in gauging effectiveness involve the outcomes derived from research activities and/or a set of research endeavors that align with the specified objectives and/or primary goals established for the scrutinized research and/or research program.

3.3 Efficiency

The evaluative approach for efficiency centers on the appropriateness of resource utilization and workflow processes to yield high-quality outcomes in line with the objectives. This also encompasses the standardized allocation of resources, cost-effectiveness, and resource-conserving operational procedures.

The metrics employed for efficiency encompass considerations of cost-effectiveness (C-cost) and the notion of value-for-money, emphasizing cost savings and optimal resource utilization. Timeliness (T-time) gauges the project's ability to adhere to predefined temporal constraints, while quality (Q-quality) scrutinizes the excellence of the produced outcomes.

3.4 Outcome

The evaluative framework for outcomes entails a consideration of the benefits derived from the effectiveness of various research activities. The measurement indicators encompass 4 principal indicators and 6 sub-indicators employed for research assessment, which are outlined as follows:

1) Network Connectivity: Scrutinizing the establishment of robust linkages between agricultural

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institutions, such as cooperatives and cooperative groups, private entities, and expansive market and distribution networks.

2) Advancement of Equitable Production and Marketing Systems

(1) Facilitation of market access for socioeconomically disadvantaged producers.

(2) Encouraging farmers and cooperatives to engage in shorter trade chains and to sell products at higher prices compared to conventional market mechanisms.

(3) Emphasizing cooperative importance in ensuring fair returns to agricultural producers and labor, sufficient to sustain them under current economic and social environmental conditions and into the future.

3) Enhancement of Farmers' and Cooperatives' Capacities for fostering more adept and efficient business practices.

4) Establishment of a Knowledge-Driven Society

(1) Promotion of cooperative processes among farmers and communities, fostering collaborative problem-solving initiatives.

(2) Provision of learning opportunities for farmers, cooperatives, and communities, facilitating continuous knowledge acquisition and the cultivation of innovative ideas.

(3) Witnessing positive changes in cooperatives and communities, leading to greater self-reliance and self-management, driven by knowledge development within cooperative groups and communities.

3.5 Impact

In the realm of impact assessment, the evaluative framework scrutinizes effects on the general population, economy, society, environment, and governance.

The evaluative metrics encompass 2 primary indicators and 6 sub-indicators, strategically applied for the comprehensive assessment of research endeavors, as delineated below:

1) The impacts on Income Augmentation and Poverty Alleviation

(1) Upward trajectory in income for farmers and cooperatives.

(2) Diminished production costs for farmers and cooperatives.

(3) Enlargement of opportunities for diverse groups and organizations.

(3.1) Augmentation of raw material sources for farmers/communities.

(3.2) Expanded market channels and distribution networks.

(3.3) Increased knowledge exchange among members and networked groups.

(3.4) Sustainable enhancement of livelihoods.

2) The impacts on Cognitive Development, Attitude, and Enhanced Thought Processes.

3.6 Sustainability

Within the context of sustainability evaluation, this framework meticulously examines economic viability, institutional robustness, and the potential for scalability. The evaluative criteria consist of 3 principal indicators and 7 sub-indicators, strategically employed in the research assessment process, as delineated below:

1) Economic Dimension

(1) The enduring relevance of the research concept and objectives.

(2) Level of financial independence from external budgetary sources.

(3) Extent of opportunities and pathways for expanding the impact of research operations.

2) Social Dimension

(1) Quantification of target groups/individuals in the community actively participating in the planning, governance, propulsion, and advancement of communal and societal initiatives.

(2) Level of impact (positive/negative) on individuals in the community resulting from the expansion of research operations.

3) Environment Dimension

(1) Enumeration of target groups/individuals in the community actively engaged in the planning, governance, propulsion, and development of environmental initiatives in the community.

(2) Level of impact (positive/negative) on the environment in the community resulting from the expansion of research operations.

For the assessment criteria in each dimension, levels are defined according to the Likert-type Rating Scale, employing a 5-point measurement scale for ordinal data. The scale consists of the following levels: Very High, High, Moderate, Low, and Very Low. The details are as follows:

Level 5 indicates the highest level, corresponding to an average score of 4.50 and above. The meanings in each dimension are as follows:

- Relevance: Clearly demonstrates alignment with the national economic and social development plan, government policies, and supporting agency's strategic plans in terms of objectives, outcomes, and impacts.
- Effectiveness: Successfully achieves all objectives.
- Efficiency: Attains overall efficiency.
- Outcome: Reflects the highest level of indicators that mirror the outcomes.
- Impact: Reflects the highest level of indicators that mirror the impact.
- Sustainability: Reflects the highest level of indicators that mirror sustainability.

Level 4 indicates a high level, encompasses an average score ranging from 3.50 to 4.49. The meanings in each dimension are as follows:

- Relevance: Demonstrates clear alignment with the strategic frameworks of funding entities and governmental policies, with objectives, outcomes, and impacts sharply coherent.
- Effectiveness: Attains objectives significantly in the crucial domains.
- Efficiency: Achieves efficiency significantly in the vital domains.
- Outcome: Exhibits a preponderance of indicators reflecting substantial outcomes.
- Impact: Evidences a preponderance of indicators reflecting significant impacts.
- Sustainability: Incorporates a preponderance of indicators reflecting considerable sustainability.

Level 3 signifies a moderate level, with an average score ranging from 2.50 to 3.49. The meanings in each dimension are as follows:

- Relevance: Demonstrates clear alignment with the strategic plans of funding entities and the national economic and social development plan.
- Effectiveness: Achieves objectives in some important areas.
- Efficiency: Attains efficiency in some important areas.
- Outcome: Reflects moderately on indicators mirroring outcomes.

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- Impact: Reflects moderately on indicators mirroring impact.
- Sustainability: Reflects moderately on indicators mirroring sustainability.

Level 2, denoting a low level, encompasses an average score ranging from 1.50 to 2.49. The nuanced meanings within each dimension are elucidated as follows:

- Relevance: Demonstrates clear alignment with the strategic frameworks of funding entities.
- Effectiveness: Achieves objectives in some less significant areas.
- Efficiency: Attains efficiency in some less significant areas.
- Outcome: Reflects minimally on indicators mirroring outcomes.
- Impact: Reflects minimally on indicators mirroring impact.
- Sustainability: Reflects minimally on indicators mirroring sustainability.

Level 1, indicating the lowest level, encompasses an average score not exceeding 1.49. The meanings in each dimension are as follows:

- Relevance: Demonstrates no alignment with the national economic and social development plan, governmental policies, or the strategic plans of funding entities.
- Effectiveness: Achieves the lowest possible level of objectives.
- Efficiency: Attains the lowest possible level of efficiency.
- Outcome: Reflects the lowest possible level of indicators mirroring outcomes.
- Impact: Reflects the lowest possible level of indicators mirroring impact.
- Sustainability: Reflects the lowest possible level of indicators mirroring sustainability.

In this regard, the consolidation of scores in the overall assessment for each dimension will employ an equally weighted average of all indicators. Subsequently, the scores for each indicator in that respective dimension will be aggregated and divided by the number of indicators, resulting in an average score for each dimension.

The assessment approach for each indicator in each dimension will involve evaluations through (1) Expert-based Evaluation, (2) the complete research reports for each research project or research program as specified in the Final Report, and (3) a survey and semi-structured interview of Stakeholders, capturing their perspectives and opinions. In each research project or program, researchers responsible for that project will study the relevant concepts/theories suitable for the project and conduct assessments, specifying theoretical justifications and qualitative data found in the reports.

Subsequently, a meeting will be convened with the entire research team to review and confirm the assessment results for each section, ensuring consensus among the researchers. In cases where researchers or the research team do not reach a consensus or perceive that the report does not clearly specify the achieved results according to objectives and/or indicators, additional data will be collected. This will involve designing inquiries focused on the missing or unclear information, utilizing research tools such as interviews with specific target groups, network members, or individuals significantly affected by the research project. Furthermore, tailored surveys will be designed to gather additional data, incorporating insights obtained from reports, interviews, and/or questionnaires for a more comprehensive evaluation.

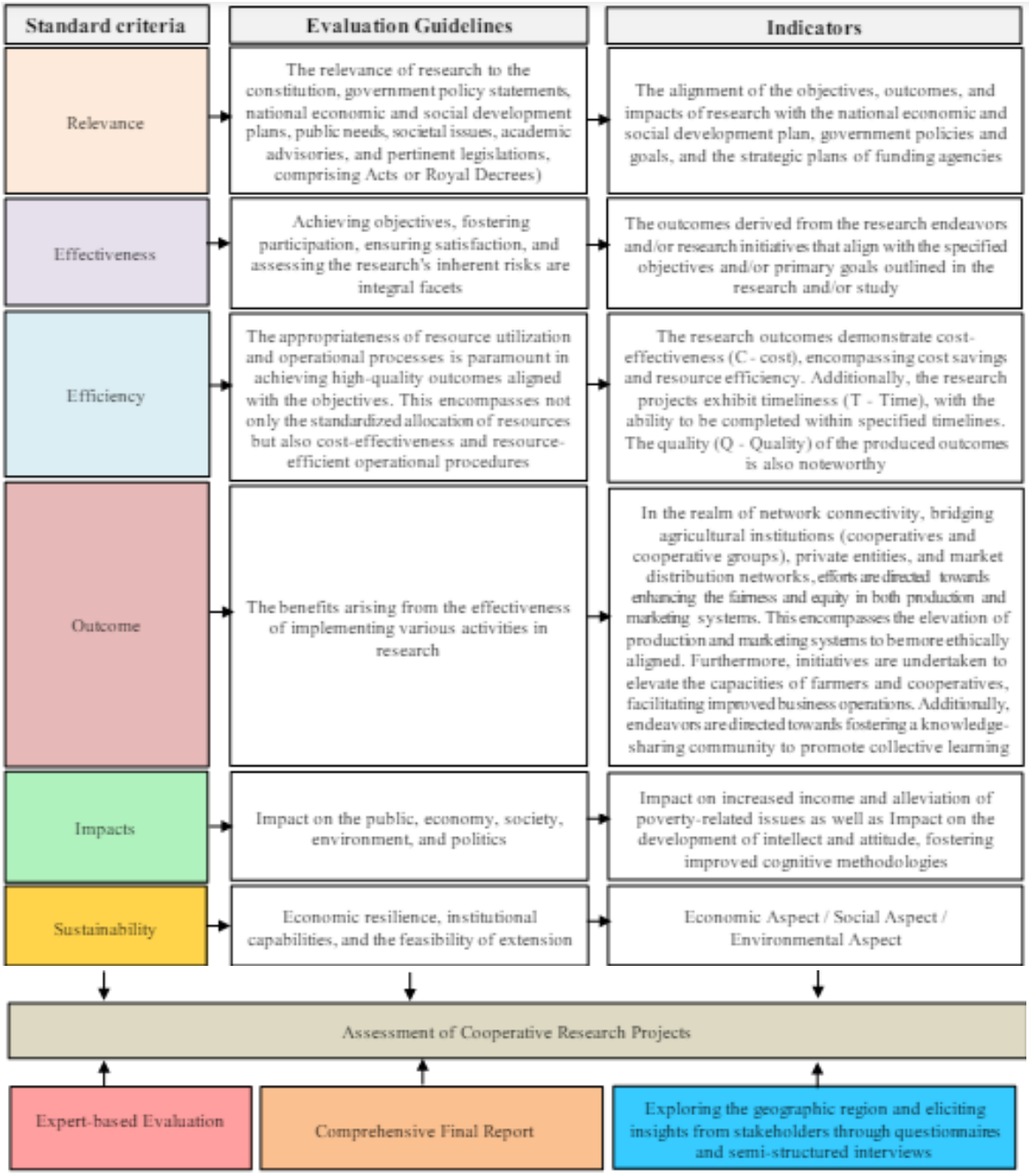

Figure 2. Standard criteria, Evaluation guidelines and indicators to evaluate the achievement and cost-effectiveness of cooperatives research. in alignment with international commonly referred to as the VFM

4. CONCLUSION

The evaluation of cooperative research is a crucial undertaking wherein researchers can review and examine the research. Additionally, evaluators can evaluate and provide recommendations for enhancing the research. These recommendations serve as guidelines for improving research quality and ultimately enhancing the performance and cost-effectiveness of the research. Therefore, it is imperative for researchers and evaluators to establish standardized criteria for assessing the performance and cost-effectiveness of cooperative research. This research has formulated standardized criteria, evaluation guidelines, and indicators to assess the performance and cost-effectiveness of cooperative research. These criteria and indicators are based on the standard criteria and indicators of the VFM concept, and the objectives set by the funding agencies. The assessment encompasses six dimensions: 1) Relevance, 2) Effectiveness, 3) Efficiency, 4) Outcomes, 5)

Impact, and 6) Sustainability. Criteria for evaluation within each indicator for every dimension are established at predefined levels using a proportional value metric. A 5-level Likert scale is employed, consisting of the following categories: Very High, High, Moderate, Low, and Very Low. The evaluation approach for each indicator in each dimension involves the following: (1) Expert-based Evaluation, (2) Analysis of the complete research reports for each research project or research program as outlined in the Final Report, and (3) Conducting a survey and semi-structured interviews with Stakeholders to capture their perspectives and opinions. Subsequently, a meeting will be convened with the entire research team to review and validate the assessment results for each section, ensuring consensus among the researchers. In cases where the researcher or research team still have disagreements or if the report fails to clearly indicate the achieved results according to the objectives and/or indicators, additional information will be gathered to ensure the most comprehensive research evaluation possible.

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