

Development of An Impact Paradigm for Institutional Research Productivity

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Abstract -*The study described and evaluated the impact on productivity and accountability of tertiary education institutions' research program profile presented in terms of policy/agenda, organizational structure, resources, and activities. Program impact, issues, and policy implications based on existing institutional research environments were derived. Finally, an impact model for institutional research productivity was evolved. Qualitative single-case research design was used. Triangulation with a criteria-referenced survey analysis and round-table discussion was sources of data. The unit of analysis was the institution. Single and cross-case analysis were used to analyze and interpret field notes consisting of descriptive profiles and graphic displays of the organizational structures, research budget, and faculty composition of the institutions and research programs.*

Findings show outcomes of research such as policy/agenda, organizational structure, staffing pattern/incentive scheme, and activities are impact indicators of research process management. Eight alterable productivity-processes outcomes defined to significantly influence impact are clear, focused and specific goals; staffing pattern/ incentive scheme; administrative arrangements; research council as monitoring mechanism; generation; dissemination; verification, and information. The evolved analogue model can measure the impact of the research process enhancing research management. An action plan considers the productivity-processes outcomes in support of a vision towards collaborative networks.

Keywords: *Research Programs, Research Process Management, Productivity Analogue Model*

INTRODUCTION

Strengthening inquiry and scholarship in schools is the single most powerful way of altering all other missions and practices. 'It is also a way of building on the top root-the essence of academy'[1]. The achievement of the research objectives, as one of the mission of schools, colleges, and universities include recruitment, support and reward for intellectually qualified faculty and students. Focusing of efforts on the discovery and application for knowledge relevant to discovery; securing and reallocating resources for inquiry and scholarship; serve as exemplars of theory and research-based instruction in all program preparations; and strengthening relationship with the profession that tests the relevance of on-going scholarship [2].

Research as one of the trilogy of functions indicated in the charters of state supported higher education institutions or SUCs is designed to be related to the curricular areas offered. However, R & D activities in the region are still sporadic without the benefit of participative planning [3]. Knowledge production, as a dimension of tertiary institutions'

functions that need to be fulfilled are guided by the following questions 1) what questions are salient for effective policy decision-making; 2) what methods need to answer these questions; 3) how do we find reliable and valid answers; 4) how does one ascertain whether answers are feasible; 5) how do we help others put the answers to use; and how do we verify that the answers in use make for a difference[4].

Organizational research structures are for knowledge production. Such organizations reveal four possibilities: individual scholar, university-based; non-university organizations; and non-university organizations for profit [5]. Within the structure, policy and agenda emanate which are designed for the development of the countryside. Regional linkages occur specific to the articulated goals. These goals are suggestive of specific areas that serve as input into the three-fold functions: generation of knowledge, methods, and technologies.

Science and Technology (S&T) is a priority brought about by globalization of world economy. 'The ASEAN community has become increasingly concerned in the development plans concerning S&T

capabilities. Indonesia adopted policies to realign S&T activities with existing national development plans such as emphasis on technologies which would create an impact on industries. Malaysia has recognized not only indigenization of S&T but also the need technological imports and scientific manpower. Thailand has likewise pursued a liberal policy on importation of foreign technologies and encouraged applied research to boost the country's economy'[6]. The Philippine science community adopted a S&T Agenda for National Development (STAND) as a strategy in support of the Philippine's blueprint for industrialization in the year 2000. Laid by the Ramos administration, it emphasized the use of superior technologies to achieve competitiveness in a global economy [7]. Among the strategies of this blueprint for science and technology development as indicated in the Science Master Plan [8] which charts the course for the attainment of Philippine industrialization at the turn of the century are: utilization of energy technologies; increased private sector participation; networking; manpower development; review of policies affecting S&T and technology management.

In response, the Department of Science and Technology (DOST) in its bid to bring S&T into the mainstream of development, took a refocusing and prioritizing role regarding programs and technology outputs. It undertook a review of Regional Projects in 1993 which included Technology Transfer, Research and Development, Institutional Development and Linkage among others. Furthermore, in 1994 the Association of Southeast Asian Nations (ASEAN) and Department of Science and Technology (DOST) focused on solving its Plan of Action for Regional S&T cooperation from 1994 to 1998. Envisioned are policy guidelines, strategic plans and action to intensify and accelerate cooperation among ASEAN member agencies and its dialogue partners under the framework of sustainable development.

At the regional level, the Southern Tagalog Region (STARRDEC Region IV- Flagship Program, 1992) has become a growth corridor with thrusts in the fields of agriculture, natural resources, and industrialization. The CALABARZON (Cavite, Laguna, Batangas, Rizal, Quezon) provinces within the region played a major role for implementation of the Japan International Cooperation Agency (JICA) Master Plan Study[9]. Region IV, has eleven state universities and colleges (SUCs) with exception of the

University of the Philippines (UPLB) which already has its established R&D system in the whole Philippine archipelago. A unifying curricular concept of these higher institutions of learning are instruction, research, and extension in trade, vocational, technical, technological fields, professional, and advanced studies in the same content areas.

To sustain the function of research requires the management of critical levels of resources for productive research. Priorities which would rationalize and operationalize research agenda need to include, among others, staff development and training for research. While at present requests for proposals (RFPs) are evaluated based on established guidelines and approved schemes, programs/ projects could be included as collaborative projects and international links to attain a measure of interschool capabilities. These are clear indications of the need for cooperation, sharing of knowledge and resources in research, training, and technology transfer among scientists, government institutions, academe and private sectors. As part of the current S&T infrastructure for development, educational institutions can help accelerate the growth of technology-based production systems.

This study looked into the accountability of research policy in terms of productivity at the tertiary level of selected SUCs. It aimed to determine the institutions' research programs 'capability and productivity toward the promotion of functional research. Moreover, it focused on what research is now and what it ought to be in order to rationalize allocation of scarce resources and promote institutional research capability for both state supported and private tertiary institutions. It evolved and proposed an impact model for institutional research productivity which could establish the possibility and limits of meaningful actions to overcome present trends in a growing technological and industrial community.

Productivity in the efficiency context of education has often been reflected only in instructional programs in terms of number of graduates and their employment. Productivity, in this study, is defined as the number of research outputs/technologies or outcomes generated and disseminated to target communities which are measures of impact of research effort. Results of the study are expected to input into the formulation of normative research policies that enhance research capabilities of the

institutions in terms of planning, implementation, evaluation, and monitoring.

Policy-makers, administrators, and program staff will gain insights into the importance of thinking about research as taking place within an institution; how the system arrived at policies and decisions; the relationships of research to the processes; and the importance of its integration into policy and decision-making. The practitioner-researcher will be made aware of the issues surrounding research policy and established priorities for improving the research systems as they engage in the day to day management of the research process.

In conceptualizing the study, the structure of institutions like SUCs become the unit of analysis which describes the ways in which the present institutional conditions operate. In this sense, the structure has a set of rules from which future institutional behavior can be derived given present conditions. The rules also indicate how the institutions will evolve through time. Feedback relationships among the actions and conditions become the basis of the structure and the manner in which the conditions are transformed through time then back to influence future action. The feedback relationships which explain the behavior of the social system are the antecedents of a model which takes into account organizational context, purposes, structure and problems.

The mission statement of the State Universities and Colleges (SUCs) have mandates of instruction, research, and extension. It is the basis of all school policies and agenda representing the goals or endpoints that direct the organization. However, the institutions vary in age, size, number of programs, faculty complement, and the environment where they are located. Direction setting process typically begin with the assessment of the opportunities and threats to the environment. Decisions are determined regarding institution research program profile which includes research policy/agenda, organizational structures, resources, and activities. Once decision for action is formulated as to how mission should be fulfilled, validation of the decisions and existing outcomes data provide the productivity variables that feed into the impact model.

However the existence of the model does not ensure that it is self-consistent overtime. Implementation indicated by broken lines as shown in figure 1 denote the cyclical nature of the model as well as the feedback mechanism which may be necessary for modification. Relevant variables are the four components of the research programs derived from literature search and baseline survey of the existing environments are policies and agenda, organizational structure, resources (internal and external), staffing pattern/incentives and activities.

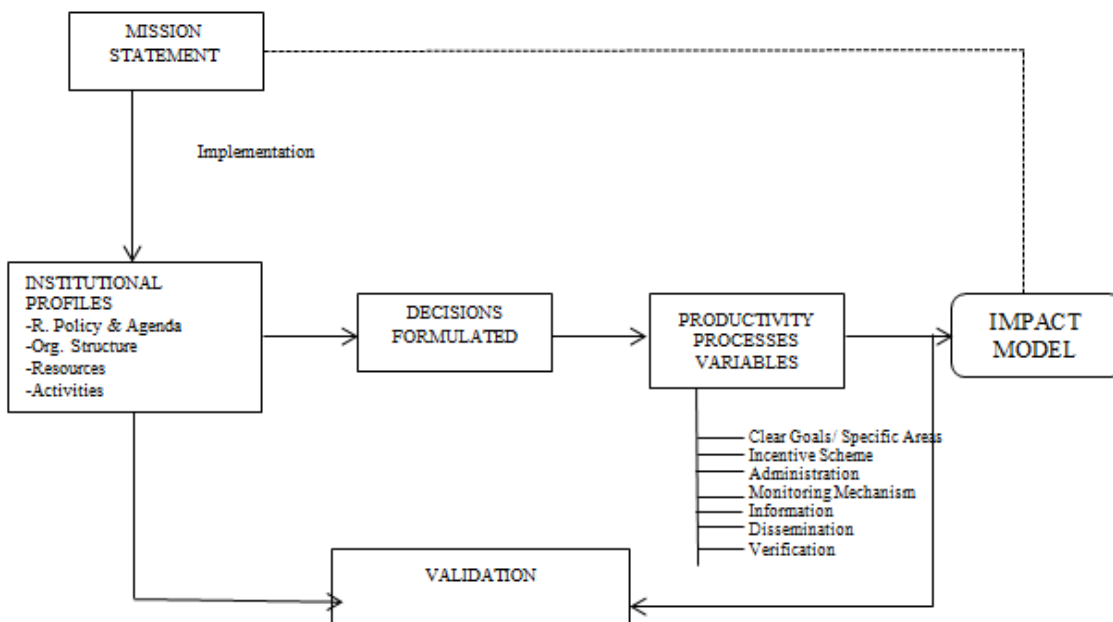


Figure 1. Conceptual Paradigm of the Study

Decisions are formulated through validation processes so that productivity processes variables are determined and identified which account for the aspects of productivity. Productivity variables include clearly specified and focused goals in program areas, staffing pattern, incentive scheme, research councils as monitoring mechanisms, institutional administrative arrangement, generation, dissemination, information, and verification. Using this model, it is predicted that institutions implement their research more efficiently and therefore would be more productive in terms of activities and utilization.

OBJECTIVES OF THE STUDY

The study sought to describe and evaluate the impact on productivity of the research programs of the selected tertiary institutions in the Region. It addressed itself specifically to the following: 1) Present the institutional profiles of the selected higher institutions as to: a) research policy and agenda; b) organizational structure; c) resources; and d) activities.; 2) Determine the impact of the institutions' research programs; 3) State the issues and policy implications based on the existing research environments within and among institutions; and 4) Develop an impact model on research productivity.

METHODS

Research Design

This is a qualitative evaluation study using single-case design with a criteria-referenced survey to respond to the normative question as to how outcomes associated with participation in research programs compare to the program objectives.

Evaluation designs are classified in a variety of ways such as sample surveys, case studies and use of available documentary data. Kenny [9] described 'two potential approaches are case-survey and case-comparison'. In single case design, information is acquired about an individual entity or process that they are valued for their ability to address certain kinds of descriptive questions. Acquiring qualitative information that describe events and conditions is the focus. The structure in data collection is from flexibility of ethnography to the highly structured interviews. Triangulation by 1) content-analysis of documents; 2) a criterion-referenced survey of informants using two-stage sampling design; and 3) a round table discussion to synthesize institutional profiles and identify variables for the analogue impact model.

Content-analysis of documents consisted of 10 college charters to get at research policy guidelines, 3 developmental plans, 15 board resolutions, 8 annual and semi-annual reports, 3 executive summaries, 3 financial statements, 2 manuals on General Appropriations Act (GAA), 4 brochures, 4 school information bulletins, 5 concept papers and 8 newsletters. Criterion-referenced survey was conducted on three institutions from which 89 informants consisting of 28 administrators, 2 budget officers, 5 research directors, 9 research staff, and 56 faculty members were chosen. A two-stage sampling design was used that finally included three state college institutions out of eleven. Criteria for choice were based on the following characteristics: strategic location; type of school; and availability of informants.

Site Selection. Across one of the biggest islands in the Philippines is a region that speaks of its capability for growth and development in the fields of agriculture, natural resources and industrialization, which is Region IV. Its rich, unexploited natural resources such as fertile soil, bodies of water, sufficient rainfall, fair and humid climate, good roads and highways that connect the provinces is reason for its being a progressive region. The region has a total land area of 46,924 sq.kilometers, which compose 16% of the national and consists of several provinces, making it the biggest of 13 regions in the archipelago. Added to this is its being contiguous to Manila. Composed of two subregions named as the 1) Growth Corridor Subregion and 2) Resources Subregion (8), the former subregion provinces composing of Cavite, Laguna, Batangas, Rizal, and Quezon (CALABARZON) were chosen as the locale of the study. The resources that abound in the region are important environmental challenges for the industrialization, regional urbanization, agromodernization and tourism development framework.

There are five state colleges located in the Growth Corridor provinces. With the growing technology-based production systems and the mandates in their respective charters, these institutions are growth centers that can help accelerate technology and transfer. Based on this strategic condition, the five institutions were initially surveyed. Of these state colleges, three are agricultural and two are technological. These three institutions are the Don Severino Agricultural College in Cavite (Case1); Pablo Borbon Memorial Institute of Technology in

Batangas (Case2); and Rizal College of Arts and Trade in Rizal (Case 3).

Availability of Informants. Selection of informants was based on purposive sampling using networking and snowballing method, their willingness to give information. The informants were selected according to who will be able to provide the researcher with information about members of the system oriented and know about the research culture well. More importantly, if they were willing to talk such that there was unsolicited imposition of responses. Informants that tended to talk too much information were taken with caution. Thus, the researcher with the capacity to access the generation of intimate information, had to make judgments as to which information should be included in the observation notes or classified as “off record”.

Instrumentation

An interview guide based on initially gathered data (baseline data) derived from literature search, content analysis of documents, and foreshadowed problems were developed. Also, initial interviews and observations were conducted which were bases for the final interview guide. Validation of the guide was through additional questions to be able to move deeper into analysis of the phenomenon or omitted to check out hunches. Furthermore, in between visits to the site, the researcher left and transcribed the field notes so that more relevant questions were framed. Such relevant questions” must be discovered in the social situation”[10]. The questionnaire had two categories : policy and impact. Policy is further categorized into: structure and resources; while impact has: research agenda, staffing patterns, activities, research output, utilization, and research based staff development. After data were gathered, the researcher deemed it appropriate to revise the categorization scheme . This was the final basis for analysis. Finally four categories included policy, agenda, organizational structure, and research activities. Three major kinds of questions as descriptive, selective, and focused were used leading to different kinds of observations in the field. These types of questions helped the researcher to make in-depth observations.

Data Collection Procedure

Entry. Protocol through formal written letters of requests signed by respective endorsing authorities

were personally handed by the researcher to the president or head of the institutions. The communication sought permission to conduct the study. It specified the research objectives and the activities of the researcher. To establish researcher role, information about the researcher, researcher’s organizational affiliation, and general uses of data. Assurance for the protection of privacy and confidentiality of elicited data and informants were indicated.

Fieldwork.. The first phase was a grand tour of the institutions accompanied by some formal interviews. Often during these tours, the researcher was endorsed to a clerk or an assistant, the board secretaries or research directors. Information that were gathered from these interviews were incorporated and transcribed. During the first days of the fieldwork, the researcher established rapport and reciprocal relations with the prospective individuals or groups to be observed. Board secretaries served as primary informants or “lead” by which the researcher became oriented to the field. The researcher gained a sense of the “totality” of the setting and the informants. Although, an interview guide was prepared, the researcher lived with the informants to experience a wide range of the activities relevant to the study. The researcher had to discover the rules of the game on cultural principles held and articulated by the people inside the institutions. Research gathering information included initial trailing in one direction, perhaps re-tracking that route, then starting out in a new direction in order to determine focus .These focused interviews allowed a closer observation of the research environment and helped bridge observation and analysis. Interviews were tape recorded supported by field notes of the informants. The survey was conducted from April to December.1994 following a fieldwork activity schedule.

Through the case study analysis, the findings and observations were summarized into an executive summary report and presented to expert participants in a round table discussion. Participants composed of six research directors; one PCARRD representative; one regional director; one extension director, and an adviser. Productivity outcomes or variables based on the institutional profiles and impact were identified. These are the process variables used to evolve the model.

Analysis Strategies

Field notes were *subjected* to single case and cross-case analysis based on data collected simultaneously throughout the research period. The analysis led to finding new questions, more data collection, more fieldwork, and more analysis of the existing situation in the institutions. Descriptive profiles of each of the institutions and their research programs were analyzed using single case study method seeking for uniformity of data. On the institutional level, case study included: history, mission statement, and curricular programs; while on the research program level: research policy/agenda, organizational structure, staffing patterns/incentive scheme, process, resources, and activities/utilization. Graphic displays of enrolment trends, faculty profiles, research budget, and organizational structures on and across institutions were analyzed using cross-comparison analysis. A total of 8 charts, 15 figures, and 9 tables were analyzed. Means and percentages were used to describe the academic ranks, educational attainment, staff development/training, and job description levels of informants.

RESULTS AND DISCUSSION

Profiles of SUC Institutions

Case 1 is an agricultural college within 60 kilometers of Manila. It is located on a 70 hectare area and is accessible to public conveyances to and from the Philippine capital. It is the only state college in the province of Cavite approved through RA.#3917 (Batas Pambansa Blg 3917) on June 18,1984. Known to be an agricultural-oriented school, the school is mandated with the mission statement:

“to provide quality but affordable education to the socially and economically disadvantaged. The college shall provide instruction, research, & extension services in the arts, science, & technology, and literature towards the development of individuals with practical orientation.”(Batas Blg 916).

A total number of nine (9) programs with specific fields of study in the graduate and undergraduate level are offered by the college. A high school level one (1) special non-degree program have continuously undergone evaluation, review, and revision of curricular offerings This is to respond to the ardently pursued efforts in providing quality but affordable

education to socio-economically disadvantaged youth in the region. Instructional services are focused on the development of curricular programs, professional training and resources development towards meeting the standards for the accreditation of the Association of Accredited Chartered Universities and Colleges of the Philippines, Inc (AACCUP). It also offers short term courses in computer education, science and general high school. There is a private kindergarten and elementary school on campus primarily for the children of the faculty and employees .

Case 2 is another state college that lies in the coastal city at the south eastern portion of the province of Batangas . It is 112 kilometers south of Manila. Converted as a state college through RA 5270 on June 15,1968,it is located in an industrialized area assuming an important role in the supply of semi-skilled, skilled, and technical manpower; and generation of research-based technologies and innovations. As embodied in its charter, its mission states:

“purpose of said institute of technology shall be to provide higher vocational professional, and technical instruction and training in trade, industrial education, and other vocational course; and offer engineering courses to uplift the technological potential and talents of the youth in this part of the archipelago, and for special purposes to promote research, advance studies and progressive leadership in the field of trade, technical, industrial technological education.” (Pambansa Blg 5270,)

In view of the technological nature of the College and the scientific developments in line with the CALABARZON project as stated in the Master Plan Study on the CALABARZON (Draft Final Report, March, 1991),specifically the support for the proliferating industries, and port development as the major projects for the province, underscore the urgent need for quality manpower training in an industrializing service area. Thus, various curricular programs of the College were revised and enriched. These are six (6) graduate and sixteen (16) undergraduate and non-degree programs . The proliferation of industries in the neighboring environ necessitated the inclusion of engineering and arts and sciences, including computer science undergraduate courses. Also significant was the signing of a MOA

of the College for the implementation of the second phase of the Dual Training System Project in the Department of Industria Technology. So far, the college is the only government educational institution in the country piloting dual-tech projects.

Case 3 is a chartered college of agriculture and technology set atop an elevation of about 1,800 feet above sea level in the mountain range of Rizal overlooking a scenic Laguna Lake and surrounding lake towns. Through RA 622 in June, 1983 the college was made a chartered institution. The enabling mandates the college to provide and the four-fold mission of instruction, research, extension services, and undergraduate students with technological, professional, occupational, vocational instruction and training in the Applied Arts and Sciences.

Each institutional case study profile revealed concern for higher learning complemented by a research function common in their respective charters. Funded by the government, they are accountable for their mandates. Inquiry is carried out by faculty in the institutions. Research organizational structures are guided by each of their formulated rationale and functions depending on the nature of the institutions. Research Councils are present which serve as mechanisms for coordination and facilitation of research efforts. But despite the presence of such support mechanisms, research activities are generally hampered by lack of coordination and resources.

The cross-case analysis made on the institutional profiles showed that in determining impact, criteria and research linked variables the experience described in the research environments suggests the following:

Quality of Goals. Research policies focused on development in the country side defined through its people, community, the institution itself, and the region in the countryside. Case 1 has clear, measurable and venue specific goals with three unified foci as generation, verification, and enumeration of technologies. Specific at the village – level, emphasis on bio-sustainable upland intensive farming. It was directed primarily for the people and community within its province. The agenda focus on the technology transfer of five specific commodity packages enumerated as 1) upland farming; 2) food processing of fruits and vegetables 3) organic farming; 4) tissue culture; 5) design and fabrication of village level equipment. This indicates the institution's thrust is based on a technology-based system and an

instrument for technology generation with significant social value for research.

Case 2 has efforts focused on outcomes to input into the three processes of coordination, rationalization, and prioritization directed towards countryside development. In contrast to Case 1, agenda are processes which include: 1) gathering and computing of data; 2) conducting of special and external research; and 3) leading and coordinating other agencies.

Case 3 has goals focused on knowledge to input into the three-fold function of generation of knowledge, methods, and technologies, complement and reinforcement of the mandates of the college. Though specific areas are suggested which include 1) conduct and dissemination of research; 2) verification; and 3) establishment of linkages, still these areas would require another step of request for funding procedure and allocation. The institutions' research priorities indicate the increasing importance given to research.

However, agenda for Cases 2 and 3 reflect the need for retraining in research management for re-direction of research strategies and reconsideration for a research agenda workshop. This agenda would provide recognition of the research role of the institute so that potential researchers would be given some particular direction in their work, nurture its research capacity and show the need for a greater impact of research on policy and implementation. Planning of research is needed to ensure increased contribution of research results to educational policy and practice for regional and national development.

Organizational Structure Mechanisms and Management

Research program of the institutions are under the vice presidents with a multi-sectoral council giving direction in the independent research centers. These centers are envisioned as coordinative and facilitative in their relationships with departments/programs/ and projects. However, the structure shows it is only Case 1 which is institutionalized while Cases 2 & 3 have formed their structure as specialized units. Such institutionalization (cited in the Thailand study) in Case 1 is an expression of the concern and recognition for the importance of research revealing capability and productiveness.

For Case 1, the Council generally meets in small commodity specific committees not necessarily en

banc. The Dept/Project Committees and Researchers Pool reflect identified organizational mechanisms as factors in facilitating production, dissemination and use of research. Through the presence of the monitoring and evaluating committees, the office is constantly in the process of studying and examining their jobs, functions and networks with other research and development offices.. This is to improve quality of research and their policy-decision-making processes.

Similarly, Cases 2 & 3 have councils which meet by project assignments. However, lack of coordination in the research process reveals organizational skills and strong leadership roles as critical ingredients. It also reveals the need for a better nurturing research climate characterized by cooperative institution relationships between researchers that would intensify collegiality particularly between reviewing administrators, faculty, and those organized into research teams. Such collegiality is a facilitating condition for productivity. To cite, is the National Council for Educational Research and Development which provides a new breed of educational research studies and a model for marshaling scarce resources towards research to enhance quality of education in the Philippines.

For Case 1 the Board acts as advisor to the Council while the director is chairman, Unlike Cases 2 & 3, the presidents head the councils. In the latter however, there is absence of specific programs reflecting that the college presidents' role is not a guarantee for the specific and focused research goals/policies and corresponding allocations.

Congruent with the findings of the South East Asian Research Review and Advisory Group (SEARRAG)*, the status of research for Cases 2 & 3 reveal that "within planning and decision-making, research has not attained its proper status"[11]. This is evidenced by the existing colleges' research structure which are only a few decades old, Relevant is the finding of Sutaria and Elequin [11] that the Philippines has had no national level research unit, except for the the recent National Testing and Research Centre (NTRC). Thus, situation in Cases 2 & 3 could be improved further by institutionalization which will give its policy-makers the opportunity to know and share findings of educational research with their peers, learn how data can contribute for effective policy decisions.

Staffing Patterns/Incentive Scheme

Research Directors have been appointed to head the centers. For Case 1 the director is full time to the Council. Cases 2 & 3 have their directors holding half time and quarter time appointments respectively. The deans/ directors/ heads of departments and campuses including the VP are full-time in the instruction and/or administration through membership in each of their respective councils.

Additional compensation are honoraria for involvement in research projects only for Case 1. This finding is similar to the SEARRAG Singapore study [12] in which most researchers had teaching and/or administrative responsibilities serving as academic adviser or thesis supervisors. Only about 30% of their time is spent on research due to other responsibilities. No such incentives exist in Cases 2 & 3. Research is covered under a deloading policy which range from 6-9 units with rate based on academic rank. This finding is consistent with the Indonesian and Malaysian studies where research productivity in their environment do not command social value that material rewards are practically non-existent. Cited in the Malaysian study, this restrictive research climate characterized by insufficient reward system, lack of cognition and support for research pose as constraints to productivity.

Interested faculty in research for Case 1 were recruited in a college-wide survey. Thus, faculty who opt for research are designated in-charge of specific commodity packages with support staff. For Cases 2 & 3 full time faculty into research are deloaded by six units and work with full time support staff appointed at the Center. It is not indicated how these support staff gets allocated for specific projects.

Compensation and incentives for Case 1 imply not only priority for research but also sophistication in research management as compensation is based on rank. Added to this, they are only required to teach 3 units to maintain faculty rank. For externally funded projects, a contract is signed with corresponding research honorarium. Other incentives include plaques of appreciation and financial gains from products/ technologies generated also reflecting sophistication in the nurture of its researchers.

To sustain the function of research requires participation by qualified men and women in all places of the activities. Cases 1 & 2 by educational attainment and academic rank profile as reflected in the ratio of doctorates to those who are not implies

leadership roles. These colleges have highly qualified staff with support (data gatherers and computer technicians) who can direct, monitor, evaluate and disseminate research. Also, these key individuals reveal the existence of significant roles within the institutional setting who have the authority to initiate and move research in certain directions.

However, for Case 3, its high level of educational attainment does not seem to ensure a focused and productive research program in terms of outputs. This may be due to the institution being young, which may explain why it has focused on staff training and development. Case 2 shows the need for more faculty/staff development efforts to attain the aspired vision of leadership to direct, monitor and even disseminate research. The absence of internationally sponsored programs in Case 2 indicates the need for efforts to work at such linkages so that status of research activities could be enhanced. There is need for a continuous flow of foreign research publications and research grants that assures continuing close ties with its counterparts in the global intellectual community.

Resources

Nurture of faculty/ staff in terms of staff development and scholarships reflects Case 1 possesses capability to conduct “in-house” trainings as a function of institutional funding which has been cited in the SEARRAG Indonesian study as factors contributing to productivity. This is supported further by the high percentage (81.8%) of institutionally-sponsored trainings and seminars which are unlikely for the other cases.

Similar to the SEARRAG countries’ findings, another factor in management of resources for productive research in the systems is a program of staff development. Each country has its own staff development program, whether they are in research units, colleges, or universities. These efforts strengthen the research capacity of staff teaching many forms – long-term, short-term, on-the-job training or cooperative projects. The Thailand study described two committee levels to train junior researchers – policy and technical committees. Through this procedure, top executives from all concerned agencies are appointed to be members of the policy committee. Members are highly experienced resource persons who are able to assist in

identifying and solving a problem through the research process.

In the SEARRAG case studies, funding for educational research is not confined to the budget of the ministries of education only. Thus, both internal and external funds can also be made available. For Case 3 only external funds are available while Case 2 has only internal funds/ allocation availability. The 4.7% allocation (1991-92); 5.1% (1992-93), and 7.4% (1993-94) show the increase in budget for research of Case 1. Except for Case 1, resource allocations for programs/ projects do not exist. The existing funds available for Cases 1 & 2 reveal that the autonomy to rationalize an agenda is expected. However, interviews and documents in Case 2 reflect that allocations for programs/ projects do not exist.

Generally for all cases, time as a key aspect of the research infrastructure allocated to researchers has been seen as a problem. Most researchers have teaching and/or administrative responsibilities serving as academic/thesis advisers. Little time on research is spent affecting the research process. This implies for a better nurturing climate characterized by cooperative institutionalized relationship between researchers and information research setting which cultivates productivity values and incentives.

There are several features in the working environment which can encourage individuals to conduct research such as supportive administration and colleagues. Researchers need to be able to discuss what they do, the questions they are researching, both with peers, and others interested in knowledge. This collegial relationship among researchers allows for an exchange of ideas and views essential to inquiry process. SEARRAG tries to promote the effective networking at the regional and national levels. Towards this purpose, it is proposed that a group of educators representing policy-makers, researchers and practitioners should be identified and brought together regularly to discuss matters and issues of common concern.

Activities

In all cases, the institutional research activities are indicators of impact of the management of the research process that differ by institutions. For Case 1 the measure of impact was on the users through generation, dissemination, information,, and verification relative to technology transfer. For Cases 2 & 3, the same processes were identified for

enrichment of instruction (Case 2) as well as technology transfer, collaboration with another state university plus an infrastructure on the community (Case 3).

Impact on Productivity

By institutions, the impact of productivity makes for a difference. Except for Case 1, impact on productivity has not been evident. By research agenda, it is only in Case 1 with divisions focused on specific packages as revealed in the completed and on-going research programs/projects/study titles gathered. Responding to its agenda which considers the community (village-level) as target user, research outputs impact on technology transfer.

Contrary to its being categorized as a regional center for research and special studies, Case 2 has policy research priorities and agenda focus had been on the institution alone. Impact has only been on curriculum as reflected from the five institutional outputs completed supposed to feedback into the enrichment of instruction.

For Case 3, impact which is supposedly on knowledge, had been unfocused, non-specific and non-generalizable as revealed by the nature and number of its output. However, technology transfer supported but its collaborative network with another SUC in another region suggests positive effects of linkages. This implies that more of such activities have to be encouraged if technology transfer is part of its agenda.

Except for Case 1, productivity deduced from the distribution, after enumeration of the completed research projects in Cases 2 & 3 seem to have been influenced by the conception that graduate students' research are outcomes of the research programs. Further, this finding indicates that the teacher-researcher tradition is absent as reflected by the very small number of action-research types. Activities therefore reflect the need for more technologies and research-based innovations expected of technology institutions. Utilization of findings in Case 1 is through verification by farmer co-operators. Dissemination of findings through publications in the form of annuals, forums, newsletters, etc. puts research to use. Copies of publications are widely distributed.. Extension completes the college's trilogy of functions. With the ultimate goal of improving the quality of life in the countryside, this program continue to forward in coordination with different

technical departments, government organizations (GOs) and other non-government organizations (NGOs) . Effective technology transfer mechanism is implemented not only through publications but also conduct of short-term trainings, non-formal education, and implementation of community based and action-oriented projects. This reflects the presence of a support system to improve the quality of research and its utilization.

For Cases 2 & 3 out-of-school youth, industries and other interested parties are also disseminated with copies. However, as of the interview conducted, continued support and funding are insufficient for publishing. Supported by the Philippine study, findings reveal that non-dissemination or non-utilization of research efforts because of lack of support and lack of research/ and researchers are constraints to productivity.

In summary, the impact of the individual research programs as to the four variables (goals, organizational structure, resources and activities) implies the fact that while research is one of the three functions of higher education, its priority varies. Furthermore, except for Case 1, there has been very minimal on productivity as reflected by the number of outputs in Case 1, not generated by the other two institutions. With the impact of Case 1, the following outcomes are identified: 1) clear, focused, and specific goals (for quality of goals); 2) Research Council as monitoring mechanism (for organizational structure);3) institutional administrative arrangement (for staffing pattern) and 4) incentive scheme (for mechanisms & research resources available); 5) generation; 6) dissemination; 7) information; 8) verification (for activities/ utilization for productivity).

Issues and Policy Implications

From the institutional cross-case analysis, the following specific issues and implications are raised.

Quality of Goals: Retaining in research management providing re-direction for productive research strategies and an agenda which would realign budget for specific programs/ project allocation.

Organizational Mechanisms: Strengthen organizational structure with mechanisms identifying specific research programs and corresponding allocations; staffing patterns and incentive schemes which included operationalization of research agenda, evaluation of present staff who can go to research full

time and capitalization on the encouragement & motivation for research through an incentive scheme which include career patterns with corresponding salary structures/ plaques of appreciation and other external rewards based on research activity accomplishments.

Existing Resources Available for Research Promotion: Acquisition of other sources of funds for program/ project allocation is needed in addition to existing resources available for research. Leadership capabilities have to be enhanced through the acquisition of funds for continuing faculty/staff development program; and a reanalysis of selection scheme and training for research.

Productivity: Diverse activities through the formulation, planning & organization of research agenda with specific and relevant programs identifying the foci and target users; and utilization/dissemination of research outputs to strengthen the link between research policy, planning and implementation.

Thus, infrastructure for research productivity in these SUCs needs an implementation machinery in support of intended research outputs attained through 1) focused goals which stem from their missions; 2) an incentive scheme emanating from the leadership roles; 3) resources for research and 4) focused programs/ areas (activities) which are outgrowths of faculty specialization and course offerings.

Model Building

In the conduct of inquiry, variables are identified as influencing outcomes of research. When the interrelationships among these variables have been formulated, they are combined together into a hypothetical model. A model requires a proposed structure to investigate relationships between variables. [13] In order for a model to be useful, it should fulfill the following requirements: contain structural relationships rather than associative relationships; lead to the prediction of consequences that can be verified by observation; structure will contribute to explanation of causal mechanisms; and aid to the imagination of new concepts and new relationships or be an extension of inquiry.

An analogue model to measure impact of the management of the research process for the research programs was developed. This model indicated the

parameters of the research process to explain the changes and subsequently predict the accuracy of the parameters established.

The Impact Model

Structural relationships of the institutions, the users both at the regional and national level constitute the environment for research as parts of the research process flow. The institutions, their mission, goals and their implementation machinery promote the research process that eventually results in research productivity.

These components were incorporated in the evolved impact model which provides an analytical framework perceived to assess an institution's capacity for educational research defined Schaeffer and Nkinyangi [11]: "the extent to which it is able to effectively use relevant inputs, generate, conduct, evaluate and use educational research; then maintain and periodically renew (revision) their abilities."

The mission statement as the overall goal of educational efforts directs the research process within the institutions. The implementation of the research process is indicated in the machineries categorized into organizational structure, resource, activities and the eventual outcomes of research projects.

To sustain the function of research requires the management of critical levels of resources for productive research. Priorities which would rationalize and operationalize research agenda need to include, among others, staff development and training for research. While at present requests for proposals (RFPs) are evaluated based on established research proposals, approved schemes, programs/ projects could be included as collaborative projects and international links to attain a measure of interschool capabilities. These programs/ projects are administratively organized arrangements by teams composed of project leaders, researchers and support staff with realigned budget coming from internal and external funding. Management systems that promote continuous improvement (through the Research Council that monitors, evaluated, and disseminates research) need to be instituted so that their activities reflect research-based innovations (research output generated, disseminated, verified or used as information) expected of the institutions.

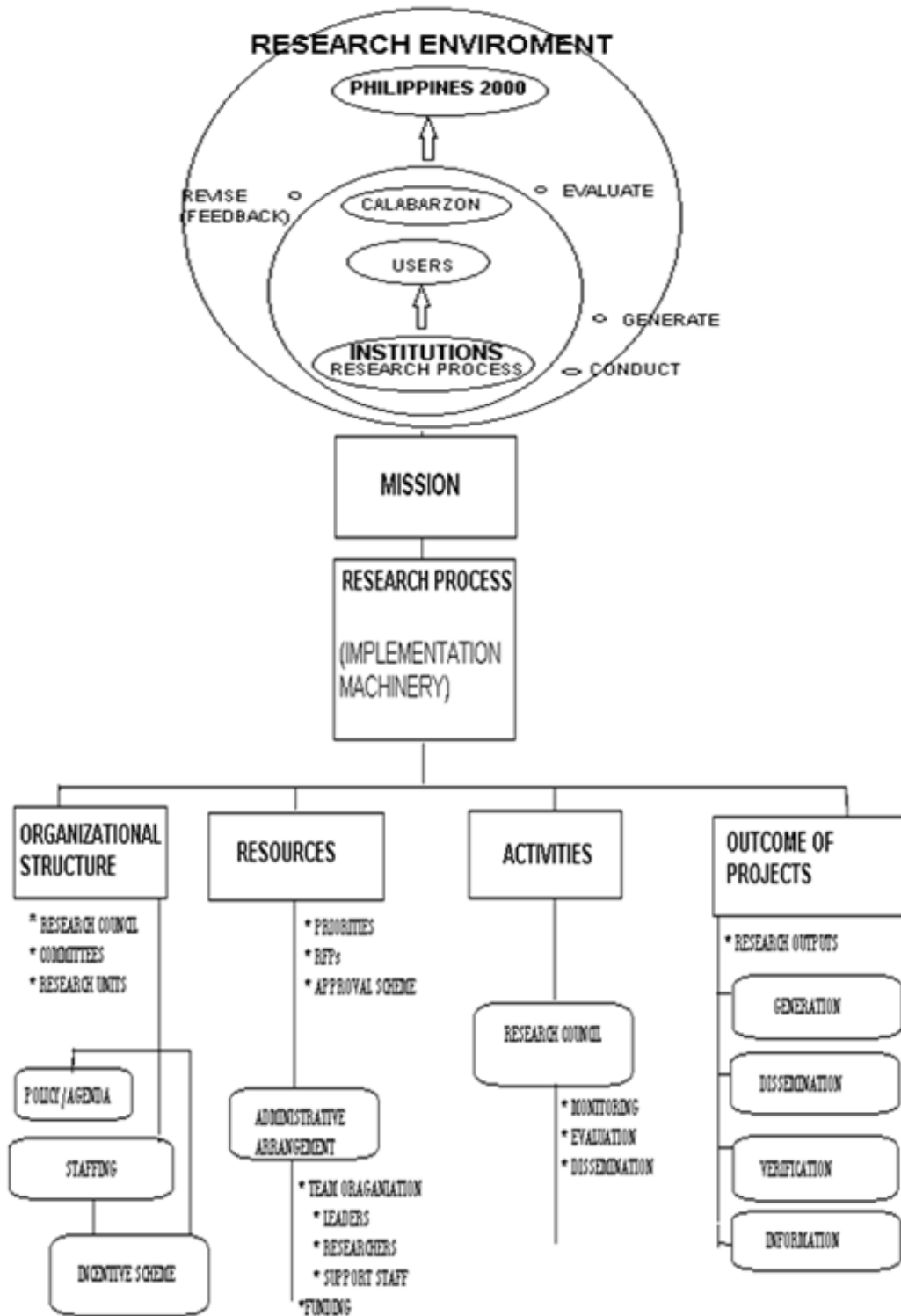


Figure 2. Impact Model for institutional Research Productivity

Table 1. Proposed Action Plan

WHAT Tasks	WHO Persons Involved	HOW Strategies	EXPECTED OUTCOMES
Enhancing research organizational management policies and procedures for productive research strategies attuned to the changes of its people, community, respective provinces and the region.	Administrators/ Faculty Staff	Training Program Workshop	Management Policies and procedures
Re-examination, reorientation and revision of programs for effective utilization of faculty/staff for effective implementation.	President and directors for research/ deans	Research agenda Workshop	Adequate time given for instruction, research and extension
	Interested faculty staff/director for research	Request for Proposal (REP)	Network for exchange of educational and technological information
			Monitoring Evaluation

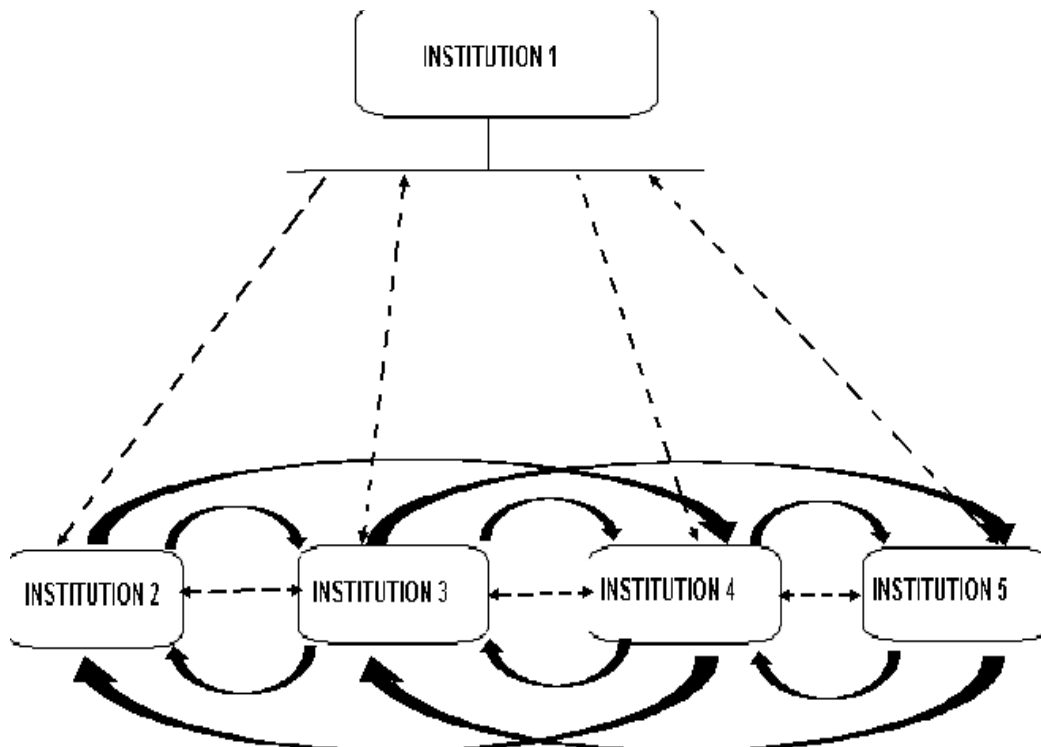


FIGURE 3: PROPOSED COLLABORATIVE NETWORKING MODEL

CONCLUSION

The impact process in Cases 1 focuses on technology transfer to the users as a result of a needs assessment survey wherein the faculty organize themselves into project teams by areas of specialization and by interest areas. For Cases 2& 3, impact result is based on “free for all individual interests” or related to their degree requirements focused on instruction programs and technology transfer as revealed in Case 3.

Alterable productive processes variables, viz :clear , focused goals, incentive scheme, administrative arrangements ,monitoring mechanisms, generation, dissemination, verification ,and information predict impact of the research programs in the selected SUCs.

An analogue model (See Figure 2) could measure the impact of the research process which enhances the management of research programs. Congruent with Schaeffer’s idea, (1988) “research is an open system deriving inputs from the environment which in turn send inputs into it. Interactive relationships between research and its environment imply that the development of capacity for research must be considered in relation to the general environment which includes research and research process.”

RECOMMENDATION

The Philippine scenario at present has institutions with minimal and almost no teacher-researcher tradition and compete for scarce resources[14]. Regional educational research institutions, particularly state colleges and universities, can help shape the organizational trend planned on a positive perspective. Networks of higher education institutions in the region provide the basis for the region to develop leaders in research and development. This vision can be realized if they develop leaders in research and development and are allowed to build appropriate networks that surmount national boundaries (Figure 3).

Bloomberg and Greenfield [15] suggested a common vision shifting from the present organizational vision to a universal vision which is “a blueprint of a desired state” an image of a preferred condition to achieve in the future”. Such vision could start with a strategic plan of actualizing that vision valuing and seeing the vision, articulating by making the vision public, planning for the strategies and finally, mobilizing the people.

A proposed analogue model and action plan deduced from the findings and implications of the

study which would consider the productivity processes outcomes rationalizes the preferred vision in the management of the institutional research process. A legislative agenda to support this vision towards collaborative network in the region can provide the impact for productivity in the institutions, province and the region.

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