Synergizing Challenges as Opportunities for Successful Ph.D. Journey in India

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Abstract: It is an un-doubted fact that the knowledge gained through education plays very important role in making the citizens responsible apart from being a driving force for well-being of any country by effective contribution in creating purposeful products or services. Higher educational institutions are being recognized as most important sources for creation as well as dissemination of knowledge by several means. Throughout the world, research productivity is of high-level priority as the innovation and research provide solutions for most of the identified problems and hidden issues and creates good sense in the life styles of people. Academic research programs lead for Ph.D. degrees to many students throughout the world every year. Contribution towards research productivity may not visible all the time despite of greater importance, which might be due to implications at organizational level and statutory level for exact creation of policies for research. Abnormal delay and dissatisfaction due to several reasons among scholars creates dropouts in doctoral education throughout the globe at times. Reports on important factors associated with doctoral programs success are not abundant. Despite of the fact India producing good number of cons in doctoral education. As research and innovation play key role in the mission of Viksit Bharat @ 2047, the present paper describes various possible opportunistic challenge to synergize academic research programs in India to produce more quality doctorates by incorporating better insights for Ph.D. Journey in India for Indian as well as international aspirants.

Keywords: Ph.D. Journey, Influencing Factors, Challenges, Synergizing Opportunities

1. Introduction

Higher education plays very prominent role with reference to different aspects. Various personal traits like personal maturity, interpersonal skills, attitude, and knowledge in various opted domains will make an individual either as an employ or employer or any other responsible person who can contribute in a meaningful way in development of society as well as country [2]. The degrees received from higher educational institutes are expected to help as catalyst for personal and professional growth of any individual as the knowledge expertise in specific fields, critical thinking, intellectual curiosity, out of think boxing, augmented communication skills, professional networks are some of the identified outcomes of the pursued courses [7]. Role of higher education in the progress of individuals as well as any country is well narrated [29]. Academic research programs commonly known as doctoral programs leads to highest level of achievements in the field of academics leads to Doctor of Philosophy (Ph.D.) degrees in India as well as in other countries. The nomenclature of doctoral degrees is slightly varied in different countries as decided by the regulatory bodies of respective countries.

It is expected that Ph.D. degrees provide profound knowledge in the respective field and it is also important to note that doctoral degree is not a terminal degree and one can work for their Ph. D. in any number of fields as they desire. There are many more reasons for any individual to encourage to pursue Ph.D. in their respective fields as the outcomes of research can make a remarkable contribution in the specific zone, and someone can generate new discoveries, hence it is to be sensitized properly as many people do not know much about most advantages that can offer to a doctorate. Now a days, in any country doctoral qualification has become mandate to work in any Universities as a teacher or a researcher. One should obviously accept that most important outcomes of the Ph.D. program can be transferred to relevant industries either by loyalty or for commercialization [9]. The Ph.D. programs can be felt like challenged programs as they are not unitructured. It is also to be understood that one can demonstrate their potential by undergoing independent research. In India, as in the case of other countries, Ph.D. programs are being run prestigiously important as the doctorates are expected to reflect better in the growth of country in many aspects. In the countries like US, the students pursuing Ph.D. vary in their experiences as it is reported that the factors like discipline, institution, geographic location, and personal circumstances will considerably influence [14],[20]. However, the Indian government constantly encouraging the research scholars and professionals as the persons with technical and professional traits really contribute to a better aspect in wealthy India apart from their contribution in influencing social change. As a statutory body, University Grants Commission (UGC) in India formulated all the relevant guidelines to pursue Ph.D., which is really a keen motivation for real researchers not only from India and for foreign nationals pursuing Ph.D. program under the quota of international scholars [31].

The guidelines are modifying at periodic intervals as per the needs and conditions. As per the latest guidelines of UGC, Ph.D. programmes are offering in India on both full-time, part-time modes but the programmes are not permitted in distance mode [31]. With due recognition of the importance and encouragement for quality research, different funding agencies both the government and non-government organizations are extending financial support by adopting suitable selection processes [5]. It is a general observation that Ph.D. programs usually take a period of three to four years for full-time mode or five to six years for part-time scholars. Of course, different factors may influence the period of Ph.D.

journey [32]. Reports are available that several breakthroughs have been found by Indian researchers with best research viz., publications, patents, and other productivity developments either in the form of services or products which emphasize the fact that Doctor is not just a prefix but to be considered as one's incredible honor for their significant contributory research. Research through Ph.D. programs in India are now being run to cater solutions for different needs and hence special prominence is given for research and innovation programs taken place exclusively in certain areas. However, the effective execution of Ph.D. program includes several key factors with appropriate identification of research gaps in the selected area of the research domain. As per the survey of All India Survey of Higher Education (AISHE), by HRD ministry, even less than 0.5% of Ph.D. enrolment is taking place every year on an average and found that 24,000 doctorate degrees are being awarded year. Introduction of new policies is good encouragement and remarkable improvement in Ph.D. enrolment is observed in India [21]. However, unfortunately, it is also seen that out of the total number of enrolments in a doctoral course, delay in awarding Ph.D. degrees, dropout rates are also observed due to various suspected factors of dissatisfaction among Ph.D. students in India, an issue of important concern. Results reveal that various pros and cons identifying in the process of doctoral program influencing considerably in the journey of Ph.D., where the scholars are really facing lot of challenges. Hence, lot of need exists in the present scenario to find out the best ways for synergizing the identified challenges opportunities for effective running of Ph.D. journey.

2. Methodology

The prime objective of this research study is the focus on presenting different constraints of Ph.D. scholars during their journey of research which are expected to influence either in positive or negative directions. With an effort to synergize the research ecosystem by nurturing the positive implications with all the available opportunities for the scholars, the author of the article tried in arranging different orientation sessions by professional research experts on research methodology, research publication ethics apart from some specialized areas of research for the benefit of research scholars. Typical surveys with relevant research questions were conducted both online and offline for the scholars of different research centers, government, private, deemed Universities. The survey was extended for around 1,000 scholars from different fields of specialization viz. science, arts, engineering, paramedical, pharmacy and management with the random sampling method for selection of scholars for the study.

All the scholars were requested through emails to participate in the research by explaining the goals and purpose of the present study. Reminder mails also sent in some cases to motivate them for participation with good spirit. Further, the participation was made voluntary and participants were intimated that they are free to withdraw from the study at any time, without providing reasons in view of their psychological satisfaction. The survey includes the pattern of both open and closed ended questions, conducted at different intervals of time as the scholars get their own experiences during their time span of Ph.D. The survey kept open for a week every time it offered. Two reminder e-mails were sent to the Ph.D. candidates who had not started or completed the survey in time which resulted in getting involvement of more participation.

The survey includes perennial aspects viz., the processes, reports, gender bias, internal and external relations, etc. Apart from the questions, suggestions/opinions of the scholars were also included in generation of results to identify the factual content without bias. The valuable information was thoroughly checked to avoid duplication and consolidated as different key factors to synergize the concept. The discussions were organized with a team of experts which includes research supervisors, administrators. The total data was thoroughly verified and discussed in a team of experts from research advisory committee. To best support the studies, literature from different national and international journals, editorials were also considered. Microsoft Office 2019 was used presentation of figures and tables.

3. Results

Considering the detailed analyses of the data from the survey, the opinion analyses of the participated scholars are reported. Different attributes pertaining to relationship with Ph.D. supervisor and perennial issues during Ph.D. program are presented in Table 1a to Table 1c and the challenges facing are presented in Table 2a to Table 2c.

Table 1a: Good relationship with Ph.D. Supervisor?

Attribute	Opinion Analyses (%)
Strongly Agree	40
Agree	35
Neutral	15
No Answer	10

Table 1b: Conflicts with PhD supervisor?

Attribute	Opinion Analyses (%)
Many Times	10
Some Times	75
Not At All	15
No Answer	10

 Table 1c: Guidance from Ph.D. supervisor?

Attribute	Opinion Analyses (%)
Consistent	30
Occasional	50
Hardly	10
No Answer	10

and the corresponding pictorial depictions are presented in Figure 1 and Figure 2 respectively. The personal traits viz., name, gender, age and pursuing year are kept confidential in view of participants psychological satisfaction. The information received through open ended questions viz., what changes or improvements expected to enhance relationship supervisors, expected support or resources for the best benefit of the Ph. D. scholars, different challenges during doctoral journey are suitably addressed in this section.



Figure 1: Opinion analyses of scholar-supervisor relationship

Table 2a: General opinion about Ph.D. journey?

Attribute	Opinion Analyses (%)
Well & Satisfactory	30
Satisfactory	40
Not as expected	20
Dissatisfied	10

Table 2b:	Experiencing	stress (or anxiety?
I abic 20.	Experiencing	Sucas	or analoty .

Attribute	Opinion Analyses (%)
Yes	30
Some times	50
No	08
No Answer	12

Table 2c: Feeling of d	ropout?
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Attribute	Opinion Analyses (%)
Many times	30
Some times	50
Never	10
No Answer	10

3.1 Aspirations of Ph.D. Scholars

Ph.D. scholars will join with lot of expectations in view of their future and most of the time they try to reach out to their best extent. The most important aspirations of fresh Ph.D. scholars are as specified under.

i) Resources: Ph.D. scholars have ample chances of acquiring knowledge which is not equally possible for the regular academicians. They have an advantage of undertaking the course work which is really an opportunity by means of interaction with domain experts from different parts of the world, state of the art lab equipment, participation in conferences, seminars etc. So, Ph.D. scholars are really an exception in expanding their knowledge with a meaningful contribution when compared to others.

ii) Duration: Despite of different modes of pursuing Ph.D. program, on an average a period of 3 to 5 years is an expected duration for generating effective output in the selected field and can also become an expert in the selected area [3]. As a trivial observation, one can expect that this specified time is reasonably sufficient for any sincere researcher to become as an expert of subject and can confidently demonstrate their worthy piece of work. Unfortunately, certain cases observed that many doctoral students complete their degrees without having good expertise at their relevant fields [19]. However, reports reveal that majority of Ph.D. scholars completed their work in the specified mentioned period were able to generate new and effective output which could get meaningful importance to adopt in academic organizations and in industries [27].

iii) Network & Relationships: Good relations with research supervisors, advisors and peers play very impactive role in Ph.D. journey. Most of the scholars are expected to have better mentors, future collaborators who can also extend their guidance regarding provision of opportunities which may facilitate some meaningful growth. However, the success of a Ph.D. scholar yields to good piece of work depends on advantageous utilization of available resources, effective utilization of time and the cultivation of meaningful relationships.







Figure 2: Opinion analyses of challenges facing during Ph.D.

3.2 Global perspective of pros and cons in Ph.D. journey

It is a global fact that pursuing Ph.D. in any desired specialization is very important decision. Particularly in India, research in the areas of multidisciplinary is very important as the country needs more knowledge bank in diversified areas to suit out the real-life problems for providing better and sustainable lifestyles to the people.

Salient pros: The Ph.D. scholars can really experience that the journey of research is a dynamic path which promises substantial intellectual growth, personal recognition in academic and research areas apart from getting an opportunity to reshape the knowledge of individuals [4]. However, different yardsticks will play their role on this. Several advantages in global perspective associated with Ph.D. scholars, a few to mention that the Ph.D. scholars can become intellectual explorers, get special recognition in the society, work places in national, international research clusters, get financial support by means of various fellowships to forgive the financial burdens, acquire national and international collaborations which facilitates future research criteria and can really involve in human service by creating significant contributions.

Recognized cons: Despite of several associated advantages in Ph.D. journey, the survey reports found with some suspected cons throughout the world as per the interpretation of scholars, mentioned under [30].

i) Duration: The stipulated duration for Ph.D. programs particularly in India is felt non satisfactory for the people who

have continual research attitude. Certain observations found that it is an extension of academic journey which may disrupt the career and personal life some times.

ii) Financial Stress: Though several financial assistance schemes are available, some scholars expressed that they may not cover all expenses incurred during their period of work. That means scholars experience financial burden during their work for Ph.D. People also feel that obstacles can hinder their financial support under bureaucratic grounds. Further, it is an assumption that international collaborations in research incurred with most expensive aspects.

iii) Post Ph.D. Job Market: Certain Ph.D. graduates feel that job chances are not plenty and even underpaid positions or temporary positions are to be faced in India. Post doctoral research opportunities in most reputed countries are very competitive and very difficult in view of profound research gaps.

iv) **Mental and Emotional Toll**: Original research without specific goals and scaffolding with no certainty in prospects leads to mental stress and may create emotional problems.

v) Change in Academic Landscape: As per the recent regulations of UGC in India, the criteria for initial position in teaching at University level is not required Ph.D. degree as more emphasis on teaching skills, experience in research and practical exposure are about to be more prioritized than the Ph.D. degree. It is really a disappointment for the people looking for academic positions with highest qualification in higher learning organizations.

3.3 Challenges for Ph.D. scholars in program execution

i) Initial Confusion: Mostly Ph.D. scholars expect that they may have ample amount of free time. The prompt utilization of the free time is really a challenge as they need to get fruitful output from time to time because the unnecessary wastage of time may attract additional expenditure [13].

It is a general expectation that during Ph.D. programs, the concerned supervisors may assign some random work to the scholars by providing some previously published articles belong to their research group, where the fresh scholars may not have any idea as they are new to the system. If the scholars can get any piece of idea regarding their need, they can start work without delay and can avoid frequent approach for guidance. However, in many cases, it is not happened and expect help from their seniors in their research groups. The scholars may feel happy in case they get responses or else it may continue as a cycle till some hints are received. It also has impact Supervisor's view to assess how the scholars are independent at their work [14].

ii) Selection of Appropriate Research Problem: The selection of appropriate research problem is very essential for the scholars. The scholars having no prior research experience find tough at times as they hardly get access for discussion with their supervisors. Supervisors may also take some initial observation time to identify appropriate skills for decision on suitable problem finalization [6]. Reports reveals that the scholars may come with some childhood dream topics and

later they find they cannot work on due to lack of sufficient stuff for their interests. That means the real picturization about research problem selection is bit cumbersome for scholars initially [12].

iii) Time Management: The research scholars need to have good time management skills. The scholars are generally expected to put in 40-50 hours per week as in the case of any job or profession. If they have poor time management skills, they may take even 100 hours per week, at least until learn better time management skills. However, working for more than 50 hours per week is not sustainable for any creative thinking and hence time management for effective production of research results is a real challenge for research scholars.

iv) Rapport with Supervisors: Several reports available that the interaction timings for research scholars with their corresponding supervisors are no so consistent. Some scholars also experience the imposing personal plans of their supervisors on them [20]. Unless there is better understanding and friendly relations, it really becomes hurdle for scholars to become independent researchers due to lack of work freedom. Further, the scholars may also feel difficult to become matured Ph.D. students without better guided exposure to work.

v) Cultural and ideological backgrounds: Initially, the scholars cannot understand the real work passion of the supervisors as they may not be able to read mind of their supervisors. Further, there are also chances that the personal and cultural back ground variations between the scholars and supervisors create some tough situations. For example, the professors may want their scholars to work more on weekends or out of academic hours which may not feel better by their scholars. Further, as results depicts some scholars may try to be with supervisors throughout their tenure and some scholars does not like this [11].

vi) Course work: Course work followed by assessment and evaluation is one of the imported tasks to be completed within time frame. Reports reveal that for the scholars pursuing Ph.D. in full time mode, the time frame may not be a big problem, However, for part time and external scholars coop up with course work is an issue of importance.

vii) Stress and anxiety: Reports from several authors reveal that Ph.D. students are expected to experience more anxiety, tension, depression, exhaustion, high stress, cynicism, and inefficacy feelings. Some of the crucial reasons as reports reveal are economic constraints, progress of work, future opportunities. Bonding with peers in research team and supervisors, working environment, time management, support from administration, family relations are also considered in this aspect. These issues many times causes the scholars for trying to quit the programs unexpectedly [10].

viii) Quality research productivity: The prime aim of the research fulfilled only with impactful productivity which includes novel creation either in the form of publications, patents, services, or products. The Ph.D. thesis includes with this value addition is a dream for the scholars. However, in view of some factors as mentioned above, the research productivity also remains like a question mark. Anyhow, the substandard production of research will be threat for future

sustainment and credibility not for an individual and for the society [25].

3.3 Synergizing Opportunities Through Challenges

Pursuing Ph.D. in India is a great opportunity for new inventions with an ample amount of time constraint despite several challenges identified. The Ph.D. degrees will be the successful accomplishments for only those whose contribution accounts for countable consideration of human knowledge. Hence, the research must be passioned which can create significant groundbreaking contributions in the relevant domains [1]. University Grants Commission (UGC) in India giving more prioritized conditions to expand Indian knowledge to better extent throughout the world. Options are provided to pursue Ph.D. course either of the modes, full-time for exclusive dedicated researchers and part-time, an exclusive opportunity in the case of working professionals. The sponsorship by governments under quality improvement program is really an excellent opportunity for the teaching fraternity to upgrade their knowledge in their respective domains [28]. It is really a paradigm shift that innovations taken place in India in recent past years attracted a greater number of global investors [22]. The Ph.D. scholars can be claimed as most opportunistic academicians as they can create a research question, in-depth organized studies and being responsible in bringing out the best and latest pieces of knowledge. Hence, despite of challenging factors, possible routes can suitably be found to pacify and appropriate adoptions can be made to transform the challenges as opportunities.

3.4 Key Factors for Synergizing Opportunities

i) Appropriate understanding and selection of research problem: It is very keen and prime ideal step for any Ph.D. scholar to have a clear focus on research area and selection of appropriate research topic. Based on prior educational back ground and enquiry-based knowledge, the scholars may adopt survey on societal, industrial issues and may identify the real root causes of the research problem [24]. Necessary discussions with research supervisor and other peers will help in developing the clear research problem statement. The research proposal with all necessary information viz., the purpose and motivation for selection of the topic, specific objectives of proposed research work and futuristic aspects must be furnished. Based on the prior art search, the scholars must refine their research problem and should have more focus on proper utilization of time and aspects in developing the effective solutions.

ii) Identification of Research Gaps: The illustrations and ideas of researchers may vary from one to other. Therefore, the research gap identification needs to be prioritized with the support of literature. Now a days, lot of scope available for getting most relevant updated information which can be accessed either offline or online. Good number of valuable academic social networks viz. research gate, Google Scholars are widely catering the appropriate needs of scholars for effective filling of research gaps [23]. Eminent researchers from national and international level throughout the globe are permitting the scholars to visit their research laboratories to provide collaborative work culture [8]. All premium

institutions in India like IISc., IITs are maintaining this as special significance to be noted. Creation of citation chart will provide excellent support to the identified research work even for future researchers.

iii) Research design: Appropriate methods and methodologies need to be designed for effective saving of time as it is really a good practice to execute activities by fixing some time frame for the entire duration. Minimal variation in the time bound process may be considered negligible as precise results may get delayed at times. It is expected that a plan-structured flow chart of research design will help the research scholars to a best extent throughout research process [26]. It is advised to consult the supervisors for designing the flowchart as it reflects the actual theme, patterns, and connections between the data and results. A typical flow chart for research design with general perspective to overcome challenges is schematically represented in is shown in Figure 3.

iv) Appropriate time management: It is very important for research scholars to have good time management skills as in the case of all the professional activities. It is an important observation that approximately 40-50 hours per each week is an optimal time for effective execution of work. It is most likely possible for full-time scholars and hence they are being allotted with stipends as in the case of typical jobholders. Reports reveals that the scholars with poor time management skills requires around 0-100 hours per each week and if so one can learn better. As per the survey, working beyond 50 hours in a week will not yield for sustainable for creative thinking [17].



Figure 3: A general perspective of research design

V) Course work: As the Ph.D. programs are considered as academic research programs, course work is mandatory for all the Ph.D. scholars which has an emphasis on providing more insights about their research problem apart from research methodology and publication ethics. The scholars will have an advantage to choose the courses from a pool of courses which are generally expected to be synthesized from good quality research publications advanced literature. In recent times with the advent of MOOCS, the scholars can also access their selected courses. In India UGC permits the research scholars to undergo their course work either through SWAYAM or NPTEL where the scholars have a chance to get most valid certificate with credit transfer. UGC in India

clearly stated that the scholars pursuing Ph.D. in external mode may be permitted by the organizations for attending course in physical mode which is the better relief to comfortably face the assessment.

vi) Financial support: Several schemes are introduced in India to provide financial assistance to Ph.D. scholars on merit base and on other societal aspects as per the provision in constitution of India. Several evidences found that different fellowships and schemes have greater positive influence and encouraging the active researchers to carry out research in different field of specializations. The aspirants qualified in GATE, GPAT, CSIRNET, UGCNET exams have ample chances to carryout research in premium institutes, research laboratories and so on with better positive weightage on their future endeavors. Several Universities encouraging scholars with their own institutional fellowships and training the scholars to apply for research grants based on their expertise being offered by several funding agencies. One should clearly note that some of the schemes also facilitates post - doctoral fellowships. Very recently, IIT Delhi in India enhanced research scholars fellowship from 37,000 Rs. to 60,000 Rs. per month, which is highest in India and very close to the financial support facilitation in many Europe countries [15]. As a ready reference, the details of funding schemes available for research scholars are shown in Annexure through Table 3a to Table 3d. These facts reveal how India is keen to encourage research and the talent pool should utilize to maximum extent.

v) Research pressure: In fact, resulting novel output from research program is not an easy thing as it requires may factors to positively incur. As per the data from Table1 and Table 2, it is also observed that the Ph.D. scholars in general feel more pressure for better research productivity in view of their coursework, academic responsibilities, and their personal life. In view of these lines, the research scholars should not be forced to chase with unnecessary or irrelevant goals to get their degrees graduate soon which may lead to get a few research papers for literature, rush for preparing the thesis, trying for easy routes for getting their results published, etc., to receive their degrees. The routes created in this informal way without appropriate utilization of results will lead them to become face the real world with no customized contribution in their field of specialization and no market place. In honest, the scholars really miss meaningful opportunity in their most valuable period in life-time.

Hence, the creation of real ecosystem recognizing all challenges to synergize opportunities will augment academic research programs in India. Further, the scholars should recognize that they are working for society but not for self. Hence with effective time management, strategic planning, self-care practice, one can shoot out the pressure and rather they may feel research as pleasure.

As it revealed from Figure 1 and Figure 2, the research scholars expressing positive reflections in all the parameters is considerably good which shows that the observed challenges can easily be converted into challenges with the suggested metrics.

4. Conclusions

The personnel awarded with Ph.D. Degrees have unforgettable benefits. One should remember that money is not just the criteria for everything. Doctorate degrees give typical credit in the field where someone belongs to. Further, the academic occupations like university professors in many countries need Ph.D. degree as a prerequisite. The scholars learn about most of the literature available in their field and hence can develop broad vision of real problems. One can get better time and project management skills. There is a belief that doctorates can do better contribution in problem solving of critical issues, which mut have been the biggest benefit of a doctorate. Doctorates in general possess hard working ability and become success which makes them more confidence about the challenging tasks. However, the benefits of having the degree may be smaller than the benefits of working for it as they last longer. Hence, the real learners should consider the challenging opportunities to acquire highest learned Ph.D. degree while enjoying all the steps in Ph.D. journey for betterment of society.

5. Impact on Society

The present piece of research will have lot of positive reflections on the students of higher learning organizations and educators in India for encouragement to Ph.D. courses in India which may facilitate effective solutions for many hidden problems which may well suit throughout the globe.

6. Recommendations For Researchers

The researchers are recommended to actively participate in identification of micro level issues not covered in the present article for synergizing the concept.

7. Future Research

The future research will focus on different specializations to verify the developed concepts in different domains viz., engineering, sciences, pharmacy, medicine etc. to bring out global level solutions.

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Author Profile



Sivagi Suryanarayana Raju received post-graduation with specialization organic chemistry in 1994 from Andhra University, Visakhapatnam, Andhra Pradesh, India and awarded Ph.D. in 1998 from NIT Warangal, Telangana, India. He has been 30 years of research

experience and 28 years of experience in teaching and learning with an exclusive 24 years of academic administration. His contributions in research includes multidisciplinary chemistry, innovative teaching learning pedagogical practices, civil environmental engineering, and environmental biotechnology. He served as chief advisor for skill development centers, innovation, and entrepreneurial education centers. The author has been extending voluntary services as mentor for number of students and teachers from various countries in development of community-based research projects as an alumnus of prestigious academic organizations. He served as an editor for some science & technology promoting magazines and an active reviewer for good number of international scientific journals. Presently he is working as Associate Dean, R & D at Godavari Global University, Rajamahendravaram, Andhra Pradesh, India.

Annexure:

Table 3a: Research schemes in India (CSIR, DST)			
S.No.	Name of the Fellowship/Scholarship	Sponsoring Agency	
1	CSIR – JRF Fellowship	CSIR	
2	CSIR – Research Associate	CSIR	
3	CSIR – SRF Fellowship	CSIR	
4	Extramural research (EMR)	CSIR	
5	Indo-U.S. Fellowship for Women in STEMM	DST	
6	INSPIRE Fellowship	DST	
7	INSPIRE Faculty Fellowship	DST	
8	J C Bose National Fellowship	DST	
9	Swarna Jayanti Fellowships Scheme	DST	
10	Scheme for Young Scientists & Technologists (SYST)	DST	
11	Nano Mission	DST	
12	Technology Development Programmes (TDP)	DST	
13	Device Development Programme (DDP)	DST	
14	NIDHI Seed Support System (NIDHI SSS)	DST	
15	Science For Equity Empowerment and Development (SEED)	DST	
16	Centre for Human and Organizational Resource Development (CHORD), The National Science and Technology Management Information System (NSTMIS)	DST	
17	Augmenting Writing Skills for Articulating Research (AWSAR)	DST	

Source: https://www.indiascienceandtechnology.gov.in/programme-schemes/human- resource-and-developmen

Table 3b: Research schemes India (UGC)

S.No.	Name of the Fellowship/Scholarship	Sponsoring Agency
18	Young Faculty Research Fellowship	UGC
19	Major Research Project fellowship	UGC
20	BSR Fellowship	UGC
21	BSR Faculty Fellowship	UGC

22	Dr. D.S. Kothari Post-doctoral Fellowship	UGC
23	Emeritus Fellowship	UGC
24	Indira Gandhi Post-doctoral Fellowship for Single Girl Child	UGC
25	Maulana Azad National Fellowship for Minority Students	UGC
26	National Fellowship for Other Backward Students	UGC
27	National Fellowship for SC Candidates	UGC
28	National Fellowship for ST Candidates	UGC
29	Net-Junior Research Fellowship in Sciences, Humanities and Social Sciences	UGC
30	Post-doctoral Fellowship for SC/ST	UGC
31	Post-doctoral Fellowship for Women	UGC
32	Post Graduate Scholarship for professional courses for SC/ST	UGC
33	Swami Vivekanand Single Girl Child Fellowship for Research in Social Sciences	UGC
34	UGC Faculty Research Programme	UGC

Table 3c: Research schemes in India (DBT, BIRAC, DRDO, USSTF)

S. No.	Name of the Fellowship/Scholarship	Sponsoring Agency
55	TATA Innovation Fellowships	DBT
56	Biotechnology Career Advancement and Re-orientation Programme (BioCare)	DBT
57	DBT – JRF Fellowship	UGC
58	DBT - The World Academy of Sciences (TWAS) Fellowship	UGC
59	Promoting Innovations in Individuals, Startups and MSMEs (PRISM)	UGC
60	Biotechnology Ignition Grant Scheme BIG	UGC
61	Promoting Academic Research Conversion to Enterprise (PACE)	UGC
62	Students Innovations for Advancement of Research Explorations (SITARE)	UGC
63	India Alliance Fellowships & India Alliance Grants	UGC
64	Relevant Research Project (RP) and Young Scientist's Research Award (YSRA)	UGC
65	Extramural Research Grant	DRDO
66	Grants-in-Aid Scheme	DRDO - Life Sciences Research Board
67	Grants-in-Aid Scheme	DRDO – Aeronautics Research & Development Board
68	Grants-in-Aid Scheme	DRDO – Naval Research Board
69	Grants-in-Aid Scheme	DRDO – Armaments Research Board
70	Building Energy Efficiency Higher & Advanced Network (BHAVAN)	Indo-U.S. Science and Technology Forum
70	Fellowships	(IUSSTF)
71	Genome Engineering/Editing Technology Initiative Program	IUSSTF

Table 3d: Research schemes in India (MHRD, ICMR, ISRO, DST, DBT)

S.No.	Name of the Fellowship/Scholarship	Sponsoring Agency
36	P M Fellowship for Doctoral Research	MHRD
37	ICMR Fellowship	ICMR
38	RESPOND Sponsored Research	ISRO
39	SERB – National Post-doctoral Fellowship	DST-SERB
40	SERB – Overseas Doctoral Fellowship	DST-SERB
41	SERB – Ramanujan Fellowship	DST-SERB
42	SERB – POWER Fellowship	DST-SERB
43	SERB – POWER Research Grant	DST-SERB
44	Core Research Grant	DST-SERB
45	Start-up Research Grant	DST-SERB
46	Intensification of Research in High Priority Area (IRHPA)	DST-SERB
47	MATRICS	DST-SERB
48	Scientific and Useful Profound Research Advancement (SUPRA)	DST-SERB
49	Teachers Associateship For Research Excellence (TARE)	DST-SERB
50	High risk – high reward grant (HRR)	DST-SERB
51	Industry-relevant R&D	DST-SERB
52	International Travel Scheme	DST-SERB
53	Empowerment and Equity Opportunities for Excellence in Science	DST-SERB
54	SERB-Science and Technology Award for Research (STAR)	DST-SERB