Quality & Benchmarking for Research in Universities

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Research is one of the prime reasons of the genesis and existence of mankind and an integral part of its advancement through the ages. Quality of research work determines the pace of growth in solving the mysteries and unknown facts eventually paving the way of a better life for our next generation. The researchers in academics have different mindset and goal for doing research, conflicting in the down line with the purpose of research and personal interest. Benchmarking the quality in research work will serve as a guide to researchers and propel them towards quality research resulting in innovations.

1. Introduction

Research & Development Programs in Higher Education

With increased focus on research and development programs by the University Grants Commission (UGC) in India duly supplemented by assistance in various forms has resulted in tremendous growth of research work in diverse fields by the academicians. The exponential growth in information technology has also helped in quick dissemination of research related information thereby resulting in the spurt of publication of research papers.

The fact that the autonomous bodies like UGC is using performance indicators for higher education is being driven by the desire on the part of government to introduce more market-like competition into higher education. The idea behind such move is to make institutions more flexible, cost-efficient and responsive to the needs of society. The performance indicators in higher education system is more research oriented with a desire that it works as a catalyst for active research, though ironically, the effect is opposite to that intended.

The purpose of performance measures for benchmarking in higher education is to shoulder the responsibility of enhancing the responsiveness and quality yet being flexible and innovative.

There is growing evidence that market competition in higher education may stimulate bureaucratic rigidity rather than flexibility and diversity (Marginson 1993; McElwee 1992; Meek 1995).

Most of the papers published by the researchers are targeted for increasing the number of publications in personal portfolio rather than being a true research. The fact that UGC gives weightage to the number of publications is exploited more for academic growth rather than for true research.

Looking closely at publishers of research papers, only a few are worthy of providing the quality expected from a research paper. Sensing the urgency of researchers to publish their research papers, lot of publishers have cropped up the world over. The process of peer review has been mocked by these publishers for monetary gain and cheap publicity. Else, it is hard to explain the publication of a research article containing mistakes within a week or fortnight of its submission with little or no comments from reviewers.

Hence a mechanism to rate the research performance is essentially needed which requires a set of quality dimension indicators duly validated for the said purpose.

What is Quality? Quality has been an eternal quest of humankind. While perception of it may differ in views from person to person, the seekers nevertheless form a set of criteria to measure and validate the quality of an object for acceptance.

Definition of quality from Online Oxford Dictionaries: [noun] the standard of something as measured against other things of a similar kind; the degree of excellence of something; distinctive attribute or characteristic possessed by someone or something.

To understand and define 'Quality' its various facets need to be understood. Quality being a subjective phenomenon, it is the emergent emotion resulting from the combination of perception and expectation. The feeling of high quality occurs when perception exceeds expectation; the feeling of low quality occurs when perception does not meet expectation. When perception and expectation match the sensation is satisfaction which represents neutral quality. Thus, quality is the function of a product or service that defines its degree of excellence.

What is Benchmarking? The benchmarking concept is more or less understood to be an act of imitating or copying something for the better. But in reality this proves to be a concept that helps in innovation rather than imitation, as stated by Thompson and Cox (1997).

Definition of benchmark from online Oxford Dictionary: (noun) a standard or point of reference against which things may be compared.

Benchmarking has been defined by Jackson and Lund (2000) as: Benchmarking is, first and foremost, a learning process structured so as to enable those engaging in the process to compare their services/activities/ products in order to identify their comparative strengths and weaknesses as a basis for self-improvement and/or self-regulation.

Garlick and Pryor (2004) have built upon this notion in their work to further characterize benchmarking: in the university situation [as using] terms like collaboration, organization learning, inclusiveness, reflection, review, leadership and improvement. This way is about connecting up relevant stakeholders both within and outside the institution in such a way that leads to knowledge exchange about why, what, where and how improvement might occur.

'Benchmarking is the open and collaborative evaluation of services and processes with the aim of emulating or improving best available practice'. (Price 1994)

'Benchmarking is a process to facilitate the systematic comparison and evaluation of practice, process and performance to aid improvement and self-regulation' Jackson (1998)

Several authors have put their own views on benchmarking which makes it clear that benchmarking is a self-improvement technique involving various tools & techniques to achieve the expected goal.

Types of Benchmarking: The classification of benchmarking is superficial in nature as the context and the underlying process need to be taken into account. Various authors have classified benchmarking based on their research area. Bhutta & Huq (1999) classified benchmarking into seven categories based on what is compared and what the comparison is being made against:

- Performance benchmarking: It is the comparison of performance measures for the purpose of determining how good our company is as compared to others
- Process benchmarking: Methods and processes are compared in an effort to improve the processes in our own company
- Strategic benchmarking: The study is undertaken when an attempt is being made to change the strategic direction of the company and the comparison with one's competition in terms of strategy is made
- Internal benchmarking: When comparisons are made between departments/divisions of the same company or organization
- Competitive benchmarking: Is performed against ``best'' competition to compare performance and results
- Functional benchmarking: A benchmarking study to compare the technology/process in one's own industry or technological area. The purpose of this type of benchmarking to become the best in that technology/process
- Generic benchmarking: Comparison of processes against best process operators regardless of industry
  Jackson (2001) has classified benchmarking according to the nature of the referencing activities process as:
- implicit (bi-product of information gathering) or explicit (deliberate and systematic);
- conducted as an independent (without partners) or a collaborative (partnership) exercise;
- confined to a single organization (internal exercise), or involves other similar or dissimilar organizations (external exercise);
- focused on the whole process (vertical benchmarking) or part of a process as it manifests itself across different functional units (horizontal benchmarking);
- focused on inputs, process or outputs (or a combination of these);
- based on quantitative (metric data) and / or qualitative (bureaucratic information)

Various other authors have also classified benchmarking processes which are more or less same as discussed above depending on their benchmarking criteria.

What is Research? The word "research" is a combination of two syllables re and search. While re is a prefix which means again, anew or over again, search is a verb meaning to examine closely and carefully, to test and try, or to probe. Literally these two words sensitize about similar and often overlapping activities involving a search for information.

Research could be a search for individual facts or data which is concerned with facts rather than seeking knowledge or performing analysis.

Research may be a report or review by collating and synthesizing existing information typically found in books, articles, research papers and web sites. This type of research is not designed to create new information or insight rather is a summary of the past.

Research which is universally accepted as real research is the process of gathering new data or information through experiments, surveys, or any other available techniques and analyzing this information or data to extract new meaning from it. This may result in some innovation or development of unique solutions to general / industrial problems or cases.

Definition of research from Online Oxford Dictionaries: (noun) the systematic investigation into and study of materials and sources in order to establish facts and reach new conclusions. (verb) investigate systematically.

As per Wikipedia "Research can be defined as the search for knowledge, or as any systematic investigation, with an open mind, to establish novel facts, usually using a scientific method".

Various authors have defined research with different perspective through a clear description of its key characteristics. A few definitions are presented below followed by the key characteristics.

Research is systematic, controlled, empirical and critical investigation of hypothetical propositions about the presumed relations among natural phenomena. (Kerlinger, 1973).
Research is the process of looking for a specific answer to a specific question in an organized, objective, reliable way. (Payton, 1979).
Research is a systematic, formal, rigorous and precise process employed to gain solutions to problems or to discover and interpret new facts and relationships. (Waltz and Bausell, 1981).
Research is the pursuit of truth with the help of study, observation, comparison and experiment; the search for knowledge through objective and systematic method of finding solutions to a problem (Kothari, 2006).
The purpose of research is to prepare the mind for active work as opposed to becoming a repository or an encyclopedia. Research is a process of collecting, analyzing and interpreting information to answer questions. But to qualify as research, the process must have certain characteristics: it must, as far as possible, be controlled, rigorous, systematic, valid and verifiable, empirical and critical.
Researches in universities are more of academic nature than an industry problem or innovative product related research. Research in industry is product driven whereas research in academia is idea driven. The industrial research faces the challenge of deployment of its findings much more significantly while academic research can afford to focus on ideas exclusively with longer gestation periods.

Types/classification of Research: Research may be classified based on six perspectives as detailed here:

1. **Application of research study: Pure and Applied Research**
   Pure research also commonly referred to as fundamental research is mainly concerned with generalizations, hypothesis testing and/or the formulation of a theory. The purpose of pure research is to produce knowledge which adds up to the existing research methods. Pure research is quite often the basis of evolving necessary concepts, principles and laws. It thus aims at obtaining knowledge of the logical processes involved in a phenomenon. It pertains to the quest for knowledge about a phenomenon without concern for its practical use. Such a research may either verify the old theory or establish a new one.Applied Research, on the other hand, utilizes pure research to analyze and solve an immediate problem facing a society or an industrial/business organization. Applied research is original investigation undertaken to acquire new knowledge but directed towards a specific, practical aim or objective. Marketing research or evaluation research or research done to identify social, economic or political trends that affecting a particular institution are examples of applied research.

2. **Method of processing of data involved: Quantitative and Qualitative Research**
   Quantitative research is based on the measurement being in numeric terms and is applicable to phenomena that can be expressed in terms of quantity. There is a need to look at the accuracy and trustworthiness of different kinds of quantitative data along with their reliability and validity in quantitative research.
   Qualitative research, on the other hand, is concerned with qualitative phenomenon, i.e., phenomena relating to or involving quality or kind. Qualitative data refers to all non-numeric data or data that have not been quantified. Researchers can obtain qualitative data by means of open-ended questions in a questionnaire or from interviews. These data are always in the form of a large amount of unstructured textual material and cannot be analyzed straightforwardly (Bryman & Bell, 2003).

3. **Based on Objectives in Undertaking the Research: Descriptive and Analytical**
   Descriptive research includes surveys and fact-finding enquiries of different kinds. It may include ex post facto (after the fact), case studies, correlation studies, developmental studies, or survey studies. The major purpose of descriptive research is description of the state of affairs as it exists at present. Descriptive research describes the present status of people, attitudes, and progress and is commonly used in social science and business research. It is worthy to note that descriptive research methods can only be used to describe a set of observations from the data collected. It cannot draw conclusions from that data.
   In analytical research, the researcher attempts to explain why and how of the research study, using facts or information available. The researcher attempts to analyze the available data and make critical evaluation about the research study. Usually a cause–effect relationship among variables is the outcome of analytic research.

4. **Inquiry Mode Employed: Explanatory and Exploratory**
   Explanatory research explains the causes of social phenomena. It aims to establish a relationship between variables, i.e., how one is the cause of the other, or how when one variable" occurs the other will also occur. For instance, explaining the relationship between broken families and juvenile delinquency, or between drug abuse and the lack of family control, or between a students' strike in a college and the apathy to solving students' grievances.
   Explanatory (or causal) research is mainly concerned with causes, or the 'why' factor, about a phenomenon. It does not involve comparison and the factors of change. For instance, research on violence against women would like to answer the question why men commit violence. Then, it is an example of explanatory research. The hypothesis in an explanatory research expresses the relationship between two (or more) variables, and the research design focuses on

ascertaining the 'why' aspect of the co-relationship. The co-relationship studies should not be confused with causal studies, as they are not synonymous. Two variables in a hypothesis may be related to each other either positively or negatively but may not have a causal relationship.

Exploratory research is qualitative which becomes useful in formulating hypotheses or testing hypotheses and theories. In this research, the assumption is that the researcher has little or no knowledge of the problem or situation under study, or is unfamiliar with the structure of the group under study. Exploratory studies are also appropriate for some persistent phenomena, like deficiencies in the functioning of educational systems, corruption among the political elite, harassment by police, rural poverty, etc. Exploratory studies are quite valuable in the social sciences. They are essential in a researcher breaking new ground.

5. Initiation Process Of Research: Conceptual and Empirical Research

As the name suggests the conceptual research is the development of certain new concept or theory based on certain abstract idea(s). The development of a concept based on certain facts or reinterpretation of any existing concept to form reinvented concept is also a part of it. This type of research is generally used by philosophers and thinkers who keep on challenging the existing concepts.

Empirical research relies on the knowledge gained through direct and/or indirect experiences or observations, often without due regard to systems and theory. The conclusions are based on the data collected which are capable of being verified by further observation or experiment. In such a research it is necessary to get first hand facts to have a working hypothesis, and to set up an experimental design. Such research is appropriate when proof is sought that certain variables affect other variables in some way. Evidence gathered through experiments or empirical studies is a powerful support for a given hypothesis. Research design varies by field and by the question being investigated. Qualitative and quantitative forms of analysis are also combined by many researchers to answer the questions in a better way which cannot be studied in laboratory settings, particularly in the social sciences and in education.

6. Method of Research: Experimental and Evaluative

Since ancient time experiments has been the purest way of dealing with the problem of cause and effect. Therefore, the experiment is the most sophisticated way of getting at the problems of explanation. In this type of research the researcher would like to show that some factor or attribute say 'a, b, c…' causes 'A'. For the purpose experiments are conducted by varying factors say 'a, b, c…' and the effect is noted on 'A'. The experiments conducted should be able to satisfy that factors 'a, b, c…' is necessary and sufficient condition for 'A' to happen. Experiments may be done in a controlled manner which involves the manipulation of circumstances. The researcher needs to identify factors which are significant and then introduce them to or exclude them from the situation so that their effect can be observed. The identification of causal factors, the introduction or exclusion of factors to or from the situation enables the researcher to pinpoint the factors that actually cause the observed outcome to occur. Experiments rely on precise and detailed observation of outcomes and changes that occur following the introduction or exclusion of potentially relevant factors. They also involve close attention to the measurement of what is observed.

Controlled Experiment Research may be in a laboratory setting or in field settings. Laboratory experiments are usually of short duration and involve close control of variables to isolate causal factors. They involve meticulous observation and measurement.

Social workers have become increasingly involved in evaluative research. The essence of evaluative research can be reduced to the following three basic questions. How effective is the program (or agency, procedure, or administrative structure)? How efficient is the program? This generates the question of cost benefit or cost effectiveness of the program. Should the activities continue? Is the program effective or efficient? If - not, is it right to continue the program? Also, researcher should not ignore the points like, is the program sound on moral or legal grounds? A competent evaluator may not ignore the value problems presented.

7. End product of Research: Output and Outcome

The output research is based on the output parameters achieved in research. The numbers of publications, citations of published papers, award of PhD and other academic distinctions (editorships, special awards) constitute output research. This type of research is more for the self-gain and satisfaction and is purely academic in nature.

The outcome research is based on outcome parameters such as the helpfulness of research to society, research results in certain new development for human or society's use, patent which is beneficial to society.

Outcomes research is applied clinical and population based research that seeks to study and optimize the end results of healthcare in terms of benefits to the patient and society. The intent of this research is to identify shortfalls in practice and to develop strategies to improve care. The evaluation methodology of outcomes research may include both experimental and non-experimental designs. The results of outcomes research are used to inform the decisions of legislative bodies that make decisions related to research, as well as of financial bodies (governments, insurers, employers) who seek to minimize cost and waste while ensuring the provision of an acceptable level of care.

2. Proposed Model

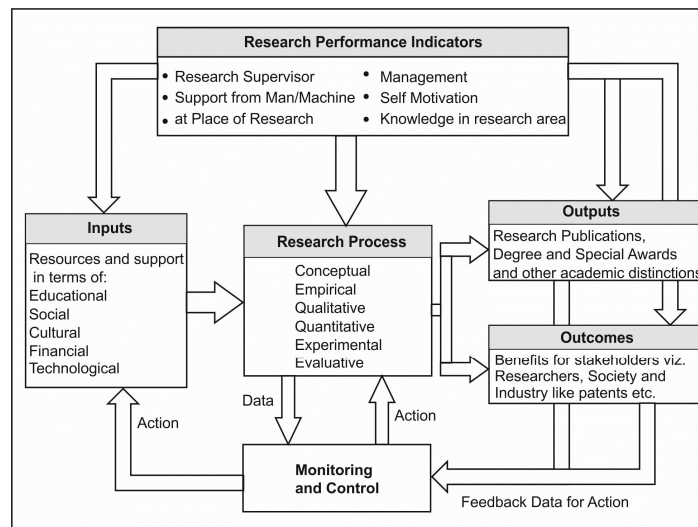Above discussion leads to one profound question "how to benchmark quality research?"

Figure 1 *Proposed Model for Quality & Benchmarking for Research in Universities*

The solution could be a model wherein constant monitoring and control is exercised on input, research process and output of research within the purview of research performance indicators as shown in figure 1.

3. Conclusion

The deliverables of industrial and academic research are of a different nature. A product is typically a result of combining large number of ideas. Idea driven researches gets more focus by academic researchers. Thus, a need arises to combine results of many idea driven research efforts which eventually will lead to the development of a new or an improved product. Thus, universities and industry need to collaborate with each other to develop different mechanism for taking advantage of academic research contributions.

Industrial research is specific result oriented and time bound. It is mandated by the market competition to develop and deploy the innovative product or an existing product with improvements before the competitor. While this research is exemplary in target achievements the economics involved is too high with equally higher risk of losing the investments in Research and Development (R&D) in case of failure.

On the other hand, academic researches form core element of higher education. The extent to which universities are engaged in research and development activities has a key role in determining the status and the quality of these universities. But, R&D activities are more of academic nature with researchers focusing more on output based research than outcome based research. With limited facility for research in most of the universities and limited fund available for research, it is expected to fall short in terms of quality.

In the light of above shortcomings, the quality of research done in universities need to be benchmarked.

Following practices need to be taken care of for quality research in universities.
- Emphasis on informed resource allocation in research, subject to accountability.
- Regular use of performance indicators and targets.
- Income based funding arrangements (to encourage self-reliance among academic units and to provide incentives), but also the retention of central university-level investment funds.
- To encourage inter-disciplinary collaboration.
- Achievement of research related goals with a commitment to growth and expansion (which brings with it resource, status, influence and opportunities).
- Research that directly influences teaching (and vice versa), and that contributes to wider social and community interaction.
- Along with local and regional fervor, strong international perspective in research.
- Co-existence of pure and applied research.
- Active support for the wide dissemination of research and for the application of the results of research to the benefit of society.

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