

**Study of Bottlenecks in Industry, Academia and Institution
Linkage in Pharmaceutical Sector**

Sponsored by
NSTMIS
(National Science and Technology Management Information System)
Department of Science & Technology
Government of India

B R Nahata College of Pharmacy
Mhow –Neemuch Road, Mandsaur 458001 MP

Website: www.aiip.info

Principal Investigator
Dr. V. B. Gupta

Co-Investigator
M S Rathore

Staff Researcher
Tanaji D Nandgude

Acknowledgement

LPAC Members

Mr. Narendra Nahata, BRNSS

Dr. Laxman Prasad, NSTMIS

Sh Rakesh Chetal, NSTMIS

Mr. Rahul Nahata, BRNSS

Dr. Arani Chaterjee, Panacea Biotech

Dr. D. C. Jain, IPCA Laboratories

Dr. B. S. Prabhu, Mandasaur Institute of Technology

Dr. Sadhana Banerjee, Govt Opium & Alkaloid Works

Prof. N. K. Jain, Sagar University

Mr. V. H. Bhabhor, District Industries Center-Mandasaur

(For sparing time, criticism & encouragement)

NSTMIS

(for financial support)

B. R. Nahata College of Pharmacy-SIRO

(for providing necessary facilities to accomplish the study)

Contents

1. Preface	4
2. Executive Summary	5
3. Methodology	8
4. Detailed Analysis a. Academic Response b. Industrial Response	9
5. List of Organizations Participated in the Study	30

1. Preface

Developing countries, particularly the BRIC, are striving to transform their economies from resource (or low technology) base to high-technology base. This transformation is guided by their desire of making the economies less dependent on natural resources and other growth inhibiting factors. To make this happen, these countries need to integrate the multifaceted aspects fundamental to high-technology growth.

The key driver of high-technology growth is knowledge, wherein wealth is created through development of innovative products. Academia being the main generator of the knowledge and the manpower, need to work in tandem with the industry, which puts the knowledge as well as to use the manpower. In knowledge-based economies, the industry engine runs on academic fuel, ultimately leading to happier and healthier societies.

As of now, academia and industry linkage is quite poor in our country. Henceforth, industry is often required to look towards developed countries for the technology; likewise, highly skilled manpower often opts migrating to knowledge economies for better rewards. This scenario is creating huge imbalance and, money and manpower loss. The reasons why linkage could not develop, mainly attribute to - poor work culture in majority of educational institutions, meager or no incentives for carrying-out consultancy/ research, lethargy and non-accountability, and academic red-tapism. The result – country is paying huge price for its graduates, lacking employability and academic researches remains in the thesis. At one hand our companies pay royalties to foreigners, and at the other, our institutions are starving for funds. The silver lining is - the education has arrived to private sector; where, it's not only catching the interest of industrial houses, it's in itself getting converted to an industry.

To fulfill this need of hour, the present survey was conducted in pharmaceutical academic institutions, industries and research organizations. The survey puts light on industrial needs, and accordingly, shows the way to improve the academic contents and delivery methods. The survey was also aimed at developing a database-cum-platform for showcasing research strengths and needs; and hence, catalyze the linkages between the two otherwise distant cousins.

Privatization and liberalization, and now perhaps the globalization, of the higher education are paving the way to Academia-Industry partnership. Also, because of emergence of India as Global R&D and Production hub, this partnership has become much more imperative than it was ever before. Henceforth it's the high time now that Academia-Industry Partnership is translated from a slogan to the reality.

2. Executive Summary

In knowledge based industry (like pharmaceutical industry) the knowledge is generated in academic institutions, put in use by the industrial segment and lead to a process or product development. In present Indian scenario the linkages in these two important segments of Pharmaceutical sector has not yet taken the proper shape which is desired for better growth and there are many factors which may be attributed for the same. The objectives of the study were:

1. Study of bottlenecks in development of such linkages
2. Development of a database providing
 - a. Academic & Industrial resources
 - b. Research being done in Industry and Academic Institutions
3. Study of industry's manpower requirement w.r.t. nature & number for next 5-10 years
4. Designing of model curriculum, systems and procedures for the academics

The desired information to meet these objectives was collected through questionnaires. In this study 1393 persons participated from 198 pharmaceutical industrial organizations and 345 academic and research organizations, working on different positions in their organizations. The collected information was uploaded in a systematic format on database hosted at www.aiip.info, the project's website.

Major Findings

- Poor or almost missing academia industry (AI) linkage was observed in pharmaceutical sector. Both the elements are working separately without knowing the needs and resources of each other. The existing interaction is limited to the training of the undergraduate students in industry. Status and level of post graduate or doctoral level research collaboration or contract research is very low. Where ever research linkage exists, it is primarily due to personal contacts, the role of department or organization as a whole was negligible.
- Majority of participants (about 90 %) think that such linkages should be established in a prominent manner for better mutual growth of academia and industry.
- The major barriers found in developing such AI linkages from academic perspective were Lack of information about getting in touch with relevant industrial partners for research, insufficient equipment and facilities in academic institutions to support collaboration and differences in research objectives between Industry and Academia.
- The major barriers identified in developing such AI linkages from industrial perspective were Poor equipment, facilities and infrastructure for research in institutions, Lack of information on research being done in institutions and Lack of Initiative taking people in academics
- A large population of participants (over 95 %) from academia and industry feel that there is an urgent need for development of a national database indicates research

- interests of the academic/industry organization, projects going on there, availability of resources etc.
- Majority of participant showed their willingness to be the part of such national database.
 - Over 85 % of participants think that people from academic institutions should go to industry. (To get tuned with latest trends of industries) and vice a versa (for higher studies) for some time
 - The information gathered from various organizations and human resource working in various departments at various designations was structured in an organized manner in the form of automatically updatable database. (www.aiip.info). The database could be searched as the instructions given on website. A directory of various Academic and Industry organizations and researchers that participated in the study was prepared. The prominent subjective comments from academia and industry were compiled and presented in the form of a single document. All these documents can be downloaded from project website.

Constraints

- The study was conducted to meet the four objectives as mentioned, however due to certain constraints, only first two of them could be completed.
 - There was no adequate responses on the research expenditures of organizations, availability of human resources in industrial organizations with respect to current status and requirement in next 5 years. Similarly in academic organizations the full details about the resources could not be retrieved.
 - The sample size was 1393 from various parts of the country. Responses from major pharmaceutical companies were not up to the expected extent.
 - There was subjective variation in responses. Since the responses were collected from a range of employees covering from top management to researchers working at bottom level. The opinions presented were based on individual's response. Lesser involvement from top level was major constraint.
-

Recommendations:

- Strong measures are to be taken to undertake massive AI linkages. Both the elements i.e Academia and industry are willing to develop such linkages. However the major constraints found were, Lack of information about getting in touch with relevant partner. A basic framework of the desired database is developed by the investigators. It is strongly recommended that government agencies (like AICTE and Pharmacy Council of India) and Industrial Organizational bodies like Indian Drugs Manufacturer's Association and, Organization of Pharmaceutical Producers of India should take strategic measures and promote and ensures maximum participation from their work force. In this manner the database would be enriched by information that could be used to meet various objectives of Academia Industry Interactions.
- It was observed during the study that the syllabi of the academic institutions is not upgrading regularly. By the time the graduate pass out from the course the knowledge obtained become outdated and of no use. Regular up gradation of the syllabus

curriculum will generate the manpower in ready to use mode that could be absorbed and utilized by industries. Industry Experts should be involved in framing the syllabus. Industry scientists should be called for examination. Academic scholars should get chance to do project in industry.

- Insufficient infrastructure and research facility was the prime barrier from industrial perspective. The academic institutions are needed to be supported financially in order to strengthen the basic infrastructure and research facilities that would be helpful in attracting the industries for research collaborations.
- It was also suggested with great emphasis that that people from academic institutions should go to industry. (To get tuned with latest trends of industries) and vice versa (for. higher studies) for some time. Henceforth strategic modifications should be taken by both academia and industry to execute such exchange.
- In academic and industrial organizations the faculty/researchers actively engaged in research and promoting such collaborations should be rewarded financially. The extent of faculty participation should build a major criterion in the promotional policies.
- Formation of joint committees of the academic and industry at different levels to evaluate the institutions interest, commitment and initiatives. No compulsions, but work for mutual academic and commercial advantage harnessing the research capabilities in both elements.
- Partnership to create centers of excellence in key functional areas with state of art infrastructure and collaboration should be established.

3. Methodology

The database developed is based on the information provided by Research Institutions, University Departments, PG Colleges; and Industrial R&D, QA and Production Centers located across the country. An introduction letter along with questionnaire was administered through various means; however, the effective was personal visits to the organizations.

In this study 1393 persons participated from 198 pharmaceutical industrial organizations and 345 academic and research organizations. The questionnaire was divided in three parts. Part 1 comprised of general information about the organization; part 2 focused on identifying the bottlenecks and part 3 consisted of resources & activities.

a. Academic Questionnaire:

Part 1: In Part 1 General information about the organization was asked.

Part 2: Part 2 was designed to study the bottlenecks in academia and industry linkages. This part was divided in 14 questions. Questions 1-5 were of objective type. The participant had to mark 'tick' on the appropriate option i.e. Yes/No/Other. In question no five, options were given to the participant for analysis of the interaction level & objective. In question, no 6 the participants were asked to rank priority out of the 11 options available. Question no 7-10 were again of objective type.

Q.12 was subjective type and participants were asked to write their organization's policy towards linkage with industry. Q.13 and 14 were again of subjective type and information in their own words and was asked about the barriers and suggestions to improve the collaborations.

Part 3

Part 3 was concerned with the human resources, facilities and equipments, and research activities of the organization in terms of research projects.

Faculty profiles of the persons engaged in research was filled at personal level. Faculty was categorized as researchers, which in total, numbered 849. Details included designation, qualification, experience and key research area.

b. Industrial Questionnaire: The industrial questionnaire was on similar lines

4. Detailed Analysis

The information received from participants was uploaded to the database. The data so generated was used for interpretation.

a. Academic Responses:

Q1-4: In questions 1-4 the participants were asked about their opinion on existing scenario on Academia industry Linkage perspective in India. The four questions asked and their results are shown in table 1.

Table 1: Results of question number 1-4

Question	Answer		
	Yes	No	Other
Q.1. Do you think Industry, Academia and Institution linkage is missing in India?	90.8%	4.98%	4.22 %
Q.2. Do you think Academia Industry and Institutions should tie up/ collaborate for mutual benefits?	97.7%	1.15%	1.15%
Q.3. Do any research or other collaboration you have with academic institution/others?	37.16%	57.85%	4.98%
Q.4 Would you like to be a part of National AIIP Database?	97.7%	2.3%	0%

90.8% of the participants responded that such linkage is missing, while 4.98% said these types of interactions do exist. 97.7 % participants believed that academic institutions and industry should tie up for their mutual benefits. 37.16% respondents said that their organization have some sort of research or other collaboration.

Q5: In this question the level and objectives of collaborations assessed. The results are shown in table 2.

Table 2: The level and objectives of collaborations of Academic organizations with Industry

Q.5	What is the level and objective of your interaction with pharmaceutical industry?	Response
1	Undergraduate level (Interaction concerning with Industrial Training for B. Pharm. students for 1-4 months)	65.21%
2	Postgraduate level (Students doing dissertation projects in industry)	47.5%
3	Doctoral level collaborative research	28.33%
4	Post Doctoral research collaboration	6.67%
5	Industry interaction limited to avail	29.58%

	facilities of the Industry	
6	Dialogue with industry limited to request for gift sample of drugs/chemicals/others	58.33%
7	Contract Research i.e. carrying out any specific research projects in academic institutions	30.42%
8	Consultation providing with or without charging fee for personal scientific or technological expertise solving specific problems	25.83%
9	Patenting /Licensing: Negotiations of Patents or licenses for research results	18.75%
10	Services in general: e.g. initiatives such as continuing education, specialized courses, and placement collaborations.	65.21%

As indicated in table 2, Academia Industry (AI) interactions in majority of cases were limited to undergraduate training of the students in the industry. There exists low degree of interactions in collaboration at doctoral level or in the form of contract research (which is actually much needed and meaningful). The dialogue of academic organization with industry was limited to asking or requesting for drug samples for research.

Q6: The participants were asked to rank priority order as 1, 2, 3..... in this question, and accordingly, major barriers were identified. The total number of participants in this question was 222 with variety of responses. To come out with some conclusion the data was analyzed and barriers were ranked on the basis of the score calculated for each parameter.

Calculation of Score

To draw meaningful conclusions a score was calculated for each barrier parameter. Total number of participants in this question was 222. The number of participants responded in the questions were divided by the priority ranking given to the barriers. Then the total of the scores was considered as one hundred (100) and percent weightage gained by each parameter was calculated.

Figure 6.1 shows the responses on the first option i.e. *“differences in research objectives between Industry and academia.”* About 19% participants ranked this option on the first priority while 13 % put it on second and the likewise. The overall score obtained by this option was 13.27506, positioning this as 3rd most important barrier in developing academia industry interactions (Table 3)

The analysis of responses on the second option *“Research objects usually not interesting for academics to work”* is depicted in figure 6.2. The data indicate that about 20% of total participants did not consider this as a barrier, while 8% ranked this as prime barrier.

The percent of responses are different at different priority ranks. The overall score obtained by this option was 8.743632, positioning this as 5th most important barrier in AI linkage development.

More than half (59%) respondents placed 3rd option “*Lack of information about getting in touch with relevant industrial partners for research*” with first three priority rankings as shown in Figure 6.3. The overall score calculated for this option was 15.79775, making it as the most significant barrier in establishing AI linkages (Table 3).

Overall score calculated for the fourth option i.e. “*No influence in base line funding of institution*” was 9.375139, placing this as fourth most significant barrier (Figure 6.4 and table 3).

The fifth option “*insufficient equipment and facilities in academic institutions to support collaboration*” was considered as second most significant barrier with overall score of 15.07474 (Figure 6.5, table 3)

Option sixth “*lack of influence on academic promotions*” carried overall score of 7.924767 and was positioned at sixth on priority ranking analysis (figure 6.6, table 3)

Seventh option “*delays in publications of results when undertaking industrial research*” occupied 9th ranking with overall score of 5.904038 (Figure 6.7, table 3)

“*IPR (Intellectual Property Rights) restrictions (Eighth option)*” were kept on 8th position (Figure 6.8, table 3) with score of 6.384548.

Ninth option “*Academics is not seen as reliable partners by industry*” got overall score of 7.318685 being ranked at 7th (Figure 6.9, table 3).

“*Geographical location i.e. Distance, Locality or other (tenth option)*” was on the second last ranking with score of 5.707047 as shown in figure 6.10 and table 3.

“*Lack of Time to devote for research*” was found as the least important factor with score of 4.494588 (figure 6.11, table 3)

Total No of Participants responded in Question No. 6 =222

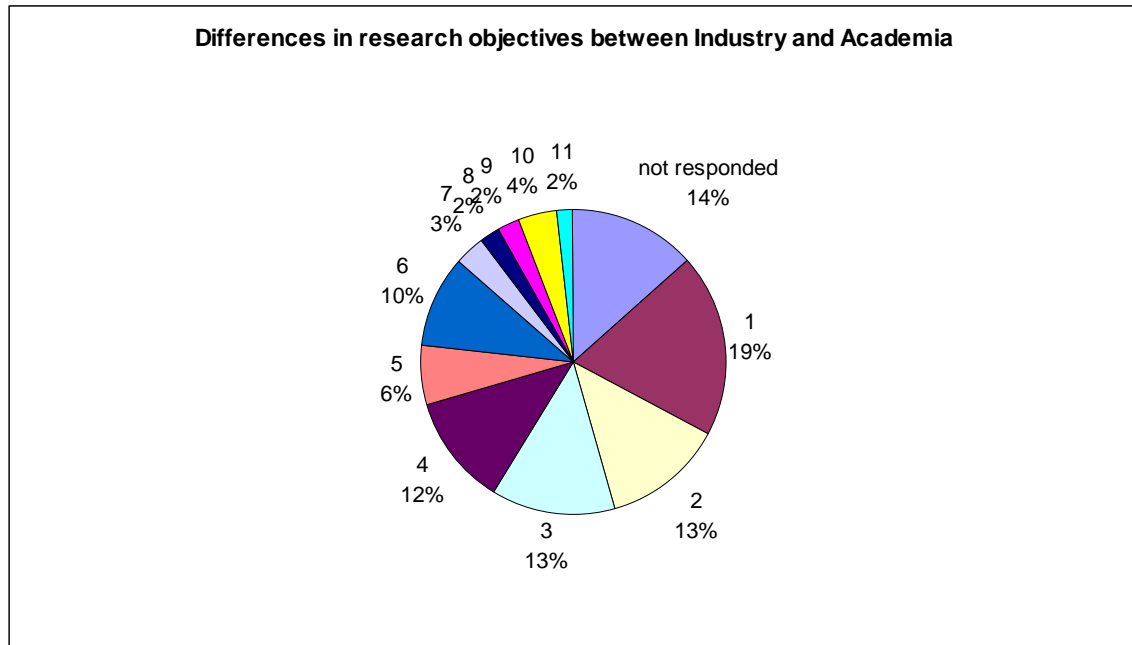


Figure 6.1: Academic respondent’s priority rank grading on “Differences in research objectives between Industry and academia”

Total No of Participants responded in Question No. 6 =222

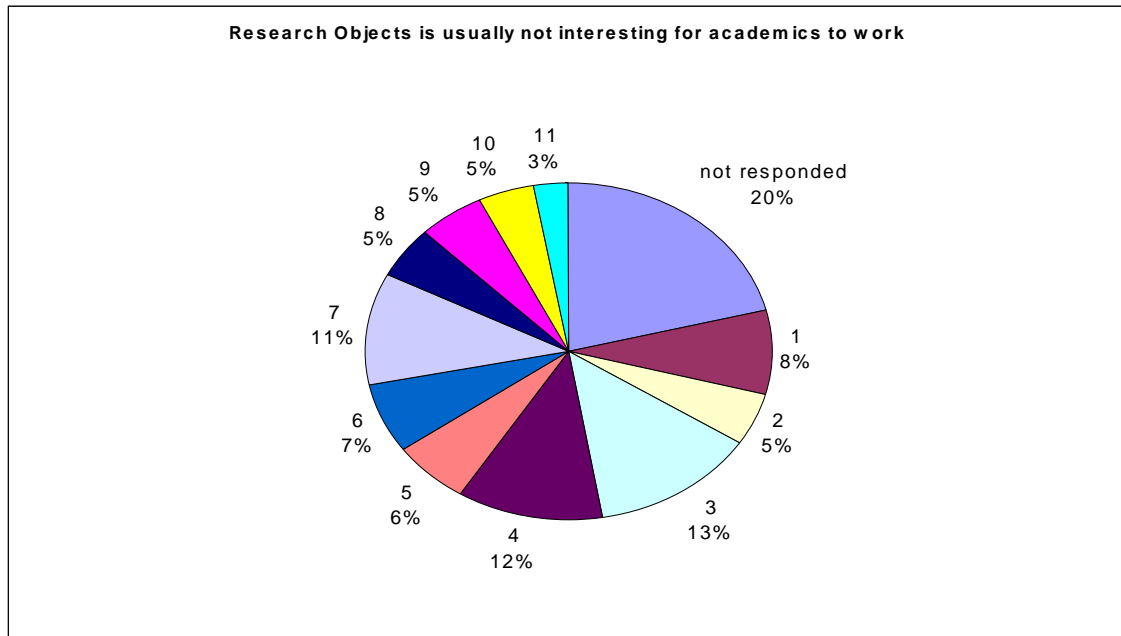


Figure 6.2: Priority rank grading analysis on “Research Objects is usually not interesting for academics to work”

Total No of Participants responded in Question No. 6 =222

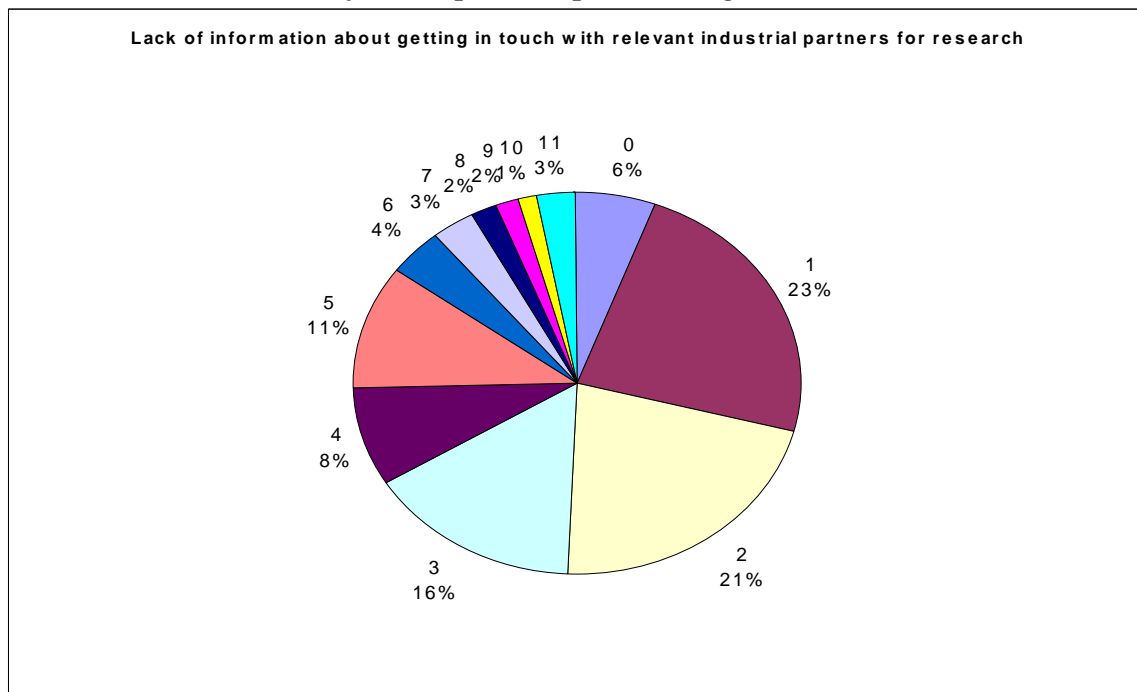


Figure 6.3: Priority rank grading analysis on “Lack of information about getting in touch with relevant industrial partners for research”

Total No of Participants responded in Question No. 6 =222

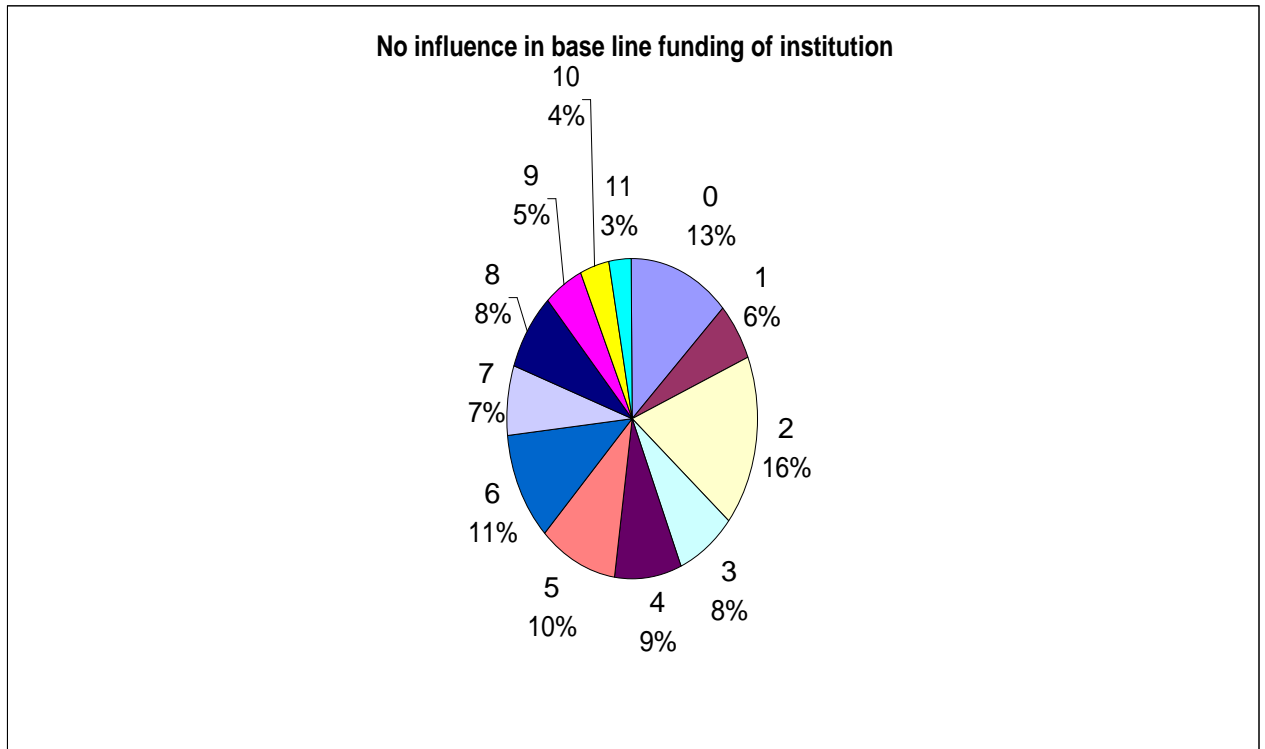


Figure 6.4: Priority rank grading analysis on “No influence in base line funding of institution”

Total No of Participants responded in Question No. 6 =222

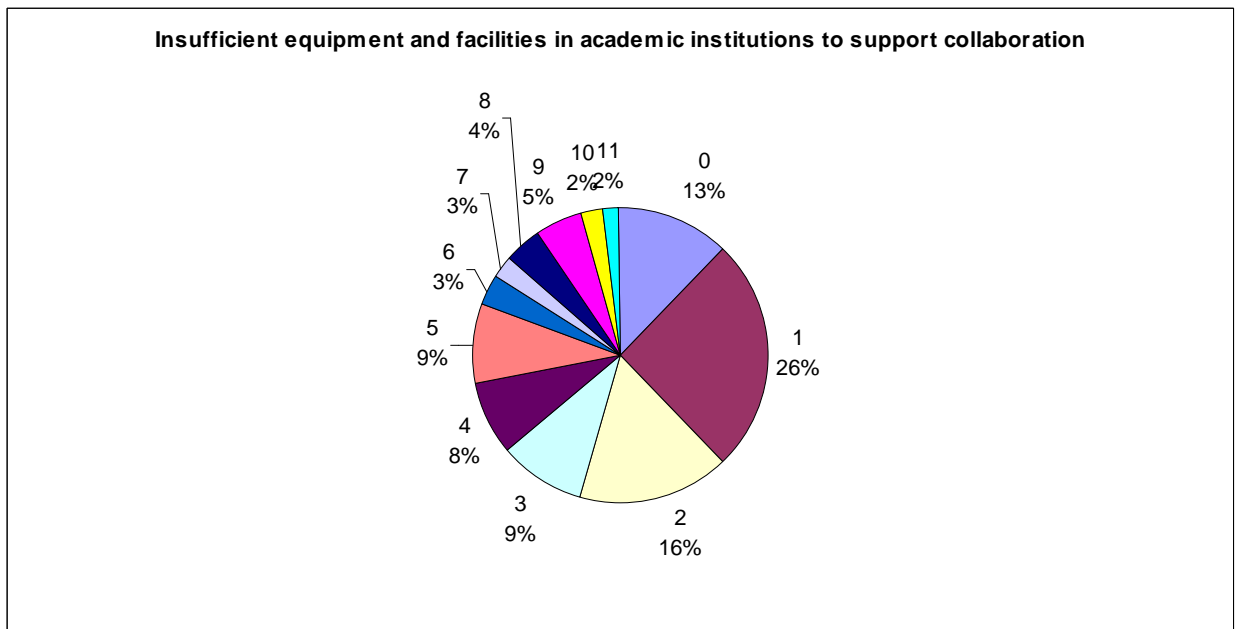


Figure 6.5: Priority rank grading analysis on “Insufficient equipment and facilities in academic institutions to support collaboration”

Total No of Participants responded in Question No. 6 =222

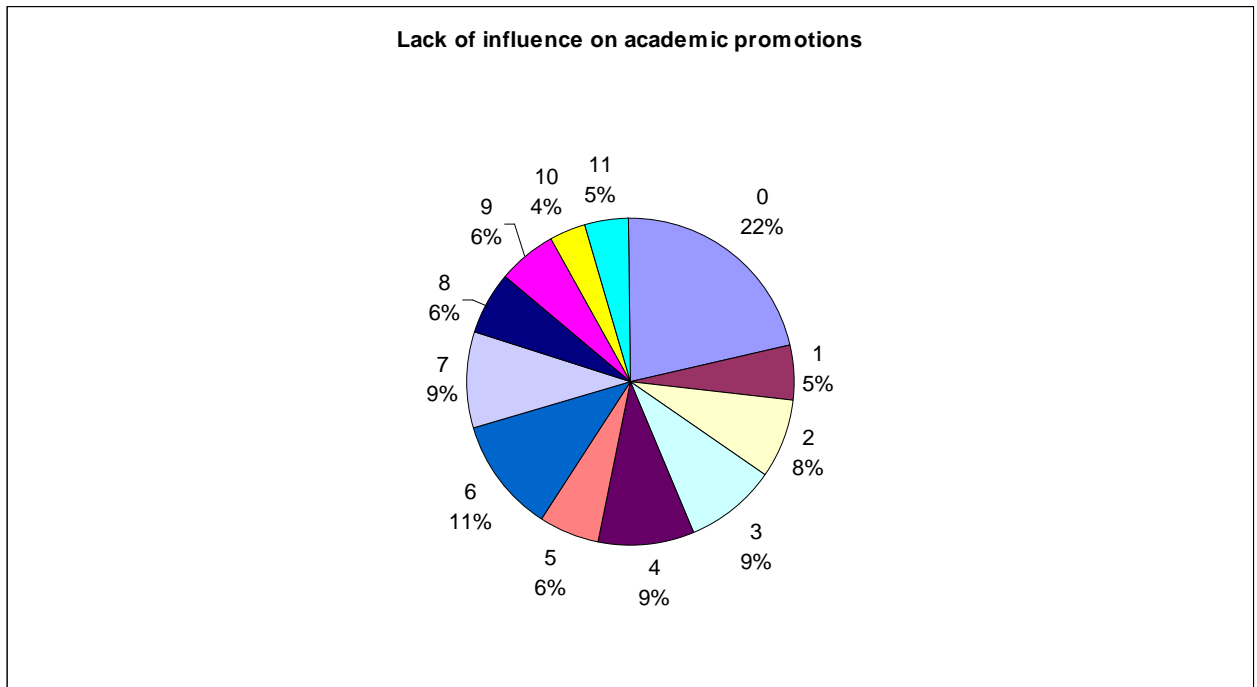


Figure 6.6: Priority rank grading analysis on “Lack of influence on academic promotions”

Total No of Participants responded in Question No. 6 =222

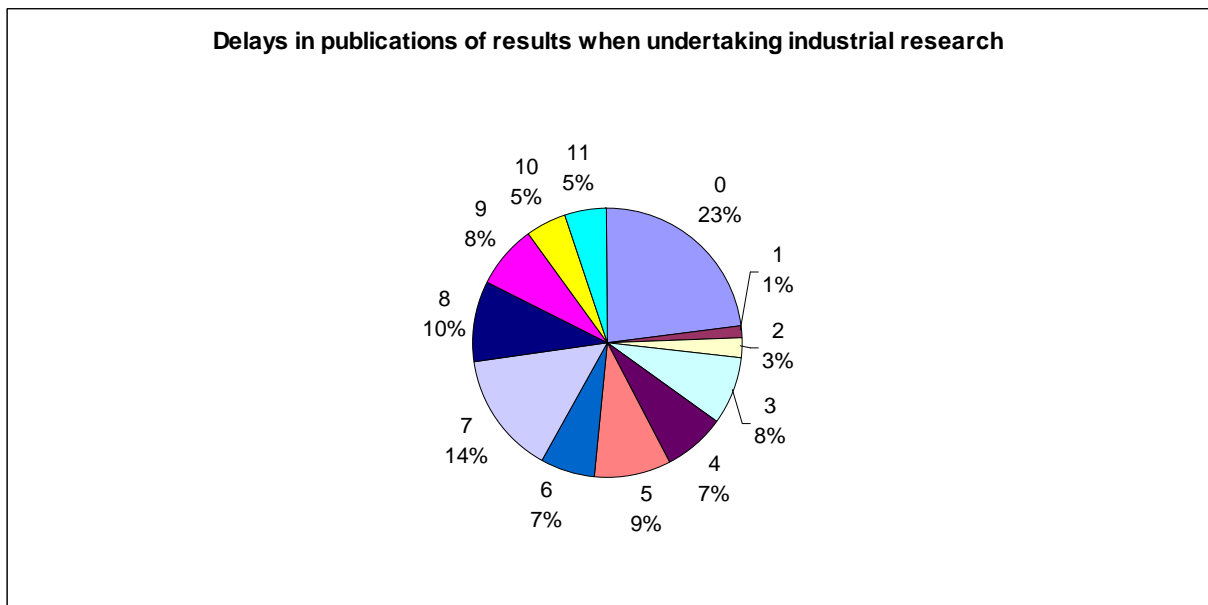


Figure 6.7: Priority rank grading analysis on “Delays in publications of results when undertaking industrial research”

Total No of Participants responded in Question No. 6 =222

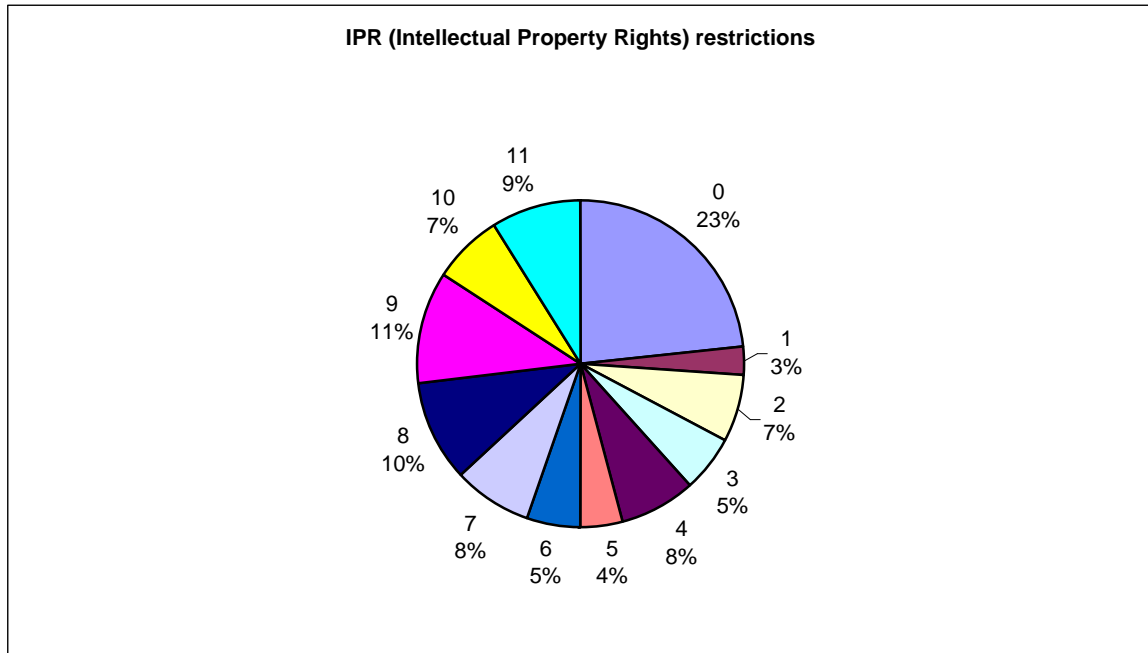


Figure 6.8: Priority rank grading analysis on “IPR (Intellectual Property Rights) restrictions”

Total No of Participants responded in Question No. 6 =222

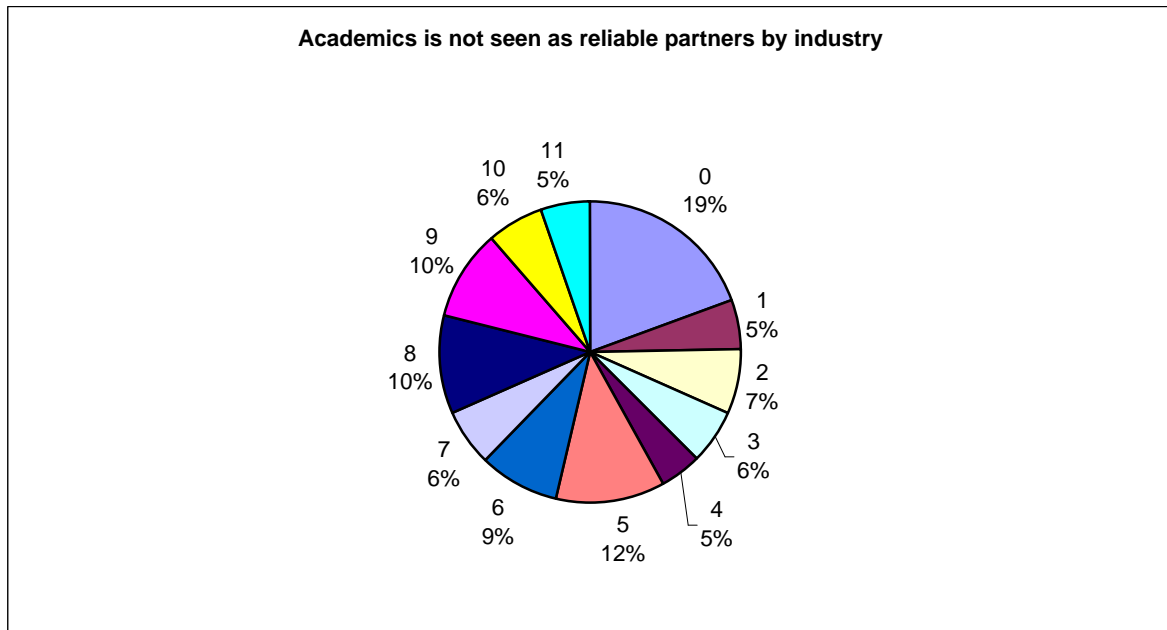


Figure 6.9: Priority rank grading analysis on “Academics is not seen as reliable partners by industry”

Total No of Participants responded in Question No. 6 =222

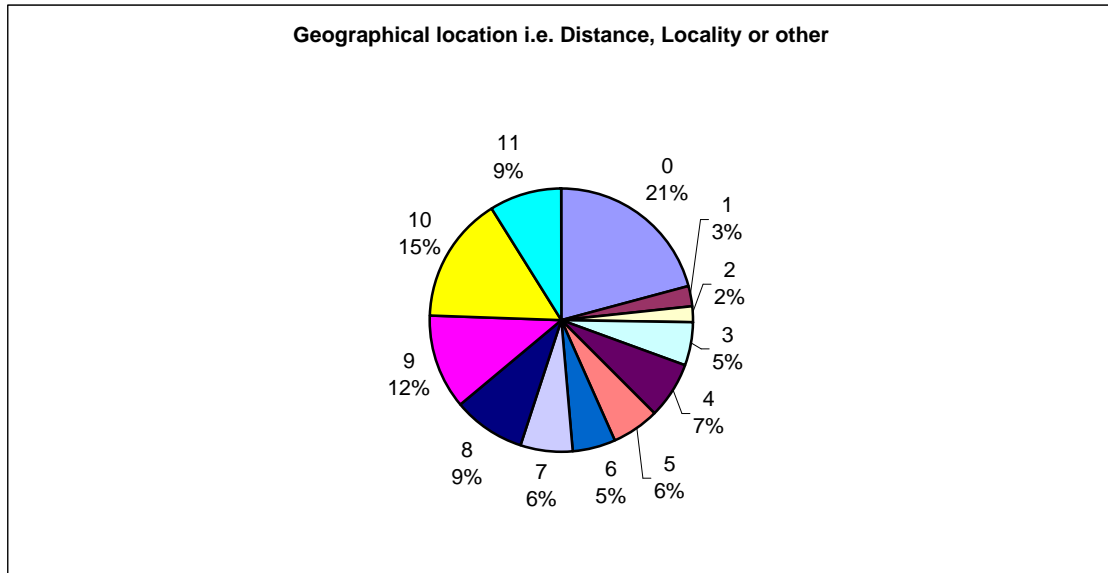


Figure 6.10: Priority rank grading analysis on “Geographical location i.e. Distance, Locality or other”

Total No of Participants responded in Question No. 6 =222

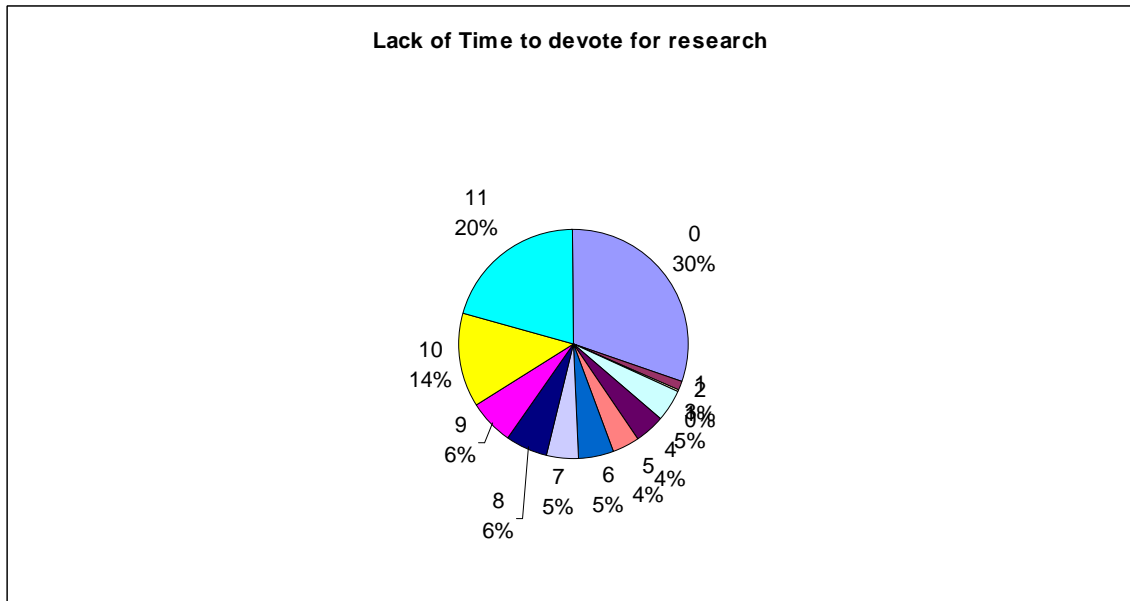


Figure 6.11: Priority rank grading analysis on “Lack of Time to devote for research”

Table 3: Major barrier in academia industry linkage, academicians' perspective

Priority	Barrier Factor	Score
1	Lack of information about getting in touch with relevant industrial partners for research	15.79775
2	Insufficient equipment and facilities in academic institutions to support collaboration	15.07474
3	Differences in research objectives between Industry and Academia	13.27506
4	No influence in base line funding of institution	9.375139
5	Research Objects is usually not interesting for academics to work	8.743632
6	Lack of influence on academic promotions	7.924767
7	Academics is not seen as reliable partners by industry	7.318685
8	IPR (Intellectual Property Rights) restrictions	6.384548
9	Delays in publications of results when undertaking industrial research	5.904038
10	Geographical location i.e. Distance, Locality or other	5.707047
11	Lack of Time to devote for research	4.494588

Question 7 to 10 were again of objective type and the results along with questions are placed in table 4.

Table 4: Results of question number 7-10.

Q.7 Do you think that a database should be prepared that indicates research interests of the industry, projects going on there, availability of resources in industry etc.	Yes 97.83%	No 2.17 %
Q.8 Are you willing to establish industrial collaborations?	Yes 97.83%	No 2.17%
Q.9 Do you think academic research has dual advantage i.e. if it fails still it is useful for award of degree to students	Yes 81.74%	No 14.35%
Q.10 Do you think people from academic institutions should go to industry. (to get tuned with latest trends of industries) and vice a versa (for higher studies) for some time? Y/N or others (please specify)	Yes 93.04%	No 5.65%

97.83 % participants said that a database should be prepared indicating the research interests of the industry, on-going projects, availability of resources etc, while 2.17 % people said no to it. 97.83% are willing to establish industrial collaborations, while 2.17 % don't. 81.74% think academic research has dual advantage - i.e. even if it fails, still it could lead to the award of a degree; 14.35% says no to it. 93.04% think that persons from academic

institutions should go to industry (for updating on the latest trends) and vice versa (for higher studies) for some time; 5.65% respondents feel otherwise.

Question 11-13 were of subjective type. Participants were asked to write their organization's policy towards linkage with industry and to identify the main barriers as they see personally for collaborative research with their suggestions to improve such collaborations hence in turn to develop the Pharmacy Profession. Subjective opinions on Q11, 12 and 13 were compiled and placed in the form of a document on project's website.

Part 2

Information on human resources, facilities and equipments, and researches being done are compiled and kept on the database available at **www.aiip.info**

Part 3

Directory of academic organizations and researchers is placed at website.

b. Industry Responses:

Q.1-4: Participants were asked four multiple-choice questions and their responses are shown in table 5.

Table 5: Questions 1-4 and responses of participants

Question	Answer		
	Yes	No	Other
Q.1. Do you think Industry, Academia and Institution linkage is missing in India?	90.48%	3.57%	5.95%
Q.2. Do you think Academia Industry and Institutions should tie up/ collaborate for mutual benefits?	92.86%	3.57%	3.57%
Q.3. Do any research or other collaboration you have with academic institution/others?	47.62%	44.05%	8.33%
Q.4 Would you like to be a part of National AIIP Database?	82.14%	9.52%	8.33%

Over ninety percent (90.48%) think that Industry, Academia and Institution linkage is missing in India, 3.57% thinks otherwise. About 92.86 % people think that Academia, Industry and Institutions should tie-up for mutual benefit; 82.14% wanted to be a part of national AIIP database. About 47.62% already have collaboration in some form (table 5).

Q5: In this question the levels and objectives of interactions with academic organizations were assessed.

Table 6: Level and objectives of collaborations of Industrial organizations with academics

Nature of Linkage		Responses
1	<i>General Linkage</i>	
	Summer Training to B. Pharm. Students	26.13%
	Participation in Workshops	19.6%
	Boards/Committee members from Academics	7.54%
2	<i>Institutional Support</i>	
	Funding Medals/Rewards/Incentives	4.52%
	Research Fellowship Support	6.53%
	Donation of Laboratory Equipments/ Chemicals/ Drugs for academic research	5.03%
	Infrastructure Support	3.52%

	Support in Research Projects	14.57%
	Other Support not covered (Support for cultural activities, seminar organization)	3.52 %
3	<i>Academic Level Interaction</i>	
	Involvement in Teaching Process	6.53%
	Involvement in Curriculum Design	2.51%
	Joint Publication	3.52%
	External Examiner for UG and PG students	5.53%
	Initiatives such as continuing education, specialized courses, placement collaborations	6.53%
4	<i>PhD research Linkage</i>	
	Research Guide	2.01%
	Putting Industrial Problems as research Project	5.53%
	Allowing the scholar to use facilities	4.02%
5	<i>Service type Interaction</i>	
	Departmental Facilities of Academics used by research Institutes/Industry	5.03%
	Training Programs conducted at Institutions	7.04%
	Consultancy availing from Research Institute/Academics to solve a specific problem	6.03%
	Using specialized Database/ Lab Equipment of the Academics	3.02%
	Other Facilities	1.51%
6	<i>Cooperative Linkage</i>	
	Collaborative Projects	9.05%
	Contract Research i.e. carrying out any specific research projects in academic institutions	7.54%
	Patenting /Licensing: Negotiations of Patents or Licensing for Research Results	5.53%

The results, shown in table 6, reflects that majority of relationships are limited to only superficial linkages viz summer training to UG students, and participation in workshops, seminars etc. The extent of research collaborations with academics was found to be extremely low.

Q.6: In Q.6 this question, we attempted in identifying the contribution factor behind linkages. In majority of the cases, linkages in research were attributed to personal. The role of department, or organization as a whole, was negligible in taking initiatives in this aspect.

Q7: In question no 7 the participants were asked whether they are willing to establish such collaborations with academic Institutions. 91.55 % respondents wish to establish collaborations with academic institutes for their better growth of profession while 6.94 says no to it.

Q8: The ranking orders of barriers in establishing AI linkages were assessed according to following responses:

According to the responses from industry participants the ranking of different barriers among given options were analyzed and the scores were calculated. The analysis of the data obtained is shown in figures 8.1 to 8.12. Total number of participants responded in this question was 61. Table 7 summarizes the results. Majority of participants restricted their views to three to four options and responded accordingly. From industry perspective “*Poor equipment, facilities and infrastructure for research in institutions*” was rated as the most important barrier in establishing the AI linkages with overall score of 17.41627. This was followed by the option “*Lack of information on research being done in institutions.*” “*Lack of Initiative taking people in academics*” was placed on third ranking in the priority order. Overall score for all the options is shown in Table 4 as per the priority rankings.

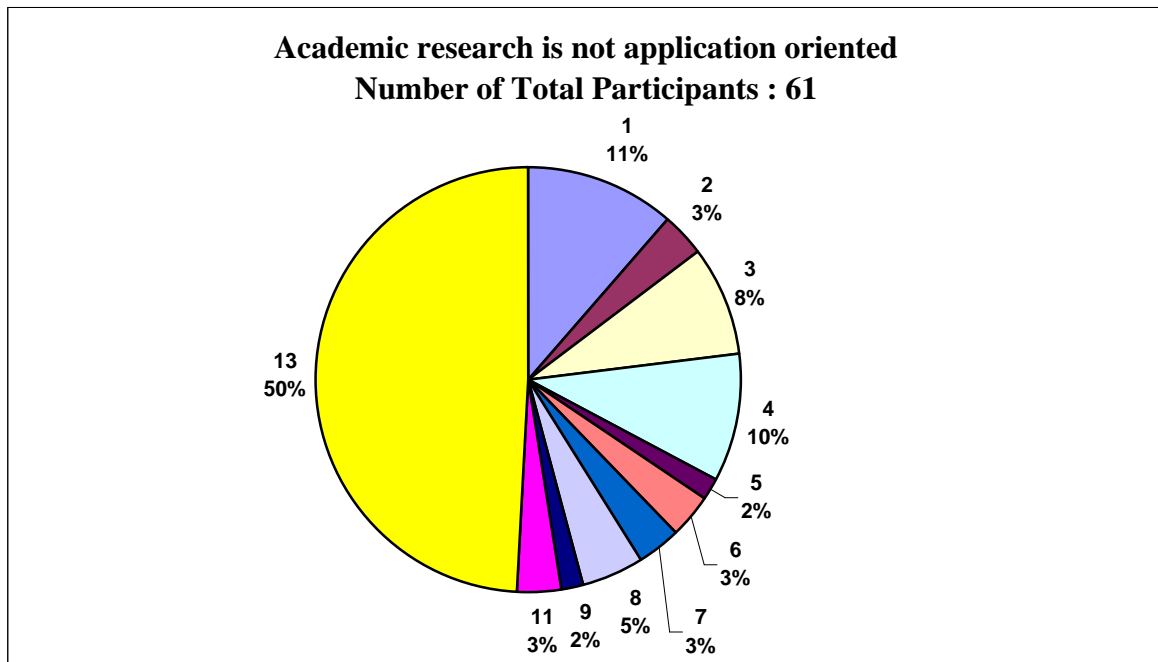


Figure 8.1: Ranking analysis for option “Academic research is not application oriented” as per responses received from participants from industry

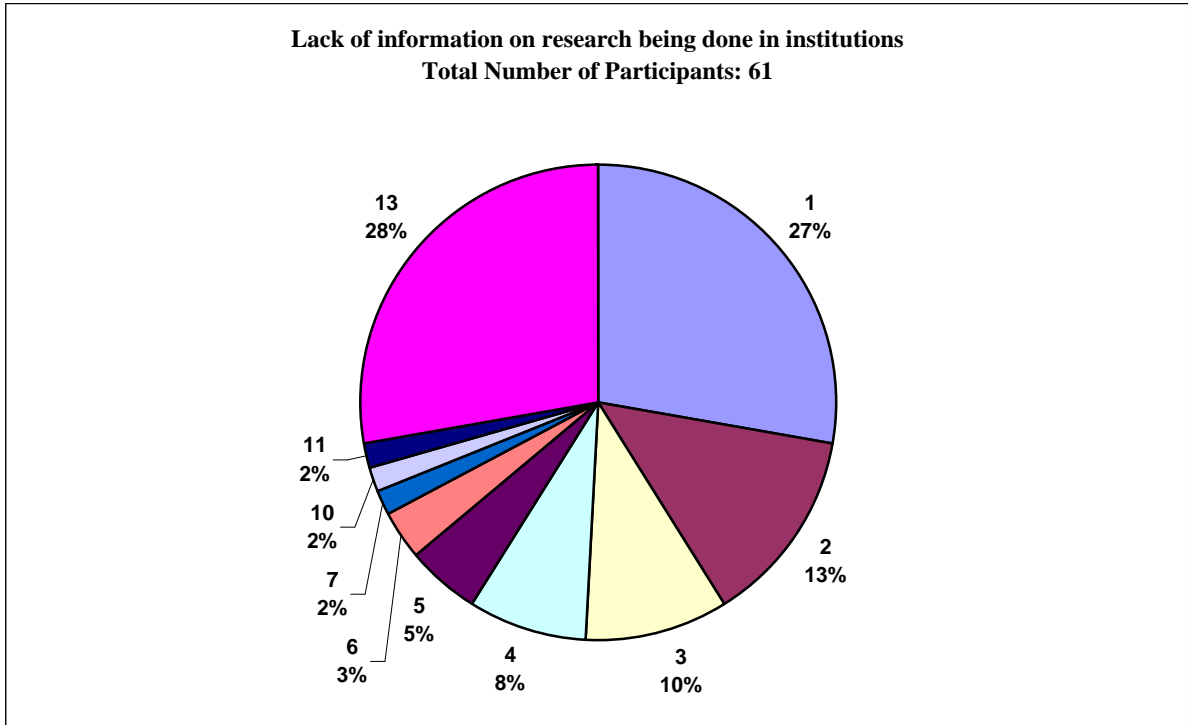


Figure 8.2: Ranking analysis for option *“Lack of information on research being done in institutions”* as per responses received from participants from industry

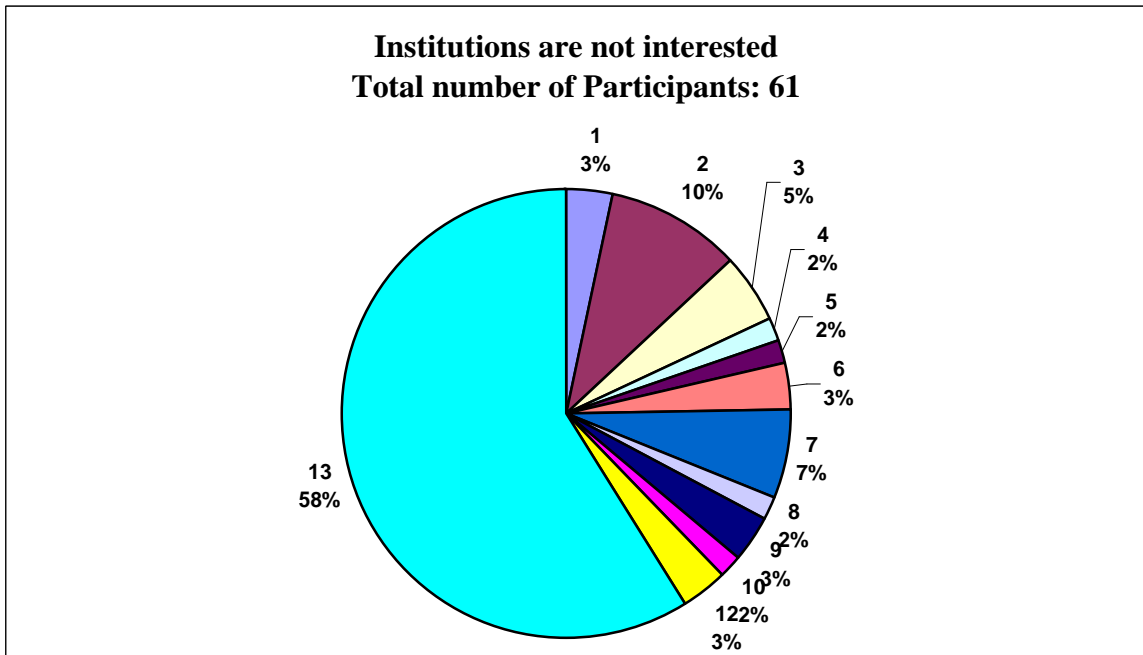


Figure 8.3: Ranking analysis for option *“Institutions are not interested”* as per responses received from participants from industry

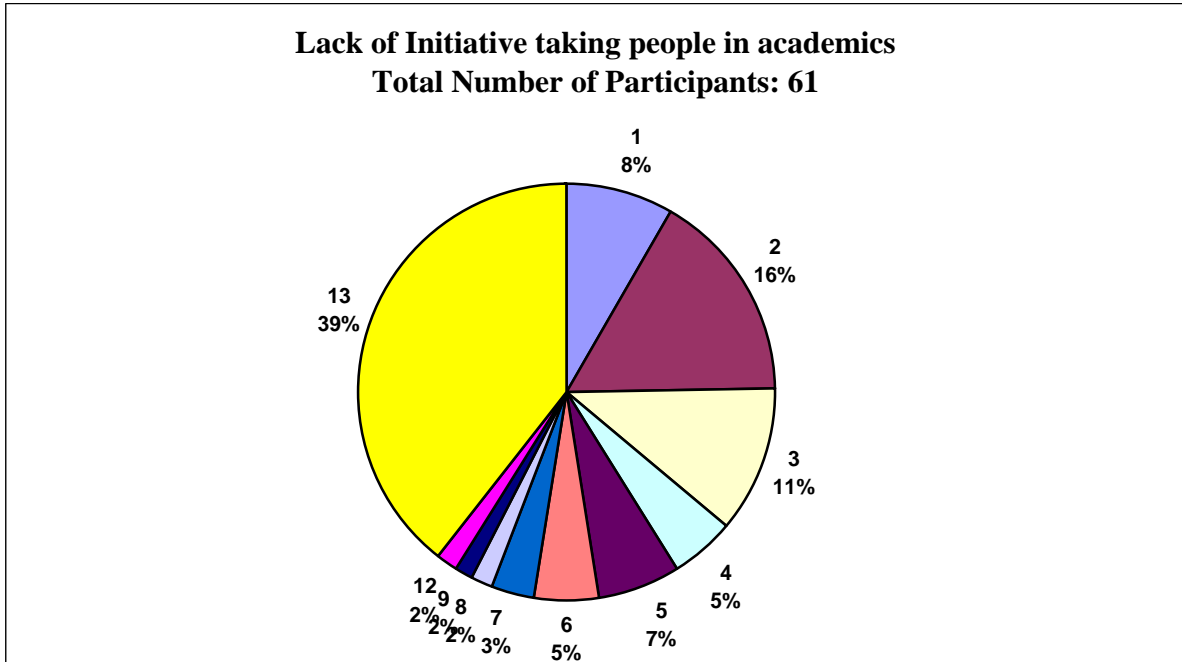


Figure 8.4: Ranking analysis for option *“Lack of Initiative taking people in academics”* as per responses received from participants from industry

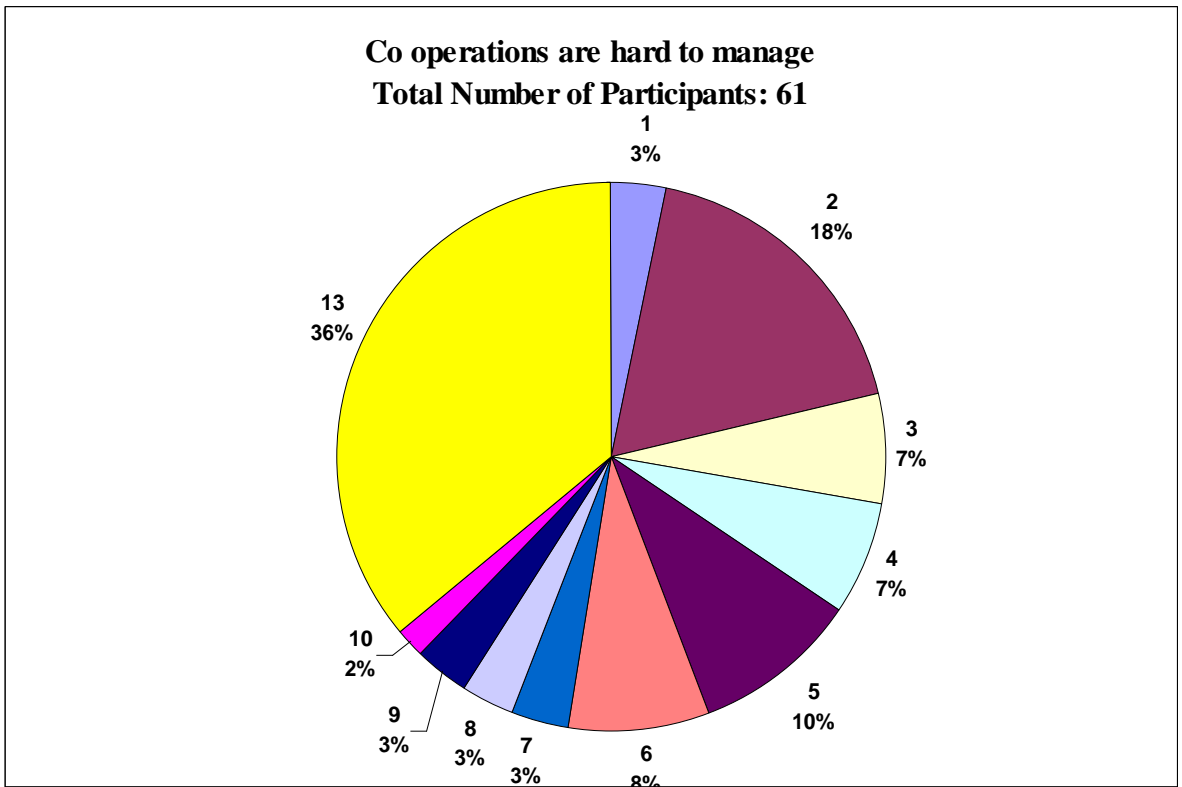


Figure 8.5: Ranking analysis for option *“Co operations are hard to manage”* as per responses received from participants from industry

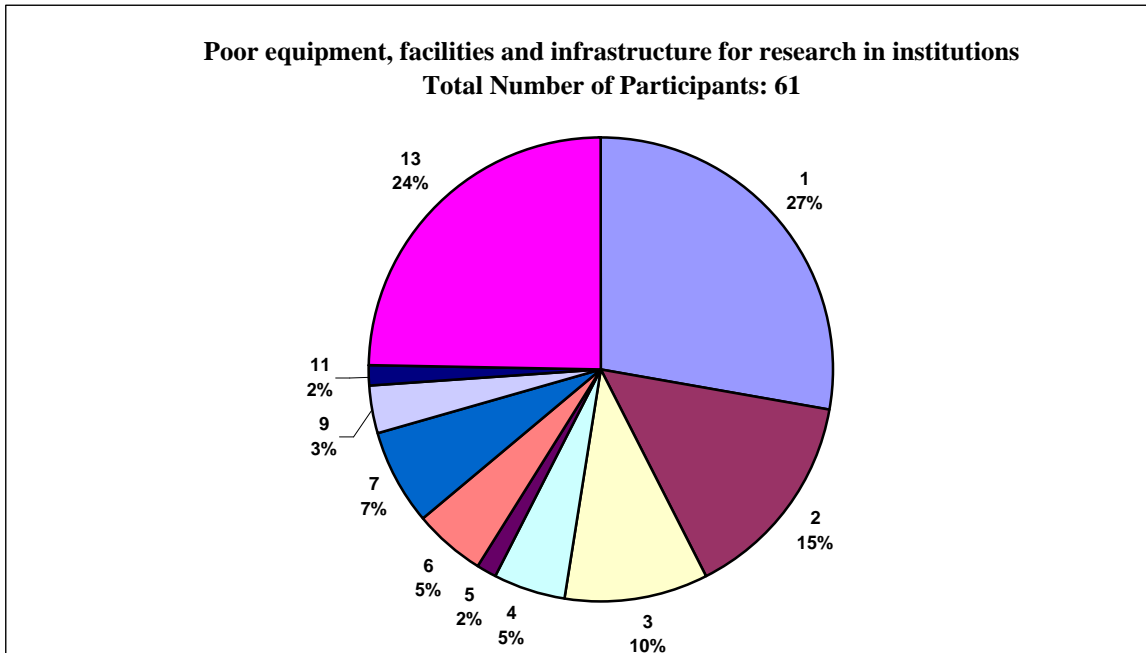


Figure 8.6: Ranking analysis for option “*Poor equipment, facilities and infrastructure for research in institutions*” as per responses received from participants from industry

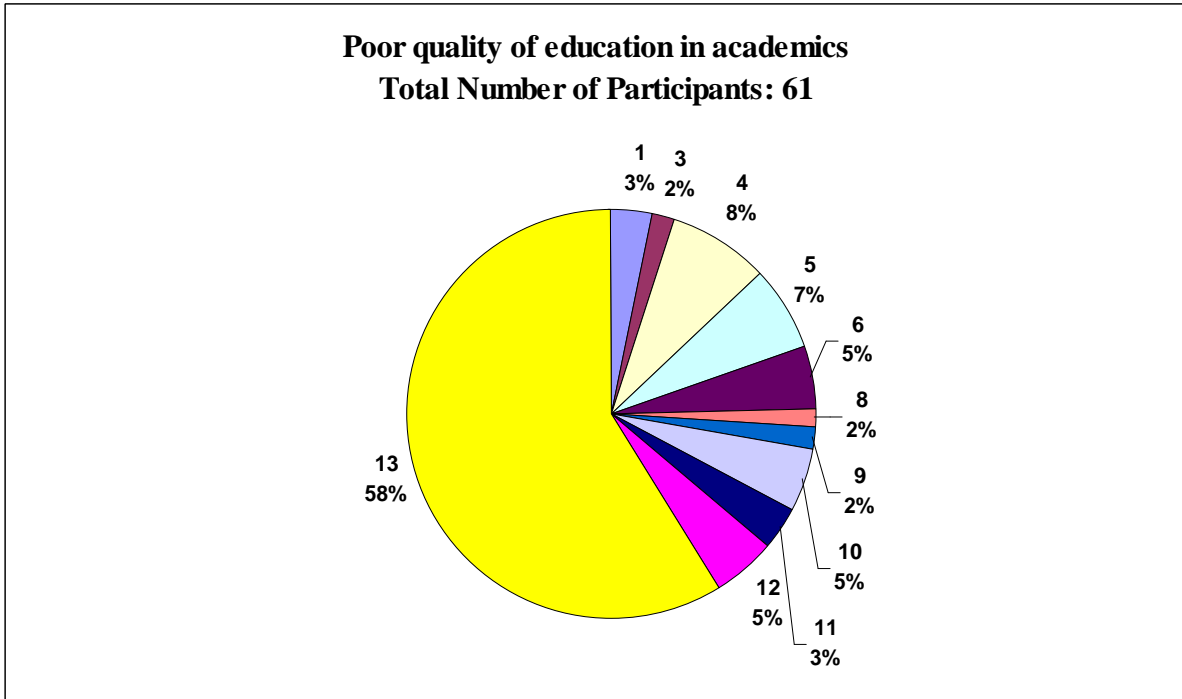


Figure 8.7: Ranking analysis for option “*Poor quality of education in academics*” as per responses received from participants from industry

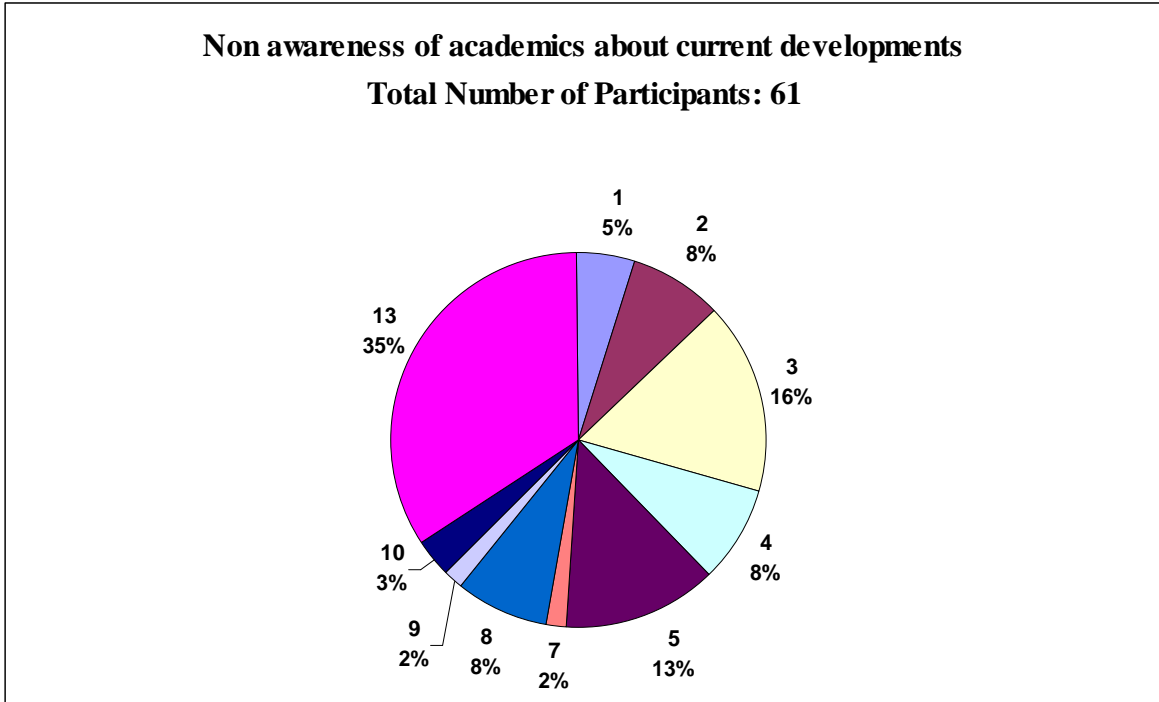


Figure 8.8: Ranking analysis for option “*Non awareness of academics about current developments*” as per responses received from participants from industry

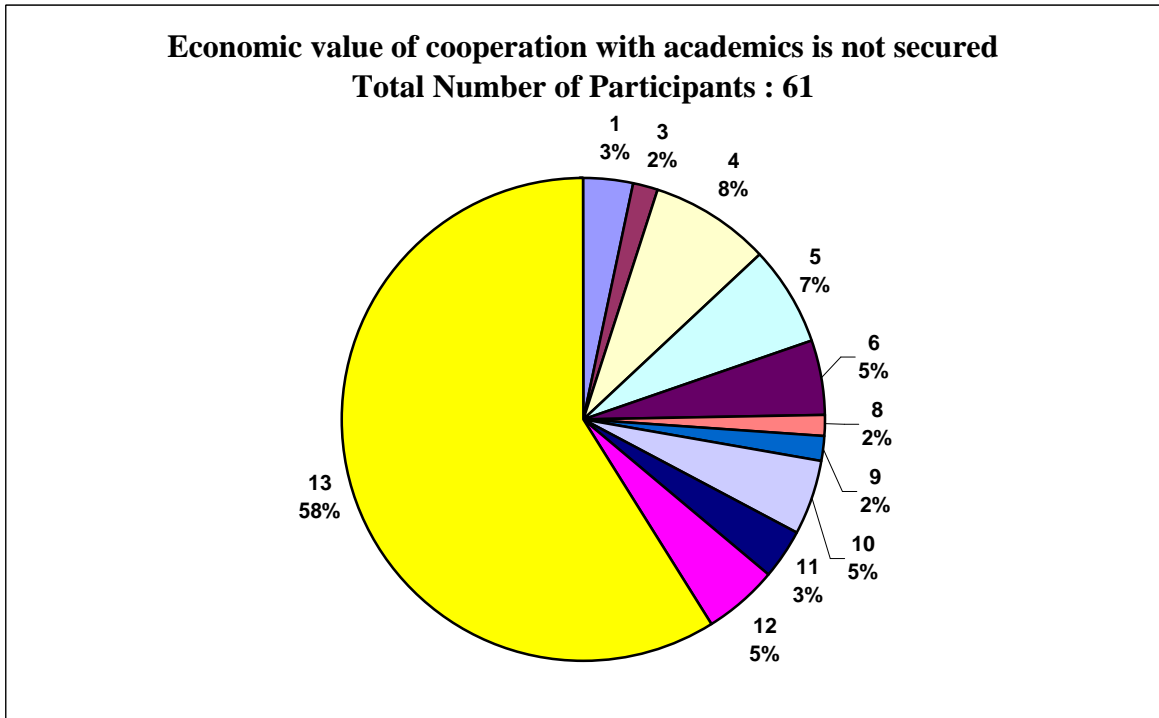


Figure 8.9: Ranking analysis for option “*Economic value of cooperation with academics is not secured*” as per responses received from participants from industry

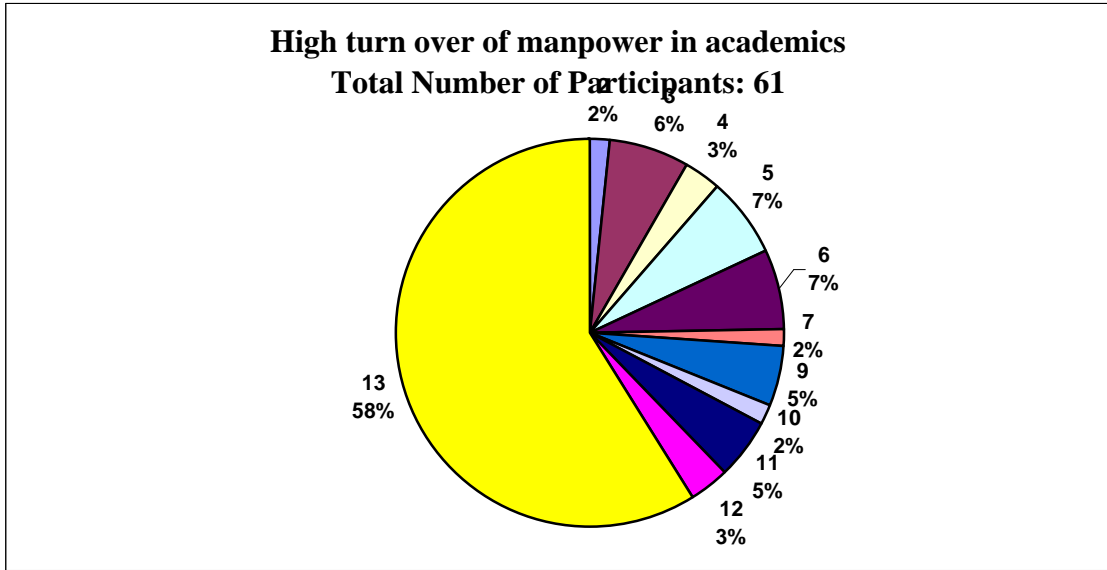


Figure 8.10: Ranking analysis for option “High turn over of manpower in academics” as per responses received from participants from industry

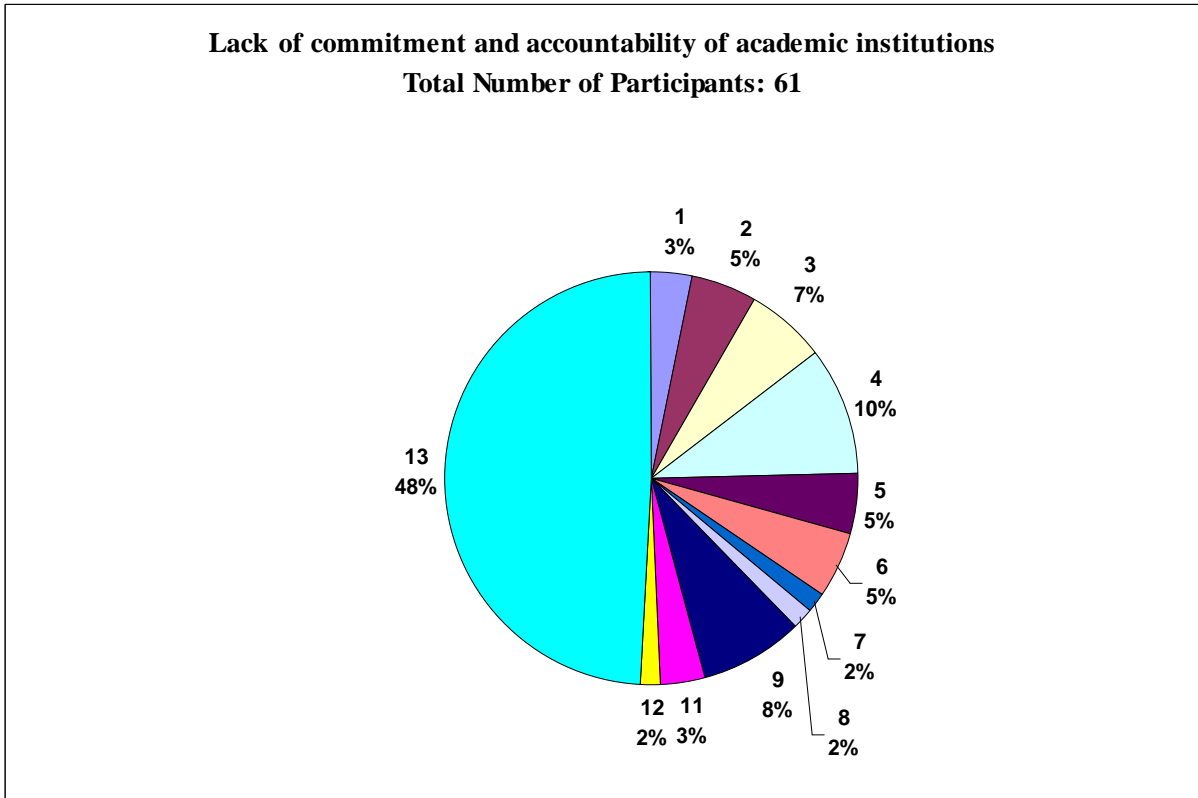


Figure 8.11: Ranking analysis for option “Lack of commitment and accountability of academic institutions” as per responses received from participants from industry

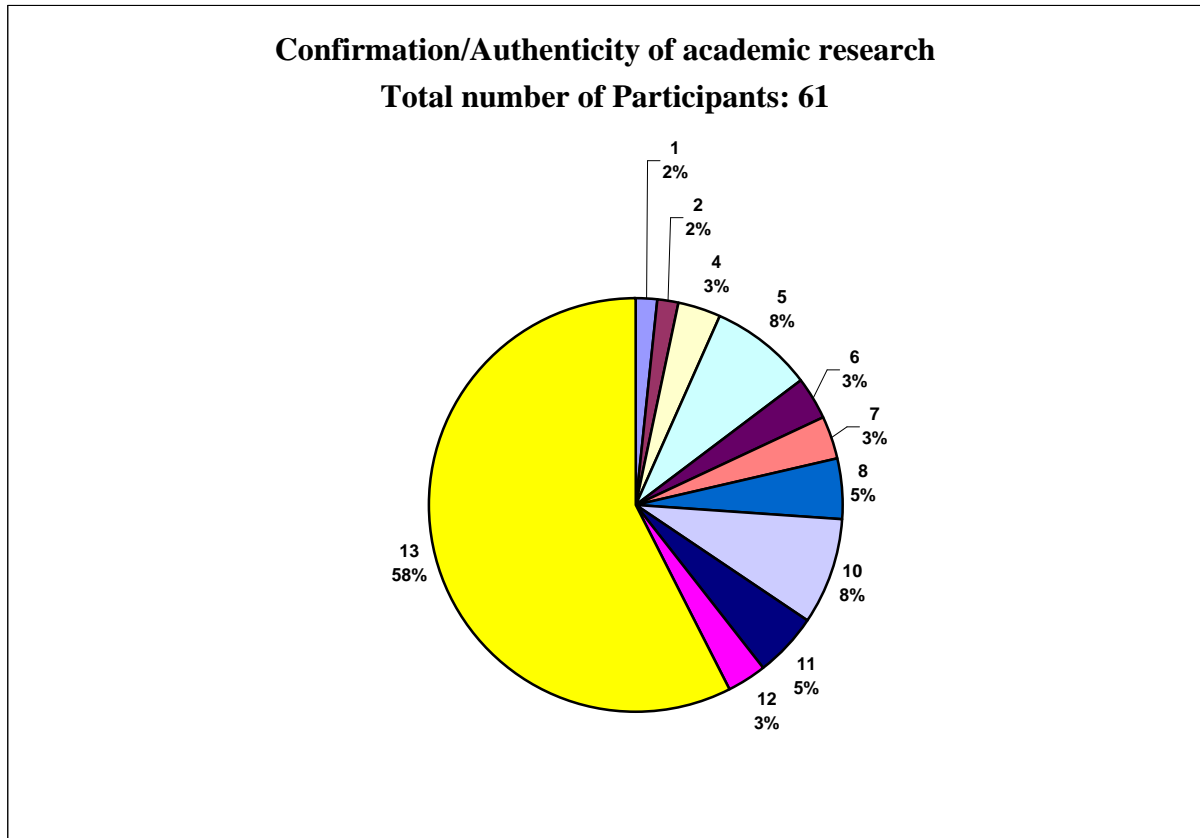


Figure 8.12: Ranking analysis for option “Confirmation/Authenticity of Academic Research” as per responses received from participants from industry

Table 7: Ranking order of major barrier in academia industry linkage (Industry perspective)

Ranking Order	Barrier Parameter	Overall Score
1	Poor equipment, facilities and infrastructure for research in institutions	17.41627
2	Lack of information on research being done in institutions	17.30658
3	Lack of Initiative taking people in academics	10.86017
4	Academic research is not application oriented	9.653481
5	Co operations are hard to manage	9.305027
6	Non awareness of academics about current developments	9.279215

7	Lack of commitment and accountability of academic institutions	6.988449
8	Institutions are not interested	6.930374
9	Poor quality of education in academics	6.130219
10	Economic value of cooperation with academics is not secured	6.130219
11	High turn over of manpower in academics	9.25
12	Confirmation/Authenticity of academic research	8.11

Q.9: 95.31% respondent feel that a database should be generated providing information about human and other resources available and researches being done in academic institutions.

Q.12: In question number 12 it was asked to participants that, “Do you think Industrial research has high degree of risk for failure and loss of investments in terms of HR and Financial”. Out of total participants, 60.71% think industrial research has high degree of risk for failure and loss of investments in terms of HR and Finance while 39.29% says no.

Q.13: In response of question 13 i.e. “Do you think academic research has dual advantage i.e. if it fails still it is useful for award of degree to students”; 67.86% think academic research has dual advantage i.e. even if it fails; it’s still useful for securing degrees.

Q.14: In this question, the participants were asked to give their opinion about “do you think that people from industry and academics should be interchange for mutual benefits. 85.71% think that people should move from industry to academic institutions (for higher studies) and vice-a-versa (to get tuned with latest trends of industries) for some time.

Q15-17: Subjective opinions are compiled in a single document and available on the website.

Part 3

Information in terms of human resource, facilities and equipments, and research activities are kept on database in a suitable format and can be accessed by browsing the website (www.aiip.info).

Guidelines to search the database:

1. Visit the website www.aiip.info
2. Go to database link
3. Login the database with User ID “administrator” and password “vishal”
4. The database could be searched by putting suitable search terms in the boxes provided.
5. Search help is provided on the site

A directory of the Industry organizations is prepared and uploaded on website.

List of Academic/Research Organizations Participated in Study

B.R.Nahata College of Pharmacy, Mandsaur	College of Life Sciences, CHRI, Gwalior
M. S. Ramaiah College of Pharmacy, Bangalore	Poona College of Pharmacy, Pune
AISSM Society's College of Pharmacy, Pune	Jayawantrao Sawant college of Pharmacy Pune
Rajarshi Shahu Coll. of Pharm. & Research Pune	
Charak College of Pharmacy & Research, Wagholi Pune	Luqman College of Pharmacy, Gulbarga
MCE Society's Allana College Of Pharmacy, Pune	Prin. K. M. Kundnani College of Pharmacy, Mumbai
Y B Chavan College of Pharmacy, Aurangabad	Shree S.K.Patel College of Pharmaceutical Education, Gujarat
Jodhpur Pharmacy College Jodhpur	Rajgad Dnyanpeeth College of Pharmacy, Bhors
Sri Balaji College of Pharmacy, Rajasthan	Lord Shiva College of Pharmacy, Haryana
Brahma Valley College Of Pharmacy, Nashik	Bhupal Nobles' Girls College of Pharmacy Udaipur
Ezhuthachan College of Pharmaceutical Science, KERALA	Royal College of Pharmacy and Health Sciences Berhampur, Orissa
Department of Pharmaceutical Sciences, Dibrugarh Universi Dibrugarh, Assam	Himalayan Pharmacy Institute Majhitar, Sikkim
Goa College of Pharmacy Panaji, Goa	Bihar College of Pharmacy Bihar
Bapatla College of Pharmacy Bapatla, Andhra Pradesh	Bharat Institute Of Technology (Pharmacy) Andhra Pradesh
G. Pulla Reddy College of Pharmacy, Hyderabad	College of Pharmaceutical Sciences Andhra University, VISAKHAPATNAM
University College of Pharmaceutical Science Andhra Pradesh	University College of Pharmaceutical Science Warangal, Andhra Pradesh
A R College & G H Patel Institute of Pharmacy Gujrat	Mohamed Sathak A.J.College of Pharmacy Chennai
Acharya B.M. Reddy College of Pharmacy Peenya	Adhiparasakthi College of Pharmacy Chengai M.G.R. Distr
Aditya College of Pharmacy and Science : New Delhi	AL-Falah College Of Pharmacy, Hubali
Amrita Institute of Pharmaceutical Sciences, kochi	Anna Saheb Ajmera College of Pharmacy (Women) Maharashtra
Basaveshwar College of Pharmacy Basaveshwar	Bharathi College of Pharmacy Karnataka
Bharati Vidyapeeth's College of Pharmacy Mumbai	Annai Velakanni's Pharmacy College Chennai
Annasaheb Ramesh Ajmera College of Pharmacy Maharashtra	Anuradha College of Pharmacy Maharashtra
Arulmigu Kalasalingam College of Pharmacy Tamilnadu	B K Mody Government Pharmacy College Gujarat
Baba Mungipa College Of Pharmacy Rajasthan	Institute of Pharmacy Jalpaiguri

Institute of Diploma in Pharmacy Maharashtra	NCRD Sterling Institute of Pharmacy Maharashtra
Vasantidevi Patil Institute of Pharmacy Maharashtra	Nerd's Sterling Inst. Of Pharmacy Maharashtra
MGV Pharmacy College Maharashtra	NCRD Sterling Institute of Pharmacy Maharashtra
Satara College of Pharmacy Maharashtra	MBES College of Pharmacy Maharashtra
Satara College of Pharmacy Maharashtra	M. M. College of Pharmacy Maharashtra
UTKAL University, Department of Phamaceutical Orissa	School of Pharmaceutical Sciences Orissa
School of Pharmaceutical Sciences Orissa	Nehru College Of Pharmacy Kerala
Mahatma Gandhi University, Dept. of Pharmaceu Kerala	Birla Institute of Technology Jharkhand
College of Pharmacy Maharashtra	MAEER's Maharashtra Institute of Pharmacy Pune
Delhi Institute of Pharmaceutical Sciences and Research Delhi	Jamia Hamdard Delhi
A.U. College of Pharmaceutical Sciences Visakhapatnam	Yalamarty College of Pharmacy Visakhapatnam
SSR College of Pharmacy Silvassa	Manipal College of Pharmaceutical Sciences Manipal, Karnataka
Government College of Pharmacy Bangalore, Karnataka	K.L.E. Society's College of Pharmacy : Bangalore, Karnataka
K.L.E.S's College of Pharmacy Hubli, Karnataka	Pharmacy Group, Birla Institute of Technology Pilani, Rajasthan
V. L. College of Pharmacy : Karnatakas	Manipal College of Pharmaceutical Sciences Manipal, Karnataka
Vinayaka Mission's College of Pharmacy Salem, Tamilnadu	Regional Institute of Paramedical and Nursing Mizoram
Govt. Polytechnic Manipur	SLT. Institute of Pharmaceutical Sciences Bilaspur
Anand Pharmacy College Gujarats	Dayalbhai R. Patel Institute of PG Studies Gujarat
K.B. Institute of Pharmaceutical Education an Gujarat	School of Pharmacy, Devi Ahilya Vishwavidyala Indore, M. P
College of Pharmacy, IPS Academy : Indore, M. P	School of Pharmaceutical Sciences, RAJIV GAND Bhopal, M. P
Jamia Humdard ,New Delhi New Delhi	S.G.R.B.D.S Dehradun (U.P).
Dehradun Institute of Technology Faculty of Pharmacy Mussoorie Diversion	Kamla Nehru Institute of Management & Technology Sultanpur (U.P)
Shrigopi Chand College Of Pharmacy Ahera Bagh Baghpat City (U.P)	Meerut Institute of Engineering & Technology Meerut
Rajiv Academy For The Pharmacy. Delhi-Mathura	University Institute of pharmacy, CSJM-Kanpur
A N D College of Pharmacy, Babhnam ? Gonda (U.P.)	GLA Institute of Pharmaceutical Research : Mathura (U.P).

Meerut Institute of Engineering & Technology Meerut, U P	Dept. of Pharmaceutical Science F.H M.S AAI-D Allahabad (U.P)
Rajiv Academy for Pharmacy Mathura	I.I.M.T. College of Medical Sciences Meerut, U P
Bharat Institute of Technology Meerut, U P	NKBR College Of Pharmacy & Research Centre Meerut, U P
Shri Guru Rava Roi Institute of Tech. & Scien Dehradun	Rajiv Academy for Pharmacy : Delhi- Mathura
Kalka Institute for Research & Advanced Studi Meerut, U P	Rajiv Academy for Pharmacy Mathura
Maharishi Arvind college of pharmacy Ambabari jaipur	Apex Mansarovar, Jaipur
PCTE Institute of Pharmacy Ludhiana	Indo - soviet friendship college of pharmacy Moga, Punjab
Maharishi Arvind college of pharmacy Ambabari Amba Bari Circle, Am	B.N.College of the Pharmacy Udaipur (Raj.)
Department of Pharmacy M.L.S.University, Udai	Bhupal Nobel Girls College of Pharmacy.Udaipu
Department of Pharmacy Course (PHTI) S.M.S. Hospital Campus	Maharishi Arvind institute of Pharmacy, Jaipur
Gyan vihar school of pharmacy, Jagatpura, Jaipur	Swami Institute of Pharmacy Raisar NH-11, Jaipur
Lachoo Memorial College of Science & Technology Sector - 4, Shastri	School of Pharmacy and Technology Management, Mumbai
Department of Pharmacy, Govt. polytechnic Jalgaon, Maharashtra	Meera Bai Polytechnic New Delhi
A.U. College of Pharmaceutical Sciences Visakhapatnam	Agharkar Research Institute : Pune, Maharashtra
Shard Pawar College of Pharmacy Wanadongri, Hingna Road, NAGPUR	Sinhgad College of Pharmacy (Poly) : Pune, Maharashtra
S.N.Institute of pharmacy, Pusad (M.S)	Government. College of Pharmacy Aurangabad, MS
St.Peter's Institute of Pharmaceutical Scienc Warangal, AP	Luqman College of Pharmacy Karnataka
SRR College of Pharmaceutical Sciences AP	H.R. Patel Women's College of Pharmacy Shirpur, Maharashtra
D J College Of Pharmacy Ghaziabad, UP	L. J. Institute Of Pharamcy Ahmedabad, Gujarat
Institute of Pharmacy, Nirma University Ahmedabad, Gujarat	Hindu college of pharmacy, Gunter.(A.P)
AISSMS College of Pharmacy.Pune, (M.S)	Manoharbhahi Patel Insti. Of Pharmacy,Gondiya
N.D.M.V.P. Nasik Gangapur Road, Nasik, Mahara	S G R S College of Pharmacy Saswad, Pune
Bharati Vidyapeeths Poona College of Pharmacy	AISSMS College of pharmacy.Pune.

Pune, Maharashtra	
Rajgad Dnyanpeeth's College of Pharmacy, Bhore, Pune	All India Shri Shivaji Memorial Society's College of Pharmacy Pune
Modern College Of Pharmacy Only For Ladies. Moshi.Haveli,Pune	Bharti Vidyapeeth College of pharmacy ,Navi M C.B.D, Belapur,Navi
Institute of Pharmaceutical Education & Research Borgoan (Meghe) Ward	Appasaheb Birnale College of Pharmacy, Sangli.
Govt. college of pharmacy, Karad ,Satara (M.H)	Appasaheb Birnale College of Pharmacy Maharashtra
Pravara Rural College of Pharmacy ,Pravarnaga	Dr.DY.Patil Institutes of Pharmaceutical Science Pimpri, Pune (M.S).
Yash Institute of Pharmacy, Aurangabad (M.H)	Poona college of pharmacy.pune
Yash Institute of Pharmacy, Aurangabad(M.H)	Maharashtra Institutes of Pharmacy, Pune
Shivlingeshwar College of pharmacy, Latur.	S.N.D.College of pharmacy, Babhulgaon, Yeola
I.P.S. college of Pharmacy, Shivpuri Link Road Gwalior (M.P)	Mandsaur Institute of Pharmacy. Mandsaur
Seth. G.L. Bihani. S.D. College, Pharmacy, Ganganaganer, (Raj)	L.B.S College of pharmacy, Jaipur.
M.C.E. Society Institute of Pharmacy, Pune	Rajgad Dnyanpeeth's College of Pharmacy Bhore. Pune
R.C.Patel College of Pharmacy.Shirpur.	Sigma institute of Pharmacy, Baroda. Gujarat
B R Nahata college of Pharmacy mandasaur	S.P.Colllege of Pharmacy, Nagapur.
Appasaheb Birnale College of Pharmacy Sangli : South Shivaji Nagar	A.P.M.C College of Pharmacy Education & Research : North Gujarat
Shri Sarvajanic Pharmacy College, Gujarat.	Visveswarapura Institute Of Pharmaceutical Science Bangalore, Karnataka
Shri B M Shah College of Pharmaceutical Education Modasa	Visveswarapura Institute of Pharmaceutical Science : Bangalore, Karnataka
Shudhakar Rao Naik Institute of Pharmacy, Pusad Yavatmal (M.S)	Pravara Rural College of Pharmacy, Pravaranagar Pravaranagar, Ahmednagar
Govt.college of pharmacy, karad. Satara Maharashtra	Institute of Diploma in Pharmacy Maharashtra
Bharti Vidyapeeth College of Pharmacy, Kolhapur	MCE Society's Allana College Of Pharmacy Pune, Maharashtra
MGV Pharmacy College Maharashtra	
Sharadchandra Pawar College of Pharmacy, Otur Juner,Pune.(M.S)	MCE Society's Allana College Of Pharmacy Pune
Rajgad Dnyanpeeth's College of Pharmacy Bhore. Pune	MAEERS Maharashtra Institutes of Pharmacy, Pune
S.N.D.College of Pharmacy, Babhulgaon, Yeola, Babhulgaon, Nasik	N. D.M.V.P. Nasik Gangapur Road, Nasik, Maharashtra
Academy of Pharmaceutical sciences & Medical Kannur, Kerala	Siddhant College Of Pharmacy, Pune.

Crescent B.Pharm College, Madhya Pradesh	K.C.T College of Pharmacy Gulbarga.Karnataka
K.L.E.Society's College of Pharmacy Belgaum,Karnataka	Bapuji Pharmacy College of Devangere, Karnata
Gulbharga University Department. Gulbharga,Karnataka	Dr.H.L.T College of pharmacy, Bangalore
Acharya and B.M.Reddy College of pharmacy Haseraghatta Road,Ba	HKE'S College of Pharmacy Gulbarga Karnataka
Manipal College of Pharmaceutical Sciences Manipal, Karnataka	PES College of Pharmacy ,Bangalore.
N.G.S.M.Institute of Pharmaceutical Sciences, Paneer, Mangalore	K.L.E.Society's College of Pharmacy Belgaum,Karnataka
JMJ Society College of pharmacy, Bangolore..	Institute of Pharmaceutical Education & Resea Wardha
Department of Biochemistry, Punjab University Chandigarh	Punjabi University, Patiala
Vasantidevi Patil Institute of Pharmacy Kolhapur	Poona College of pharmacy, Bharati Vidyapeeth Pune
Department of Pharmaceutical Sciences and Dru Patiala	Jayawantrao Sawant college of Pharmacy and Re Pune
V J S M'S Institute of Pharmacy for Women Pune	Institute of Pharmacy Pune
National Institute of Pharmaceutical Sciences : Mohali	A.P.Singh Ropar, Punjab
Sayali charitable trusts college of pharmacy Maharashtra	ASBASJS Memorial College of Pharmacy, Bela, R Punjab
SMBT College of pharmacy Maharashtra	Krishna Foundations college of pharmacy : Karad
Govt. college of pharmacy Karad	I.S.F. College of Pharmacy Moga
Maa Saraswati College of Pharmacy Abohar	School of Pharmacy, Chouksey Engg. College Chattisgarhs
UIPS : Chandigarh	Appasaheb Birnale College of Pharmacy Maharashtra
J.S.S.College of Pharmacy Maysore	Mother Terasa College of Pharmacy Puducheery
s J.S.S.College of Pharmacy OOTY	AISSMS college of pharmacy : Pune
Sonali Ashok Patil Maharashtra	S G R S college of pharmacy Pune
J.K.K. Natrajan College of Pharmacy Komarapalayam, Tamil	Padmavati Dharpuri,Tamilnadu
Vinayaka Mission College of Pharmacy Salem, Tamilnadu	C.L. baid Mehta College of Pharmacy Chennai, Tamilnadu
Anna University Tiruchirapalli	Vels College of Pharmacy Chennai
Nawdha College of Pharmacy Erode, Tamilnadu	BIT, BU Trichy, Tamilnadu
Vels College of Pharmacy Trichy	Swami Vivekanand College of Pharmacy Namakkal, Tamilnadu
Ultra College of pharmacy Madurai, Tamilnadu	J.S.s.College of Pharmacy Ooty,

	Tamilnadu
Vinayaka Mission College of Pharmacy Salem, Tamilnadu	Appasaheb Birnali College of Pharmacy Sangli, Maharashtra Major
Brahma valley College of Pharmacy Nashik, Maharashtra	J.K.K. Tamilnadu
Annamalai University, Tamilnadu	University Department of Pharmacy, Annamalai

List of Industry Organizations Participated in The Study

Vadofi Life Science, Chandigarh	ZyduS Ahemdabad
Nicks Laboratories 170,S.F.A., Nagpur	Onex Pharmaceutical Ltd Jaipur
Windlas Biotech Ltd Dehradun	Medox Karnal
Unicheml Lab.Ltd Roha (Maharashtra),	Modi Mundipharma Limited Modipuram
Bestochem Formulations (I) Ltd. Meerut	Nicholas Piramal India Ltd Mumbai
Coral Laboratories Ltd Mumbai	Regent Drugs Limited (Teva Pharmaceutical Ind Gajraula.
Agron Remedies Pvt. Ltd : Kashipur	Mankind Pharma Pvt Ltd : Gurgaon
Johnson Hyderabad	Intas Pharmaceuticals Ltd. Ahemedabad
Criterion Clinical Research Organization Maharashtra,India	Accutest Research Lab (I) Pvt. Ltd. Navi Mumbai ,Pune
Admark Herbals Limited Gujarat	Surya Herbal Limited Noida
Abhi Systems New Delhi	Cholayil Pvt. Ltd. Chennai, Tamilnadu
Deluxe International Tamilnadu	Millennium Impex Mumbai
Wilson Drugs & Pharmaceuticals Pvt Ltd Punjab	Yash Pharma International Mumbai
M.K.Medical Services Mumbai	M.S.S.Asan Exports : Tamilnadu
Zigma Herbal Remedies : Tamilnadu	Veeda Clinical Research Pvt. Ltd. Ahmedabad,
Emami Health Care West Bengal	Emami Limited : West Bengal
Muthuswamy Mumbai	Dr.Reddy's Laboratories Ltd. Hyderabad
Eli Lilly And Company (India) Pvt. Ltd. Gurgaon, Haryana	Meridian Pharmacare Bangalore, Karnatakas
Alembic Limited Gujarat	Abbott India Limited Mumbai
Dabur Pharma Limited New Delhi	Digvijay Pharma Industry Maharashtra
Elite Pharma Pvt. Ltd. Ahmedabad, Gujarat	Synchron Research Services Pvt. Ltd. Ahmedabad, Gujarat
Lee Pharma Limited. Hyderabad	Udaipur Mineral Development Syndicate Pvt. L Jaipur, Rajstan
Anjum Extraction Pvt.Ltd. Chittorgarh(Raj.)	Rajesh Chemicals.Co. Mumbai,Maharashtra
FDC Limited ,Aurangabad	Serum Instituteof India Ltd. Pune,India.

Concept Pharmaceutical Ltd. Waluj,Aurangabad	Novartis India Limited Mumbai
Astrazenicapharma India Ltd Hebbal Bangalore	Aventis Pharma. Ltd. Andheri,Mumbai(M.S)
Baxter (India.)Pvt.Ltd. Gurgaon, Haryana	Bayer Pharmaceutical. Pvt. Ltd. Thane.Mumbai
Bandra West, Mumbai	Boots Piramal Healthcares Pvt. Ltd Parel Mumbai
Bristol-Mayers Squibb India Pvt.Ltd. Worli, Mumbai(M.S	DeyS Medical (U.P) Pvt. Ltd. Collin Lane Calcutta
East India Pharmaceutical Works Ltd. Russell Street,Calcutta	Baxter India Pvt. Ltd. Waluj, Aurangabad(M.S.)
The Varma Pharmacy.Pvt.Ltd. Hadpsar, Pune(M.S)	Harman Finochem Limited Aurangabad, India
Glaxosmithkline Pharmaceutical Ltd. Andehri, Mumbai	S.S.Pharmachem.Pvt.Ltd. Thane. Maharashtra
Iantros Pharmaceutical.Pvt.Ltd : Pune .Maharashtra	Nulife Pharmaceuticals Pimpri, Pune.(M.S)
Aaron Pharmaceutical .Pvt.Ltd Andheri(E), Mumbai	Alkem Laboratories Ltd. Parel, Mumbai
Micro Orgo Chem (Moc) Mumbai , India	Kamud Drug Pvt.Ltd Sangli,Maharashtra
Meenaxy Pharma Pvt. Ltd Hyderabad India	Gangwal Chemical Pvt.Ltd Malad (W),Mumbai
Choksi Laboratories Limited Indore (M.P)	Nitin Pharmaceuticals Pvt.Ltd Kernal ,Haryana
V life Science Technologics.Pvt.Ltd. Pune,	Alchem International Ltd. Ballabgarh, Haryana
Kopran Laboratories Ltd. Worli,Mumbai	Lupin Ltd Santacruz (East)
Zytex (India) Pvt. Ltd. Andheri	Drugmek Laboratories (P) Ltd. : Gurgaon, Haryana
Venus International Mumbai	Albega Biological (P) Ltd. Gurgaon, Haryana
Vashista Pharmaceuticals Gurgaon, Haryana	: Eastern Medikit Ltd. : Gurgaon, Haryana
Remis Pharmaceuticals (Ndia) Pvt. Ltd. Gurgaon, Haryana	J P Pharma Mumbai
Chem Pharma Pvt. Ltd. Gurgaon, Haryana	Indmag Remedies Pvt. Ltd. Gurgaon, Haryana
Cognition Group Gurgaon, Haryana	Shriram Institute For Industrial Research (SR Delhi
Veeda Clinical Research Pvt. Ltd. Ahmedabad, Gujarat	Ranbaxy Laboratories Limited Gurgaon, Haryana
Torrent Baddi,Hp	Lifecare Innovations Pvt. Ltd. Gurgaon, Haryana
Promed Research Center : Gurgaon, Haryana	Baxter India Gurgaon, Haryana

Gvk Biosciences Pvt. Ltd. Gurgaon, Haryana	Murli Krishna Pharma Private Ltd. Pune, Maharashtra
Pfizer Limited : Mumbai	Cadila Pharmaceuticals Limited Ahmedabad, Gujarat
Catalyst Clinical Services Pvt. Ltd. Delhi	Radha Medical Ltd Karnataka
Kendli India Pvt. Ltd Gurgaon, Haryana	Sanmour Pharma Pvt. Ltd. Mumbai
Eisai Pharmaceuticals India Ltd. : Mumbai	Ethypharm LI Pvt. Ltd. Mumbai
Fulford (India) Ltd. : Mumbai	Galderma India Pvt. Ltd. Mumbai
Glaxosmithkline Consumer Healthcare Ltd. Gurgaon, Haryana	Hindustan Lever Ltd. : Mumbai
Intervet India Pvt. Ltd. Pune, Maharashtra	Janssen Cilag Pharmaceuticals, Johnson & John : Mumbai
Laboratories Griffon Pvt. Ltd. Mumbai	LG Life Sciences India Pvt. Ltd. : Delhi
Lupin Ltd. Mumbai	Martin & Harris Pvt. Ltd : Delhi
Merck Ltd. Mumbai	Msd Pharmaceuticals Pvt. Ltd. : Delhi
Nicholas Piramal India Ltd. Mumbai	Novartis India Ltd. Mumbai
Novo Nordisk India Pvt. Ltd. Bangalore, Karnataka	Organon (India) Ltd. Mumbai
Paras Pharmaceuticals Ltd. Ahmedabad, Gujarat	Pfizer Ltd. Mumbai
Procter & Gamble Hygiene & Health Care Ltd. Mumbai	Ranbaxy Laboratories Ltd. Gurgaon, Haryana
Raptakos, Brett & Co. Ltd. Mumbai	Reckitt Benkiser (India) Ltd. Gurgaon, Haryana
Roche Scientific Company (India) Pvt. Ltd., Mumbai	Sandoz Pvt. Ltd. : Mumbai
Shreya Life Sciences Pvt. Ltd. Mumbai	Solvay Pharma India Ltd. Mumbai
Mitocon Biotec, Pharmaceutical Division, Spic Chennai	Ucb India Pvt. Ltd. Mumbai
Unichem Laboratories Ltd. Mumbai	Wanbury Ltd. : Mumbai
Wockhardt Ltd. : Mumbai	Wyeth Ltd. : Mumbai
Serdia Pharmaceuticals (India) Pvt. Ltd. Mumbai	Sangfroid Industries Pvt. Ltd. Hyderabad
Sanofi Pasteur India Pvt. Ltd. Delhi	Bilcare Limited Pune, Maharashtra
Richter Themis Medicare India Pvt Ltd Mumbai	Rpg Life Sciences Ltd. Mumbai
C Marc (India) Pvt. Ltd. Kolkata	Concordas Informatics India Pvt. Ltd. Mumbai
Eanst & Young Pvt. Ltd. Mumbai	Marsteller Public Relations Pvt. Ltd. Gurgaon, Haryana
Healthworld India Mumbai	Ors Ims Research Pvt. Ltd. Mumbai
Quintiles Research (India) Ltd. Bangalore, Karnataka	Price Waterhouse Coopers Pvt. Ltd. Mumbai
Sudler & Hennessey Pvt. Ltd. Mumbai	Wolters Kluwer Health India Pvt. Ltd. Delhi

Zuellig Pharma (India) Pvt. Ltd. Mumbai	Colorcon Asia Pvt. Limited. Mumbai
Fmc India Pvt. Ltd. Banglore, Karnataka	Gmm Pfaudler Limited Mumbai
Sri Ramya Pharmaceuticals Hyderabad	Advinus Therapeutics Private Limited Pune, Maharashtra
Arbro Pharmaceutical Limited Delhi	Datla Laboratories Pcd Hyderabad
Saviour Caps Pvt. Ltd. Bhopal	Blue Cross Laboratories Ltd : Mumbai
Cadila Pharma Ahmedabad	Cadila Ahemdabad
Macleods Pharmaceuticals Mumbai, Maharashtra	Halewood Labs Ahemdabad, Gujrat
Libra Drugs Pune, Maharashtra	Sanjeevani Healthcare New Delhi
Amrit Aurangabad	Hindustan Moradabad,
Osho Pharma Ahemdabad, Gujrat	Able : Abohar
Zydus Cadila Healthcare Moraiya, Ahemdabad	Neutricea : Sri
Hindustan Belgaum,	Concept Pharmaceuticals Ltd. Aurangabad
Win Meerut,Up	Vats Pharma Pvt Ltd Meerut,Up
Amkay Laboratories Meerut,UP	Cure Quick Pharmaceuticals Karnal, Haryana
Curewell Drugs Panipat, Haryana	Horizon Bioceuticals Kala Amb, Hp
Sun Pharmaceuticals Halal, Gujrat	

References

Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P., Trow, M., 1994. *The New Production of Knowledge: The Dynamics of Sciences and Research in Contemporary Societies*. Sage, London.

Inzelt, A., 2004. The evolution of university-industry-government relationships during transition. *Research Policy* 33, 975-995.

Senker, J., 2001. Changing organization of public sector research in Europe-implications for benchmarking human resources in RTD. *Science and Public Policy* 28(4), 39-50.

Etzkowitz, H., Leydesdorff, L., 2000. The dynamics of innovation: from national system and “mode 2” to a triple helix of university-industry-government relations. *Research Policy* 29, 109-123.

Nelson, R.R., 1993. *National Innovation Systems: a comparative study*. Oxford University Press, New York.

Etzkowitz, H., Webster, A., Healey, P. (eds.) 1998. *Capitalizing knowledge: new intersections of industry and academia*, Albany: SUNY Press.

Sandhya, G.D., Visalakshi, S., 2000. R&D capability and alliance formation in the pharmaceutical industry in India. *Science and Public Policy*, 27(2), 109-121.

Bhattacharya, S. (forthcoming). Implications for Indian pharmaceutical sector in the new World Trade Organization (WTO) regime. *Medicinal Chemistry Research*.