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How to Increase Research Productivity in Higher Educational Institutions –SIMS Model

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ABSTRACT :

Institutional Ranking in higher educational institutions became common practice and business schools are highly benefited by announcing worldwide ranks based on various ranking criteria. Ranking at higher educational institutions which have already accredited with minimum required infrastructure, innovative curriculum design, should depend on their ability to produce new knowledge as the output of the institutions. Based on the postulates of ABC model of institutional performance measurement, we have devised a model of improving the higher educational output. This model contains the idea on how to involve students and faculty members in improving organizational research output. By means of adopting a curriculum model of research focussed curriculum design and adoption in which students are made to work on industry projects and research projects in each semester along with the study of core and elective subjects, and by means formulating strategy on active involvement of faculty members in intensive research, we have developed a method of increasing research performance and hence enhancing the research productivity in higher educational institutions. We have analysed this model by considering our recent experience and efforts of increasing the research productivity at Srinivas Institute of Management Studies as the case example. The strategies to be followed to increase the number of research publications and subject book publications by effective faculty involvement and business case development by student involvement are discussed.

Index Terms : Higher educational institutional performance, Research productivity, Institutional productivity, Strategy to improve institutional productivity.

1. Introduction :

The quality in higher education is continuously improving in the entire world due to efforts of various accrediting agencies set by Governments, worldwide competitions among institutions for admissions and also due to the institutional interest in improving quality against constraints [1-4]. Higher education institutions should have objectives of not only providing student centric quality education but also should involve in new knowledge creation. Quality in higher education is possible by developing good infrastructure for teaching and learning, by designing industry oriented student centric skill focussed curriculum, and by implementing innovative and effective pedagogy in training in order to create innovators. By creating better infrastructure certainly attracts more students for admission with higher annual fees and hence supports better institutional earning. The industry oriented curriculum designed by the institution promotes better job opportunity to its students and hence improves high salaried campus placements. By implementing innovative and effective pedagogy in training, students are made to understand the concepts so as to improve their analytical skills and creativity which converts them as innovators. Apart from the above aspects, involving the students in research activities at higher educational institutions by designing research oriented curriculum, pedagogy and evaluation policies in the course so that both students and faculty members will involve in new knowledge creation and their publications which will automatically increases the research productivity of the Thus higher educational institutions can effectively face the enhanced institution.

competitions and sustain in their service only if they focus on (1) improving their infrastructure for better admission, (2) industry oriented current curriculum for better students placement and (3) new knowledge creation through curriculum oriented research & publications to enhance research productivity and hence global outlook. In this paper, we have discussed the importance of organizational productivity in higher educational institutions and the application of ABC research productivity model in calculating research performance. An institutional research enhancement model is proposed and strategies to be followed by institutions to enhance research productivity are suggested to become competent and sustainable in national and international scenario. Based on optimum research performance of ABC model, how a higher educational institution can think to become 'Super Productive' in terms its research output is also discussed. The strategies adopted by an upcoming higher educational institution – Srinivas Institute of Management Studies, Mangalore, India to increase the research productivity are discussed as a case example.

2. Productivity in Higher Educational Institutions :

Institutional Ranking in higher educational institutions became common practice and business schools are highly benefited by announcing worldwide or national level ranks based on various ranking criteria. Ranking of higher educational institutions which have already accredited with minimum required infrastructure, innovative curriculum design, should depend on their ability to produce new knowledge as output of the institutions. New knowledge creation is possible only if both students and faculty members are involved in research activities and publish the new knowledge periodically for the benefit of the society and industry. Hence the effectiveness of higher education institutions should be measured based on the research productivity of the institution. The measure of new knowledge creation ability of the institution is usually done by studying the research publications of the faculty members individually or with their students. The measure of institutional research productivity will also give insight for institutional ranking for a given year in a given country or at world level. Thus the productivity of higher educational institutions which are already accredited for their minimum required infrastructure, innovative curriculum design, and comprehensive placement support should depend on their ability to produce new knowledge in the form of publications using their active resources as output of the institutions.

3. Research Productivity – ABC Model :

In our model of studying institutional effectiveness, which in turn depends on institutional research productivity of both faculty and students of higher educational institution, we have developed a scheme of measuring institutional research performance based on following postulates [5].

Postulate 1 : The Quality in higher education depends on the ability of the institution in new knowledge creation.

Postulate 2 : The ability of new knowledge creation of the institution depends on the institutional research and publications by both faculty members and students.

Postulate 3 : The institutional publication is measured by calculating its annual average publications.

Postulate 4 : The institutional publication ability is measured by its annual publications in terms of number of Articles published in Journals (A), number of Books published in the subjects/Edited volumes (B), and number of Business cases, and Book chapters (C) published.

Postulate 5 : The Research productivity (P) of the institution can be measured by knowing research index (α) and weighted research index (β), which shall be calculated using average

publications in Journals, average publications of books and average number of publications of Business cases/book chapters.

The research index per year (α) is calculated using the formula $\alpha = (2A + 5B + C)/F$, and the weighted research index (β) per year is calculated using the formula $\beta = (2A + 5B + C)/8F$, where A = No. of publications in Journals in that year, B = No. books published in that year, C = No. of Publications of Business Cases published in that year, and F = No. of fulltime Faculty members in that institution during that year. In the above formula the weightage for a research article A is two and that of book B is five and the case study is one, based on a quantified assumption of the relative significance & efforts involved in generating it arrived at through a summated scaling technique.

Postulate 6 : The annual research productivity (research index α) of the organization decides institutional ranking. If $\alpha < 3$, the Business school is poor in Research Productivity, if $\alpha = 3$, the Business School is sustainable, if $\alpha > 3$, the institution is good and $\alpha > 5$ for top business schools and only such institutions should be considered for global Ranking.



Fig.1 : Model of improving the higher educational research output.

The last postulate gives an idea for Institutional administrators of what productivity level the organization should maintain to improve its brand. The faculty members who fail to contribute to the research in addition to their teaching workload to improve annual research productivity to desired level should be relieved from the job. Since the annual research productivity decides the quality of higher educational institution, there is a continuous pressure on all the faculty members to involve in research activities and best performers in the team should get incentives from the organization [5]. Based on the above postulates of ABC model of institutional performance measurement, we have devised a model of improving the higher educational output. This model contains an idea on how to involve students and faculty members in improving organizational research output. By means of developing and adopting a curriculum model focussing on research in which students are made to work in industry projects and research projects in each semesters along with the study on core and elective subjects, and by means formulating strategy on active involvement of faculty members in intensive research, we have developed a model which consists three sets of interconnected methods for increasing research performance and publication and hence enhancing the research productivity in higher educational institutions (Figure 1).

The model consists of following components to increase institutional research productivity :

(1) Organizational Objectives, Policies and Administrators Perception to contribute for new knowledge :

Institutional objectives, desire and strategies : The major objective of higher educational institutions is creating new knowledge and skills and imparting them to the students. With this responsibility, the institutions are developing their policies to add research component as major component of higher education curriculum. By providing scholarship, and fellowship to research students, organizations are encouraging useful research in identified areas. Based on administrators' perception, higher education institutions promote research atmosphere in the college and encourages faculty members to involve in useful research. Organizations give emphasis to recruit research oriented faculty members, provides financial supports in the form of institutional research funding, setting up research centres in identified areas and promoting research through them, organizing periodic national/international conferences in the institution with faculty and students active participation and publications, setting up targets both for faculty members at different cadre, and motivating & monitoring the progress periodically. The institution should insists clear policy towards nonperformer and make them accountable for failure to maintain required publication.

(2) Faculty & Students Involvement in Research and Publications :

Faculty commitment and dedication along with competitiveness in research & innovation is very essential in higher education system. Higher education institutions can create value through students involvement in research based projects guided by faculty members and industry collaborators. There should be well developed policy towards including research papers along with industry internship projects to involve students in research activities. Students are compiled to develop at least one case study paper/review paper and one empirical research paper during their post graduation course period along with their faculty guide.

(3) Supporting Facilities /Strategies for Boosting Research and Publications:

The higher educational institutions who have interest in creating new knowledge can develop following facilities to boost institutional research performance :

- Research centres in identified futuristic areas as per faculty members specialization.
- Creating infrastructure for research centres, IT facilities, online information and database subscription through national library networks.
- Providing Computation and data analysis facilities to faculties and students.
- Students have to be motivated and instructed to convert their projects in to publishable papers or case studies.
- Creating institutional research fund to support any activity related to research and publication.
- Honouring the faculty and students every year who contributes considerably for new knowledge creation through research publications.

(4) Commitment and Hard work of all stakeholders :

The model stress on commitment of all the stakeholders of higher education institution to enhance the research contribution. In higher education institution, the faculty members get lot of free time from teaching for focus in research. This may be during the examination time for students, semester end vacations, study holidays etc. The effective teaching time for faculty members is on an average 120 days only in a given year. Hence based on setting research target by administrators to involve in research, faculty members may outperform to reach the objectives of the organization through their commitment and hard work with proper strategy towards achieving the target which in turn enhance organizational research productivity.

4. Strategy to Increase Research Productivity :

Institutional research productivity can be increased by increasing the research publications of both faculty members and the students. The following strategies can be used in higher education institutions to increase the research productivity :

(1) Appointing faculty members who have research experience or passion and inclination on research and publications.

(2) Supporting faculty members to work on research projects by allocating time, providing internal institutional projects and external industry projects.

(3) Creating research centres on various futuristic subjects/areas and making faculty members in-charge to such centres will set the research objectives of each faculty members in the institution.

(4) By setting up the research publication target to each faculty member and by providing facilities to reach the target.

(5) Arranging Faculty Development Programmes on research methods, business case development, and scholar publications in international journals.

(6) Organizing national/international conferences periodically in each department of the organization every year and setting the target to institutional faculty members to submit and present papers in the identified themes of the conferences.

(7) Encouraging the faculty members and their research teams (consisting of students) to publish conference papers in international journals.

(8) The institution should have an effective publication division which should plan/support to publish books on various futuristic emerging areas by identifying and encouraging suitable faculty members.

(9) The institution should encourage its graduate and post graduate students to involve in developing business case studies as their project work.

(10) The institution should have policy to encourage and felicitate the 'Star Researchers' by identifying Top Publishers of every year.

(11) The institution should support its faculty members to publish their papers in international open access journals to increase the citations of the published papers.

(12) The promotions and the increments should be strictly depend on the individual faculty research productivity index.

(13) Since the institutional research productivity is the whole sum average of individual faculty research productivity, the organization should focus on developing team based research productivity so that every faculty member should be the Star Researcher.

(14) By adding more research components in the curriculum, the institution can involve students in research activities and hence creation of new knowledge. Thus an autonomous institution has better opportunity to increase its research productivity compared to affiliated institutions in higher education.

(15) By means of providing opportunity to increase institutional collaborations both at national and international level in multi-disciplinary areas, the faculty members will get better opportunity for exchanging ideas, and work together for inter institutional collaborative publications.

By adopting the above strategies in higher educational institution, the institutional research productivity can be increased and higher education institutions can become more competitive and better contributor for the society.

 Table 1 : Institutional annual research productivity index, weighted annual research productivity index and Grading [5].

Value of Institutional annual research index (α) ≥	Value of weighted annual research index (β)	Grade
24	3	Optimum level

16	2	Best
08	1	Good
04	0.5	Satisfactory
03	0.375	Average
02	0.25	Poor
01	0.125	Nonperformer

5. Optimum Research Productivity :

Higher education institutions which follow the above model shown in fig. 1, will certainly improve their annual research productivity. This is mainly due to involving all internal stake-holders in research activities. Such institutions, based on improving their research output by increasing the value of their annual research index, can improve their overall research grade towards optimum level as shown in Table 1. Table 2 shows the various combinations of publication plan for faculty members in order to reach overall performance of the organization to optimum level. In table 3, we have suggested an optimum target plan for the faculty members in any higher education institution at different academic position/cadre, and for the students, for improved research productivity performance.

Expected Optimum Value of α :

Assuming that each faculty member with Ph.D. qualification should be capable of publishing 4 papers (A), 2 books (B) and 6 business cases/book chapters per year in a good/top business school, the average institutional research index will be $\alpha = (8+10+6)/1 = 24$. In all practical situations, such institution can target optimum research productivity index value as 24. Some of other combinations of publication plan for an institution to achieve optimum level is shown in the table 2.

S. No.	Articles/year	Books/year	Book chapters or	Research index
			business cases/year	α
1	12	0	0	24
2	7	2	0	24
3	6	2	2	24
4	4	2	6	24
5	6	1	7	24
6	2	4	0	24

Table 2 : Various combination of publication plan to achieve Optimum level

Table	3	:	Suggested	target	plan	at	different	academic	position	for	improved	research
produc	tiv	ity	performan	ce.								

S. No.	Academic position	Articles/year	Books/year	Book chapters or business cases/year	Research index α
1	Professor	8	2	4	24
2	Associate Professor	4	1	3	16
3	Assistant Professor	4	0	4	8
4	Lecturer/ Senior Research fellow	2	0	0	4

5	P.G. Student	1	0	1	3
6	U.G. Student	0	0	1	1

6. Super Productivity in HE Institutions :

When the organizational research productivity index crosses above 32, through the collective effort of the researchers of that institution, the research productivity can be named as super productivity. Higher educational institutions should plan and motivate their faculty and students to achieve this super productivity level. Hence if $\alpha = (2A + 5B + 1C)/F \ge 32$, the institution becomes Super Productive Institution (SPI). Achieving and maintaining the goal of Super Productivity Level is an opportunity and challenge to all higher educational institutions irrespective of their country of origin, medium of instruction, type of higher education subjects, and the size of the institution in terms of number of faculty members and students.

Advantages :

- (1) Attaining super productivity level by organizations enhances the organizations image in national and global level
- (2) The faculty members who contributed for super productivity level will get boosted confidence to think innovatively to contribute further to create new knowledge.
- (3) The charisma created by the faculty members of the organization and the confidence developed in them further contributes for generation of new ideas for further research.
- (4) Based on attaining super researcher level, organizations and the faculty members command more respects from their students and the society.
- (5) Attaining super researcher level for given time period set further challenges to maintain it. As a result organization further focus on research and publications.

Benefits :

- (1) The faculty members who are responsible for organizations super researcher level will get encouragement, promotion, research support in the form both in-bound and outbound projects.
- (2) Additional responsibilities in various research committees in the organization and universities.
- (3) Organization and individuals may get more project funding from various funding agencies.
- (4) Through international recognition, such organizations will get better research collaboration opportunity.
- (5) The faculty members responsible for reaching super researcher level get invitation to be reviewer and editor in various international journals & publishers.
- (6) Invitation for book writing from international publishers creates additional opportunities.
- (7) Better job/fellowship offers in international institutions.

7. Strategies to Increase Research Productivity – SIMS Model :

7.1 About SIMS :

Srinivas Institute of Management Studies (SIMS) is established by A. Shama Rao Foundation Mangalore, India with the vision of imparting quality education and expanding opportunities to all the aspirants and across all realms of knowledge including substantial contribution to new knowledge creation through innovative research. It envisages to become

a centre of excellence to serve as change agent in the society both in educational training and research contribution by generating a pool of human resources trained in science and technology, management and social service. The college offers bachelor and master degree programmes in Business Management and Computer Science and Bachelor degree in Commerce and Masters Degree in Social Work. During last few years the college has established success in achieving its target both in education training and research contribution.

Under education training part, the curriculum provided for both U.G and P.G. courses are effectively improved by resorting to action planning through developing academic calendar, teaching plan, teachers diary and study material. In addition to the specialization required to be taught, the institute offers dual specialization facility of its own, and equip students to wider opportunities for employment and research. A large number of certificate programmes of short duration, customized to suit the students of all courses, are offered to promote skill development to enhance employability. Entrepreneurial talents are cultivated among the students by EDP cell. The institute offers orientation programmes, guest lectures, study tours, video lectures, field practicum, NGO internship, industrial exposures, student exchange programmes and international educational visits also as supplements to the curriculum. It supports research based learning, exposure based learning, experiential learning. Value addition is incorporated in teaching through adding extra sessions over and above the prescribed syllabus for insight development. Weak students and slow learners are supported through tutorials, counselling and mentoring.

Under new knowledge creation part, the college enhanced its contribution on Research and Publication by setting up its research objectives, policies, target, and strategies. Based on such strategies, the college could publish good number of research papers, books, and study materials. Table 4 contain the research publication information which is the result of the efforts of SIMS during last three years. Based on the new institutional policy on setting the target for each faculty members, the research output is boosted from the year 2014 onwards.

S. No.	Type of Publication	2013	2014	2015	2016 (Till May end)
1	Journal Articles with ISSN	02	06	74	42 +35 = 77
2	Study Material Books	132	164	164	164
3	Books/Edited Books with ISBN	01	05	04	03
4	Case Studies/Book Chapters	02	02	02	05
5	Publications in Conference Proceedings with ISBN	25	126	106	72
6	Project Reports	379	363	325	270

Table 4 : Information of Publications of SIMS during last 3 years
 by 24 Faculty Members

7.2 Research Strategies of SIMS :

Faculty Research contribution is increased using following strategies :

(a) Plan : The college adopted a fixed policy on its commitment towards research. It encourages both faculty members and students to involve themselves in research activities. The college plans to conduct faculty and students training programmes in Research Methodology, Statistical Software tools, Journal publication strategies etc. The college started several research centres and each faculty member is either co-ordinator or member of at least one research centre.

(b) Target : The college has set target to its faculty members of different cadre as shown in table 5. The college is keen in promoting research leading to publication by providing required facility to all its faculty members. No target is set for a newly joined junior faculty for initial two years. Once the faculty attains two years of experience as lecturer has to publish at least two papers in institutional conferences and convert them into journal publishable articles. Faculty members have responsibility to write and publish study materials of the subjects they are teaching exactly according to the university syllabus. As per ABC model the college has given 2 points weightage to each journal Article, five point weightage to published Book, 2 point weightage to Study Material Book and one point weightage to published case studies/ book chapter. Study material is a compiled book written by a faculty member handling a given subject of a course. A study material contain detailed information collected from different sources along with number of possible assignment questions in each chapter. A study material generally contains 150 pages of information in printed form for U.G. subjects and about 200 pages of printed information for P.G. subjects.

S. No.	Academic position	Journal Articles/ year	Printed Study material Book/year	Book chapters or business cases/year	Research index α
1	Professor	6/7	2	2/0	18
2	Associate Professor	4/5	2	2/0	14
3	Assistant Professor	2/3	2	2/0	10
4	Lecturer	2	2	0	8

Table 5 :	Target set by	SIMS for its	Faculty members
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(c) Motivation : The research atmosphere is created in the college by following means :

- Counselling & Idea generation : Through research committee, each and every faculty members are counselled for their research interest, appointed as coordinator/member of institutional research centres and based on need, young faculty members are supported by giving research/case study ideas.
- Training/Workshops : The college conducts faculty meetings on every saturday afternoon to discuss the individual progress in research and study material development. The research committee organizes training and workshop for faculty on research methodology and on journal publishing strategy.
- Organizing National Conferences : The college organizes four to five national conferences every year and encourages the faculty members to submit at least one paper to each conferences.
- Publication support : The presented papers in the conferences are reviewed and published in ISBN conference proceedings and further improved papers are published in international journals through institutional supervision.

(d) Working strategy : The working strategy is formulated by research committee of the organization headed by the Principal. The committee supervises the faculty and student research progress as per organizational set policies. The research committee focussed on following working strategies :

- Setting their career goal as successful researcher.
- Creating the competition among faculty members and students.
- Creating Research Environment in the college by providing required infrastructure, computer with internet, online databases etc.
- Empowering the faculty members and students by organizing FDP, research related seminars, training to use statistical & graphical software etc.
- Encouragement for publication by organizing periodic conferences to present their papers, creating opportunity to hear others research presentations, and opportunity to create researcher network.
- Printing Support : Study materials are printed in institutional publishing press.
- Journal publication support by providing publication charges from the institution.
- By considering Research performance weightage for faculty increments and promotion.

(e) Responsibility : The goal setting strategy for faculty members also convey the responsibility to faculty members in education institutions. When a faculty member realizes the responsibility of him as a teacher, as a trainer and as a researcher, he will orient his mindset to think towards the effective ways of generating new knowledge. As per theory Y in organizational behaviour, employees work maximum and contribute to organizational policies when they get responsibility based on setting the target [5]. When faculty members take responsibility to involvement of themselves in research activities, they find enough time even in their busy schedule.

(f) Monitoring : The progress of each faculty in study material preparation, research & paper writing, converting students projects into case studies are closely monitored and discussed in weekly faculty meetings. The three hours long meeting session on every Saturday afternoon include the sessions on sharing individual progress, suggestions by senior researchers and possible in-house collaborations. This also includes discussion on faculty contribution to up-coming conferences.

(g) Role model : The college encourages and motivates the faculty members to put maximum effort to develop new ideas, new methods, new analysis or effective case studies, and use new empirical tools for their research. Some of the senior faculty members who attained super researcher level will be poised as roll model to young faculty to encourage research interest among them. This will stimulate all faculty members to develop a mindset to involve them self in new knowledge creation.

(h) Accountability : The college research committee takes initiative in monitoring the research performance of its faculty members quarterly. The committee reviews the progress of each and every faculty in preparation of papers for forthcoming conference and improvement of previous conference presented paper for journal publication. The junior faculty members who need support to identify topics, research procedures and motivation to focus on research, get suggestions on possible topics of research/case study by the Research committee members. The college also reviews the research performance of the faculty members through annual self-appraisal report. The P.G. faculty members who fail to publish at least 4 papers per year will be transferred to U.G. course teaching for the next academic year. The senior faculty members who are working as emeritus faculty will be relieved from the duty for a year/semester until they achieve the target. The faculty members teaching U.G. programmes with minimum two years experience are also give target of publishing minimum two papers per year and given enough support to achieve the target through Research

Committee. The faculty member who fails to achieve the target will get delay in promotions and fails to receive research component in annual increment.

(i) Involvement of Students in Research : Being an affiliated college of a government university, SIMS has restrictions in deciding the curriculum of the programme. But these restrictions are not constraints for the administrator and faculty members to add research components in the P. G. curriculum. The college has modified the course structure to involve students in research by means of adopting a model of research focussed curriculum in which students are made to work on industry projects and research projects in each semester along with the study on core and elective subjects. Students are trained to use both explorative research model and empirical research model to convert their projects in to effective case studies and publishable research papers in conferences and journals. The faculty members who are guiding these projects are also instructed and motivated to improve the quality of research as publishable research paper. Thus by means of formulating strategy on active involvement of students along with faculty members in intensive research, the college is trying to achieve its goal.

7.3 Results & Discussion on SIMS Strategy :

Results of the efforts of the internal stake holders through setting the research objectives, developing the research policies, setting the targets, motivating the faculties and students, creating a research environment, reminding the responsibilities, showing the super researcher role-models to prove that, the set goals are achievable, and making the faculty members accountable to create the new knowledge as per the goal set, are some of the strategies adopted by SIMS, transformed it into a successful highly productive research institution. The institutional strategy of involving both the faculty members and the students and setting their objectives towards research focussed, made the institutional strategy as positive sum game. The substantial increase in research productivity from 2015 is due to the fact that the institution changed its objectives towards research, modified its policies to get maximum contribution from the faculty members and the students. The new research strategy is developed according to the administrators' perception on research and publications in support of new policies, faculty members are motivated and the target for research publications is set as per the table 3. In its effort of increasing the annual research productivity, the institution also improved the research infrastructure, started various research centres in identified areas, created institutional research fund etc. The students are involved in research based projects and some of the good projects are converted into publishable papers through faculty guidance. Through commitment and hard work with proper strategy, the faculty members and the institution could able to improve its contribution for creating new knowledge as per the model given in fig. 1.

8. Conclusion :

Based on the postulates of ABC model of institutional performance measurement, the college has devised its strategy of improving the higher educational research productivity. This model contains the idea on how to involve students and faculty members in improving organizational research performance. By means of formulating a strategy on active involvement of faculty members in intensive research, and research focussed curriculum design and adoption for the students in which they are made to work on industry projects and research projects in each semesters, the college has developed a method of increasing research performance and hence enhancing the research productivity in higher educational institutions. In this paper, we have systematically presented this model and analysed it by considering our recent experience and efforts of increasing the research productivity at Srinivas Institute of Management Studies as case example. The strategies to be followed to increase the number of research publications, and subject book publications by effective faculty involvement and business case development by student involvement are discussed.

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