Guidelines for Evaluating the Economic and Social Returns of Fundamental Research Grant Projects, Fiscal Year 2025, Rajamangala University of Technology Lanna

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Abstract

This study aims to develop comprehensive guidelines and assessment tools for evaluating the economic and social returns of research projects funded by the Fundamental Fund at Rajamangala University of Technology Lanna. The assessment focuses on systematically measuring the empirical outcomes and impacts derived from basic research. The developed tools include a prototype economic and social return assessment program, a scoring rubric for selecting pilot projects, and an impact pathway diagram, which together facilitate a comprehensive analysis of the relationships between research outcomes and their resulting impacts. Application of these guidelines and tools to an actual research case study revealed a Social Return on Investment (SROI) ratio of 1:3.79, indicating that every 1 baht invested generated 3.79 baht in combined social and economic value. This result demonstrates the efficiency and value for money inherent in basic research investment. Furthermore, the developed tools proved effective in capturing and reflecting the value created within the specific context of Rajamangala University of Technology Lanna, whose vision emphasizes innovation for community development. The findings also highlight the importance of strengthening researcher capacity and supporting research projects that aim to generate sustainable socio-economic impact.

Keywords: Social Return on Investment (SROI), Fundamental Fund, Impact Assessment, Higher Education, University-Based Impact Assessment

Introduction

Research and development investment at the university level plays a crucial role in developing knowledge-based economies and fostering innovation, particularly in developing countries that rely on building competitive capabilities through knowledge and technology. However, measuring returns on research investment remains a significant academic and policy challenge, as most impacts are non-financial outcomes with complex causal relationships occurring across different timeframes (OECD, 2021).

In the Thai context, research budget allocation through the Fundamental Fund (FF) mechanism under the supervision of the National Research Council of Thailand (NRCT) aims to strengthen institutional research capacity, promote basic research, and create new

knowledge aligned with national needs (NRCT, 2023). Therefore, a monitoring and evaluation system capable of demonstrating concrete investment value is essential.

Social Return on Investment (SROI) assessment has gained increasing attention as an approach to measuring research and innovation investment impacts, as it encompasses both economic and social outcomes, particularly for universities with missions to benefit local communities and society.

Rajamangala University of Technology Lanna (RMUTL) is a higher education institution with a specific role in Thailand's higher education system, committed to becoming "a university for technology development and innovation promotion for grassroots economy" (RMUTL, 2023). The university's unique characteristics reflect its potential to create local community impact, strategically positioned in the northern region with diverse economic activities ranging from agriculture, processing industries, tourism, and creative economy.

This study aims to assess economic and social returns from FF investment at RMUTL using the SROI approach, analyze research project impacts on grassroots economic development and human capital in the north, develop a prototype return assessment tool applicable to other universities, and propose policy recommendations for enhancing national-level research investment impact assessment.

Literature Review

Social Return on Investment Concept and Framework

Social Return on Investment is an evaluation methodology derived from cost-benefit analysis, first applied by The Roberts Enterprise Development Fund in the United States in 1997 [Nicholls et al., 2012]. The fundamental principle of SROI is to broaden the scope of return assessment beyond purely financial metrics to encompass social and environmental values. Unlike traditional evaluation tools, SROI emphasizes stakeholder engagement in identifying and valuing the outcomes produced, subsequently translating these social outcomes into monetary terms. This process aims to quantify the social and economic value generated for every unit of investment, necessitating in-depth analysis and collaborative efforts with diverse stakeholder groups.

In both domestic and international contexts, the application of SROI has evolved with various approaches to enhance assessment completeness. For instance, a study by the Thailand Development Research Institute proposed integrating SROI with a Relative Impact Index for research project evaluation, particularly when certain outcomes cannot be fully monetized. Internationally, the Organisation for Economic Cooperation and Development Emphasizes the use of its criteria-relevance, effectiveness, efficiency, impact, and sustainability-in conjunction with SROI to ensure a more comprehensive and balanced assessment. These five dimensions are recommended as a "framework for reflection" rather rather than solely for scoring, demonstrating SROI's capability to integrate with broader evaluation frameworks to address the complexities of investment impacts effectively.

Research Impact Assessment in University Context

The literature indicates that assessing the returns on research investment within university contexts presents several specific challenges [Kampanart et al., 2023]. These include the complexity of impact pathways, which often involve non-linear relationships between research outputs and outcomes; the time lag inherent in realizing real-world impacts, which often occur long after project completion; and the difficulty in attributing specific impacts directly to particular research projects. To address these challenges, the National Science and Technology Development Agency in Thailand

introduced a guideline utilizing a Logic Model alongside Counterfactual and Contribution concepts. This approach emphasizes collecting direct outcome data from beneficiaries and calculating "value added" to determine true impact. The guideline aims to establish a" ommo' standard for measuring and reporting NSTDA's performance, particularly across economic, social, and environmental dimensions, reflecting concerted efforts to develop appropriate mechanisms for assessing research impact within research organizations.

Case Study Context: Research Investment from Fundamental Fund at Rajamangala University of Technology Lanna

To illustrate the complexities and specific characteristics of university research projects and the necessity for developing a tailored SROI assessment tool, this study selected the "Research and Development of a Patient Lifting Device to Assist Standing and Ambulation for Bedridden Patients, the Elderly, and Persons with Disabilities" as its primary case study. This project received Fundamental Fund support in the 2025 fiscal year, led by Asst. Prof. Dr. Phakphoom Jarupoom and team. Operating under Research Framework 1, which focuses on developing an ecosystem to support an aging society and medical innovations, its core objective is to design and develop a safe prototype device to aid standing and walking for the target beneficiaries, with an emphasis on evaluating its quality and safety in real-world contexts.

This case study further aims to analyze the readiness of such research projects to generate measurable economic and social outcomes and their potential for in-depth SROI analysis, aligned with principles from Social Value International and the OECD-DAC framework. It also seeks to propose development pathways to meet SROI assessment criteria effectively. The project's inputs primarily comprise budget allocations for personnel and equipment, utilizing specialized tools such as laboratories, CAD/3D systems, and simulation software. Key activities include pilot testing with target groups, developing and testing four functional models, and conducting two knowledge transfer workshops. Expected outputs include one device prototype, a user manual, a pending patent, and an academic article, all of which will be crucial data for constructing the Impact Pathway and Logic Model for SROI assessment.

Research Conceptual Framework

Drawing from the aforementioned literature, this research adopts an integrated conceptual framework. It utilizes the Theory of Change to delineate the pathways from research activities to actual economic and social impacts, combined with a Logic Model to systematically link Inputs, Activities, Outputs, Outcomes, and Impacts. Furthermore, the 6-step SROI framework by Social Value UK serves as a primary guide, integrating the Impact Value Chain concept to track both short-term and long-term effects. This blended approach is designed to develop a comprehensive, evidence-based guideline and tool for assessing the economic and social returns from research investment. This framework is specifically tailored for application within the context of Rajamangala University of Technology Lanna and serves as a replicable model for other higher education institutions.

Research Methodology

Evaluation Framework

The underpinning evaluative paradigm for this research is the six-stage Social Return on Investment framework, a standard articulated by Social Value UK and Social Value International. This comprehensive framework necessitates several key steps: delineating the scope and identifying pertinent stakeholders, systematically mapping anticipated outcomes, specifying both outcomes and their corresponding financial proxies, executing a net impact assessment, computing the SROI ratio, and formally disseminating the findings. This structured methodology serves as an essential foundation for the design of data acquisition strategies, analytical procedures, and the formulation of evidence-based policy recommendations, ensuring a precise representation of the value created by projects financed through the Fundamental Fund.

Population and Sampling

The investigative population comprises all fifteen Fundamental Fund research projects sanctioned during the 2025 fiscal year at Rajamangala University of Technology Lanna, each having concluded its stipulated one-year funding cycle. The selection of the focal case study was executed via a rigorous, criteria-driven methodology, employing a tailored Scoring Rubric to gauge project aptness and rank them for subsequent SROI assessment. The project garnering the highest score, titled "Research and Development of a Patient Lifting Device to Aid Standing and Walking for Bedridden Patients, the Elderly, and Persons with Disabilities," was consequently designated as the principal case study for exhaustive analytical scrutiny.

Research Instrumentation

The research instruments were meticulously crafted through a three-phase developmental sequence: the conceptualization of the SROI evaluation framework, the subsequent development of the instruments themselves, and their iterative testing and refinement. These instruments are categorized into two principal groups. The first group encompasses a Scoring Rubric, characterized by eight weighted criteria assessed on a 0-5 scale, employed for the systematic selection of research projects. The second group consists of tools designed for data collection and outcome analysis, which utilize Impact Pathway diagrams to illustrate the logical relationships between project activities and their ensuing impacts, and subsequently to financialize these outcomes for the precise calculation of SROI.

Data Analysis

Data analysis was conducted across two primary tiers: initially, the evaluation of scores derived from the Scoring Rubric to pinpoint the pilot project, and subsequently, the rigorous analysis of outcome data pertinent to SROI calculation. Information garnered from interviews, questionnaires, and Impact Pathway diagrams underwent structural analysis to elucidate relationships and isolate project-specific impacts. The SROI was computed by converting quantifiable outcomes into monetary values through the application of established financial proxies, followed by adjustments for displacement, attribution, and deadweight, and finally, by comparing these adjusted values against the aggregate project costs to determine the SROI ratio, which reflects the project's overall socio-economic efficiency.

Data Quality Assurance

Stringent data quality protocols ensured accuracy, reliability, and consistency throughout the research process. All instruments adhered to international guidelines, undergoing rigorous expert review for validity and comprehensiveness. Data reliability was

further substantiated via triangulation of findings and stakeholder corroboration. To mitigate potential biases, open-ended questions were integrated into questionnaires and interview protocols, alongside diverse sampling methodologies. All collected data were electronically archived, ensuring security and transparency.

Research Finding

Development of Social and Economic Impact Assessment Tools

This research systematically developed three distinct sets of social and economic impact assessment tools specifically tailored for fundamental research projects. These instruments are designed to facilitate a comprehensive evaluation of the intrinsic social value generated by such projects, encompassing perspectives from both researchers and external stakeholders. The development aligns with established theories of change and internationally recognized impact assessment methodologies, detailed as follows:

Tool 1: Project Suitability Assessment for Social and Economic Return Evaluation. This instrument's primary objective is to systematically identify and select research projects optimally suited for a pilot Social Return on Investment assessment. The selection process considers the project's potential to generate economic and social impact, including factors such as revenue generation, efficiency improvements, and enhancement of quality of life.

Tool 2: Outcome Analysis Toolkit. This comprehensive toolkit is designed for the systematic identification, collection, analysis, and interpretation of project outcomes. It specifically emphasizes elucidating the causal relationships between project outputs, intermediate outcomes, and ultimate impacts, thereby reflecting transformative changes at individual, target group, or community levels.

Tool 3: Interviews and Focus Group Discussions for Fundamental Research Impact Assessment, supplemented with Questionnaires. This dual-purpose instrument facilitates both qualitative and quantitative data collection. In-depth interviews and focus group discussions are crucial for understanding the intricate causal linkages among outputs, outcomes, and impacts, while questionnaires are employed for gathering quantitative data necessary for statistical processing and methodological triangulation.

Case Study Project Evaluation: "Research and Development of a Patient Lifting Device to Aid Standing and Walking for Bedridden Patients, the Elderly, and Persons with Disabilities"

Following the development of the social and economic impact assessment tools, these instruments were applied and validated through a comprehensive evaluation of a designated case study project. This project, titled "Research and Development of a Patient Lifting Device to Aid Standing and Walking for Bedridden Patients, the Elderly, and Persons with Disabilities," received funding from the Fundamental Fund during the 2025 fiscal year. It was conducted over a one-year period with a total budget allocation of 420,000 Thai Baht. The primary inputs for this project comprised the aforementioned financial support of 420,000 Thai Baht and the specialized knowledge and skills contributed by the research team from Rajamangala University of Technology Lanna.

The core activities of the project focused on the design and development of a prototype device engineered to safely assist bedridden patients, the elderly, and persons with disabilities in standing and ambulating. Significant emphasis was placed on developing a prototype that is contextually appropriate for real-world application in community settings, hospitals, or rehabilitation centers, alongside rigorous evaluation of its quality and safety standards.

The research and development activities of this case study project yielded several significant tangible outputs, which serve as foundational elements for subsequent outcomes and impacts. These outputs include a functional prototype of the patient lifting and ambulation

assistance device, ready for pilot testing and practical application. Furthermore, the project developed novel methodologies or conceptual frameworks for lifting system design, established a new database compiling data from actual device testing, and formulated a cost-effectiveness analysis framework. These tangible outputs demonstrate a clear potential for utilization by patients, caregivers, and relevant organizations, thereby initiating behavioral changes or improvements in living conditions, ultimately leading to broader outcomes and impacts.

The case study project demonstrably generated clear social outcomes through the deployment of its prototype product, reflecting positive changes for patients, the elderly, and caregivers. These outcomes include a reduction in caregiver burden, alleviating physical and psychological strain associated with assisting patient mobility; a decrease in patient risk, specifically mitigating the risk of falls or injuries during movement; and enhanced rehabilitation efficiency, facilitating a more effective rehabilitation process for patients. Upon conversion into monetary values, the aggregated social returns for these outcomes amounted to a total of 1,799,807.77 Thai Baht. The Net Present Value (NPV) was subsequently calculated based on the validated SROI ratio of 3.79 and the total project investment of 420,000 Thai Baht. The resulting NPV amounted to 1,171,800 Thai Baht, demonstrating that the project generated substantial net benefits beyond its initial investment.

Sensitivity Analysis

Additionally, a sensitivity analysis was conducted to assess the robustness of the SROI calculation. Two scenarios were simulated: a 10% increase in project costs and a 20% reduction in the duration of realized benefits. The SROI ratios remained substantially high, registering 3.90 and 3.43 respectively. These results underscore the resilience of the evaluation model and the sustained potential for the project's impact, even under less favorable conditions.

Discussion/Conclusion

SROI Calculation Analysis in Basic Research Context

The social return on investment analysis for the fundamental research project, "Research and Development of a Patient Lifting Device to Aid Standing and Walking for Bedridden Patients, the Elderly, and Persons with Disabilities," revealed an SROI ratio of 3.79. This positive value is satisfactory when compared to the allocation of fundamental research budgets. This figure is consistent with DASTA's SROI report of 3.8 and falls within the general target range for development projects, which is typically between 3 and 5. However, this result may differ from the average SROI for fundamental research at Rajamangala University of Technology Lanna due to the nature of fundamental research, which often has long-term impacts and requires follow-up from multiple sectors. This aligns with the recommendations of Suwanna Kampantong et al., who state that SROI assessment alone may be insufficient without a strong supporting data system.

Key Findings on Return Distribution

The balanced distribution of returns across economic, social, and educational dimensions confirms the university's role in creating value in both economic and social spheres. This supports the concept of "Innovation University for the Community" and reflects success in promoting grassroots economy and developing the potential of researchers through fundamental research grants.

A crucial factor contributing to success is the involvement of research beneficiaries from the project's inception. This aligns with the recommendations of Kampantong et al.,

who emphasize the importance of co-creating a research agenda between researchers and beneficiaries from the early stages. Projects with high SROI often involve co-design with research beneficiaries, clear technology transfer mechanisms, and support for impact monitoring after technology transfer.

This research assessed the social return on investment for fundamental research funding at Rajamangala University of Technology Lanna, using the case study "Research and Development of a Patient Lifting Device, etc." which showed that the project generated satisfactory economic and social returns, with an SROI ratio of 3.79. The balanced distribution of returns in both economic and social dimensions reflects the university's crucial role as an "Innovation University for the Community" in creating value to develop the grassroots economy and enhance human capital in the northern region.

Key success factors include co-designing projects with research beneficiaries from the outset, clear technology transfer mechanisms, and support for post-transfer impact monitoring. The study highlighted the distinction between the characteristics of fundamental research funding and strategic funding, which has significant implications for determining appropriate research budget allocation policies for each type of funding.

Proactive Recommendations for Driving Value from Research Investment

University-level Recommendations: Universities must accelerate the development of an integrated research impact monitoring system, incorporating SROI and Theory of Change from the outset. This will enable continuous outcome assessment, strengthen personnel capacity for policy impact measurement, and enhance efficiency, thereby maximizing research investment value.

Policy-level Recommendations: Policymakers must use SROI as a decisive criterion for budget allocation, assigning up to a 30% weight for project renewal, and create powerful incentives for high SROI projects. Budgets must also be allocated for long-term monitoring and to establish a Thai proxy data repository as a national standard for future research evaluation. These mechanisms are crucial to drive research investments to maximize tangible benefits for society and the nation.

Future Research: Future research must focus on long-term monitoring and comparative studies across universities to extract lessons on success factors. The development of predictive impact models using Big Data/ML will be an indispensable tool for accurate foresight. SROI application should be rapidly expanded to other types of research funding, and a real-time impact assessment system developed to enable data-driven, timely decision-making. real-time impact assessment system development for project adjustment during implementation.

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