Co-funded by the
Erasmus+ Programme
of the European Union

UNIVERSITY PRIORITY SETTING REPORT FOR THE PROVISION OF RESEARCH AND EDUCATION

RK UNIVERSITY, INDIA

Integrating Talent Development into Innovation Ecosystems in Higher Education

586227-EPP-1-2017-1-BG-EPP

INNOTAL

Table of Contents

This report seeks to map priority areas for research and education provision at the University. It aims to provide a vision on how the institution can develop further to become innovation and skills provider for its region and locality, and how students and graduates should be involved in this process.

Authors:

Mr. Denish Patel, Executive Vice President, RK University

Dr. Dharmesh Raval, Professor, RK University

Dr. Nilesh Kalani, Professor, RK University

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Review of national priorities for research, innovation and education

The self-study manual published by the National Assessment and Accreditation Council (NAAC) (http://www.naac.gov.in/docs/University%20Manual%20-%2020.6.13.pdf) provides useful guidelines for universities across India. As per the NAAC requirements, universities are expected to invest significantly in their research infrastructure. Out of the seven outlined criteria, criterion no. 3 (Research, Consultancy, and Extension) has been assigned the highest importance.

There are several major research priorities for India, including (but not limited to):

- Novel Drug Delivery system for various disorders
- Nanoparticles, herbal and synthetic agent as an anticancer agent
- Community Based Rehabilitation, Physical and Functional Activity
- Big Data Analytics
- Sustainable Marketing
- Establish a Centre for National Institute of Solar Energy
- Digitalization of Agricultural Sectors and introducing latest technology to increase agricultural productivity.
- Sustainable Manufacturing and Construction
- Promoting and fostering big data science, technology and applications in India and developing core generic technologies, tools and algorithms for wider applications in the government
- Other areas like Smart City, Edutech, Agritech, Artificial Intelligence, Clean Energy, IoT, Flexible Electronics, Social sector

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

University priorities for research and innovation targeted at the economy and business enterprises

RK University currently works on several research areas and research priorities for future development, including (but not limited to):

- Reproduction of Cheapest Electronic Gadgets from e-waste
- Evaluation of versatility of Thermoplastic Granulation technique, Novel Drug Delivery System like Microparticles, Pulsatile Release formulation for the treatment of disorders having circadian rhythm
- Studies on Suitability of Thermoplastic Granulation technique to formulate Solid oral drug products of all the categories, i.e. immediate release, Extended release and Delayed release. Through such research work Institute offer industry a novel, simple and cost-effective method for preparing delayed release formulation
- Physiotherapy for Geriatric Population, compensatory approaches to enhance daily routine activity
- Marketing Intelligence, Social Media Marketing
- Development of Web/mobile based solutions for various organizations to digitalize the organizational process.
- Sustainable concrete design to the Industries

A continuing field of research and education provision is Pharmacy. The School of Pharmacy provides education at Bachelor and Master level, as well as PhD studies. Program Specific Outcomes include degrees in Pharmacy, Pharmaceutics, Pharmacology and Quality Assurance. The School responds to the needs of the Indian Pharmaceutical Industry, which is growing and has managed to attract multinational giants who have opened their subsidiaries in India. New areas like clinical trial conducting agencies, Contract Research Organizations, Auditors and R&D sectors are attracting huge foreign investment. The RK University campus has 15 laboratories, 4 classrooms, auditorium, library with Wi-Fi network, learning resource centre, medicinal garden, animal house and administrative area. More than 50 persons industry personnel are associated with the institute. The Institute has produced over 150 research publications.

Another continuing priority field is Engineering. The School of Diploma Studies at RK University hosts four Engineering Departments and cooperates with over 65 placement companies.

The Department of Mechanical Engineering addresses the needs of local and regional industries. It has 11 well equipped laboratories with facilities of CAD-CAM and different shop floor machines and models that are used to provide hands-on experience. At the end of their studies, students undergo a 14-week industrial training in order to gain knowledge about various industries. Some students also participate in technical events and extra-curricular activities to further develop their skills and talents.

RK University's Department of Civil Engineering strives to produce highly knowledgeable, competent and resourceful young engineers who can adequately address the needs of society and the economy. The Department provides ample opportunities for the students to work on mini-projects, to develop communication skills, to explore internship opportunities in industry and to take part in national design contests.

The Department of Computer Engineering aims at developing sound computer fundamentals among the students in order to meet the demand for employees with strong IT skills. The Department avails of well-equipped laboratories with modern computing facilities. The laboratories include Programming in C and C++ Lab, System Analysis and Design Lab,

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Computer Graphics Lab, Computer Network Lab, Operating System Lab, Open Source Technology Lab, Data Structure Lab, Java Programming Lab, Microsoft ASP.NET Lab.

RK University's Electrical Engineering Department was established with a vision of providing trained human capital for sustainable development in the field of Electrical Engineering, including Electrical Machines, Power Systems, Power Electronics, Instrumentation, Switchgear and protection. The Department has well equipped laboratories and strives to provide opportunities to students and staff members to get exposed to the latest trends in technology.

Computer Science has been and continues to be a priority for education provision, as well as research. RK University has a well-developed School of Computer Science. It prepares labor force to meet the rapidly growing demand for qualified IT professionals in areas such as Systems Designing, Application Software Development, Enterprise Resource Planning, Computer Networks, System Administration, Web Designing and Development, Database Administration, Data Mining and Warehousing, etc. A concomitant objective is to prepare graduates to launch their own Application Development company. The School strives to combine sound theoretical knowledge with practical training and exposure to the realities of industry. It is thus intended to provide a modern, industry-oriented education in applied computer science. The School's M.Sc.IT program is aimed at training IT managers with strong foundations in technology studies, including software engineering, software development, computer programming, software testing, or computer security. It seeks to allow graduates to build a professional career in Information Technology.

Notably, some study programs are developed and delivered in collaboration with the industrial partner iNurture. These programs include Bachelor of Technology, Bachelor of Computer Application, Bachelor of Business Administration and Master of Science in Information Technology. These programs feature up-to-date and industry ready curriculum, faculty with industrial experience and certifications, continuous exposure and interaction with industry, technology-enabled learning with learning management system and e-learning, application-oriented hands-on learning, a focus on soft skills and aptitude training to assists students in placement and career progression, and 100% placement support.

To improve the employability skills of graduates and to make sure that the University trains a workforce prepared to meet the challenges of the work place, the university offers a variety of value-added courses imparting transferable and life skills. These courses include:

- Communication skills
- English as a second language
- Campus to corporate training
- Industrial project
- Rural internship
- Basics of business management
- Computer applications in pharmacy

Consultancy is one of the main channels through which University research reaches industry. During the 2017-2018 academic year, a number of consultancy projects were carried out:

- Pharmacy: Hematological toxicity study of drugs; Preclinical investigation of Withania somnifera in obesity

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

- Physiotherapy: almost 20 projects on a variety of problems, including for example: effect of therapeutic massage of hand & feet in relieving pain in CS patients; effectiveness of MET v/s manipulation therapy in SI joint dysfunction patients; effect of dynamic soft tissue mobilization & bowen tech on dynamic balance & hams flexibility in young collegiate students; effect of quadriceps combined with abductor strengthening versus quadriceps combined with hamstring strengthening in treating knee osteoarthritis; effectiveness of back school exercise versus yogasana in patients with chronic back pain; effect of scapular stability exercises vs scapular PNF on function of paretic upper extremity of stroke patients; cross study culture adaptation. reliability and validity of Gujrati version of short sensory; the effect of telehealth on effective delivery of home based exercise program in neuromuscular- rehabilitation profile among parents of typically developing children age 3-10 years; the effect of telehealth on effective delivery of home based exercise program in neuromuscular rehabilitation.
- Engineering and Technology: Environment audits through the Environmental Audit Lab approved by Gujarat Pollution Control Board, Government of Gujarat

The above broad areas will continue to be priorities for further research targeted at industry and public sector organizations. Additional areas in which the University has expertise and capacity to engage in consultancy and applied research include:

- Materials Testing for quality infrastructure and effective utilization of materials, through government approved Materials Testing Lab
- Design and Testing solutions for various engineering components prior to manufacturing. Analysis are available for Efficient Utilization of Materials, Reducing Design Time & Efforts and Optimizing Components' Costs
- IT solutions taking into consideration the specific needs of organisations
- Training programs from higher level, middle level & lower level management
- Tailor made technical training programs developed on the basis of the needs of the Industry partner

RK University also engages in industry-university linkages through corporate training. During the 2017-2018 academic year, such trainings were provided in the areas of Physiotherapy and Engineering. These areas will continue to be priorities for further such work.

The activities of the Industry Institute Interaction Cell will continue to be central to the coordination of activities aimed at knowledge transfer to industry.

In addition, knowledge flow toward industry shall also be facilitated through the K S Patel Centre for Entrepreneurship (KSPCE) operating at the University. This Centre is the result of a unique Scheme of Government of Gujarat to facilitate enterprise development in the Saurashtra region. It provides startup, innovation and incubation support. It seeks to develop and refine the entrepreneurial competencies of citizens willing to take up innovation and entrepreneurship. The Centre provides also financial support needed to get an innovative product or business idea an initial start.

An interactive seminar was organized by RK University in 2018 in association with a Gujarat-based state University – GTU, for the students and faculty members of Rajkot city on the theme of "Role of Universities in Innovation and Student Start-ups"

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

The Centre is especially targeted at RK University Students. It will allow them to learn the nitty-gritty of innovation, financial and marketing management. The Centre seeks to nurture entrepreneurial culture among students by developing core behavioural values. The Centre organizes activities for and activities by students to spread awareness about innovation and skill development.

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

The professional development of teaching and non-teaching staff will continue to be a priority, too, as it ensures the relevance of the education delivered at RK. During the 2017-2018 academic year, for example, professional development training was provided in the following fields:

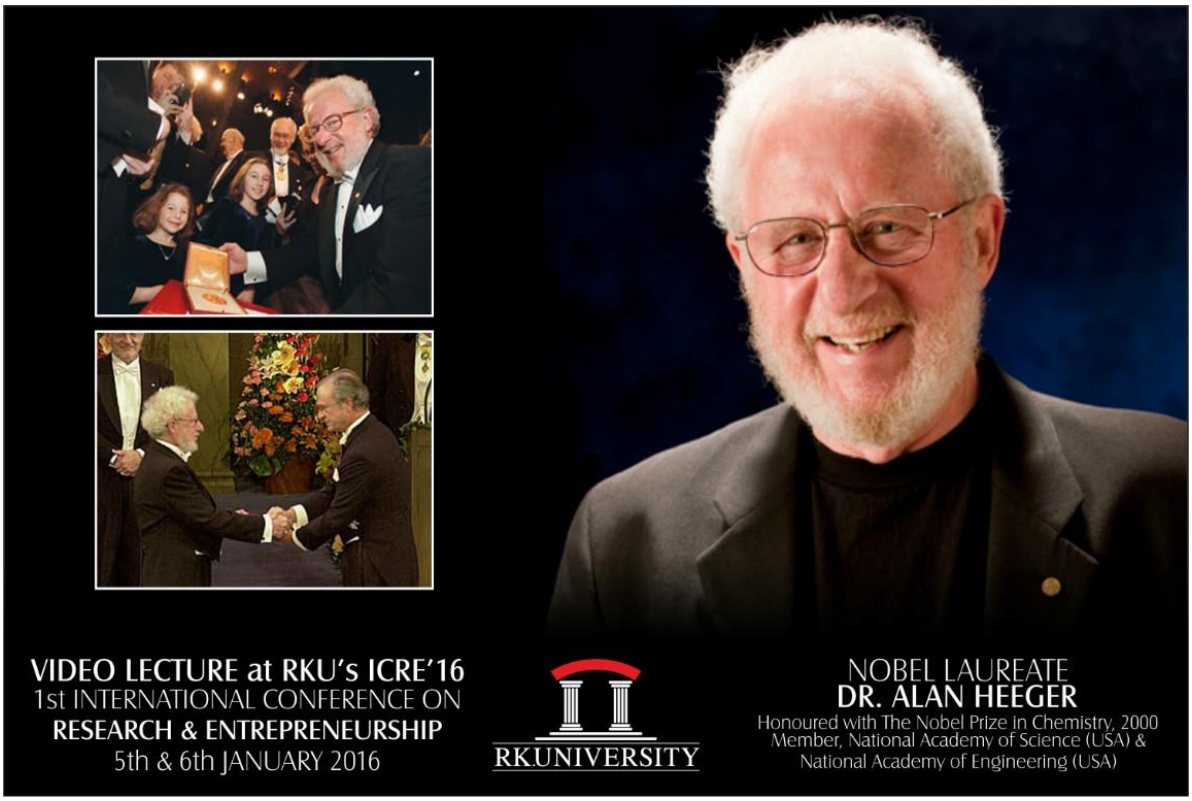
- Teaching and Learning Methodology
- 21st Century Teaching Skills
- Solar Energy System Design
- A Hands-on Workshop on "Design e-Course using Canvas LMS
- Design thinking and Designing Interval training program
- Lean six sigma yellow belt training
- C Programming Language Certified Associate (CLA)
- Cisco Certified Network Associate
- Water Resource Availability and Management in Gujarat
- Product Design using AutoCAD
- WF-NEN Business Model Workshop
- WordPress _Open-Source Website platform
- Introduction to LabVIEW and it's applications
- Orientation program in Entrepreneurship
- Applications of Software Packages in Electrical Power System Design and Relay Testing

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

RKU has recently approved research facility upgrades worth approx. half a crore (during the academic year 2016–2017). The recently established Bioresearch & Characterisation Centre is expected to provide great research and training opportunities to all the current/future students, doctoral researchers, industrial researchers, and (internal/external) faculty members.

RK University organized its first International Conference on January 5th & 6th, 2016. It was titled "International Conference on Research and Entrepreneurship: India's Century in the Making". The primary focus of this conference was India's competitive positioning in the world of research and entrepreneurship. Since education is key to nation-building in a youth-dominated developing nation like India, the theme essentially covered the roles of research and entrepreneurship, from classrooms to shop floors to boardrooms, in making the 21st century India's century too. This conference theme is in synergy with the various other topical initiatives being undertaken in our country (e.g., the "Make in India" initiative, or the "Digital India," and "Skill India" initiatives). Nobel Laureate Dr. Alan J. Heeger delivered a pre-recorded video address to the conference attendees during ICRE 2016



This conference outlined several key University research and education priorities:

- Latest Trends in Pharmacy
- Current Concepts in Physiotherapy
- Latest Trends in Science
- Management Research for Start-Ups and Family Businesses
- Innovative Materials, Methods, and Mechanisms in Engineering
- Innovations in Pedagogy

The two days "National Conference on Recent Innovations in Sciences - 2018" (NCRIS-2018) was organized at the School of Science of RK University in the period 19-20 January 2018. The

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

conference was attended by more than 400 delegates representing various research organizations, universities and colleges throughout Gujarat and other parts of India, including Andhra Pradesh, Madhya Pradesh, Karnataka and New Delhi. The conference featured 90 oral presentations and 150 posters covering diverse areas of science. More than 45 research papers were published in peer reviewed international journals as a result of the conference.

RK researchers thus had the chance to share their research results and benchmark their research priorities with other leading researchers from the India.

In 2019, under the same flagship NCRIS-2019 the School of Science will organize a similar conference (18th – 19th January, 2019). The scientific areas that will be covered in the upcoming event include innovations in science, advanced spectroscopic applications, innovative materials. The communities of innovators and scientists will join together in the event and share their ideas within the scientific fraternity.

Considering that RK is new University, opening of new research centres may not be the highest priority right now. However it will become a priority as the University gains more experience. The same is not true about creation of new collaborations with business and associations. In all of the priority areas described above, existing collaborations need to be strengthened and new collaborative initiatives have to be set up.

Co-funded by the
Erasmus+ Programme
of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

University priorities for research and innovation targeted at inclusive economic growth

Research priorities in this field include (but are not limited to):

- Financial Inclusion
- Entrepreneurship Ecosystem for Academic Institutions
- Role of Innovation and Research
- Role of soft skills and domain related employability skills
- Standardization of herbal medicines, detection of Substitution & Adulteration
- Weeds as medicine
- Develop an ecosystem in the university to foster new scientific ethics and etiquettes

The School of Management at RK offers Bachelor and MBA degrees with a special focus on entrepreneurship. It equips students with understanding of business administration in a local, national and global context. The program is suited for students who want to join their family business or who want to start an entrepreneurial venture of their own after graduation. While this program primarily responds to the interest of industry, government, academia, research, it also aims at inculcating ethics and responsibility toward the wellbeing of society.

RK University's extension activities are another way to contribute to inclusive economic growth and the continuous search for solutions to social issues. They ensure that research and knowledge generated within the University is transferred to society and communities. During the 2017-2018 academic year, for example, the following extension activities were carried out:

Pharmacy:

- Health awareness drive -World Heart Day
- Sister Nivedita Welness camp
- Health awareness drive - World Kidney Day
- Health awareness drive - Monsoon Ailments
- Parkinson an diseases support group
- Rajkot knee club

National Service Scheme:

- Joy of Giving Day
- Let's Pledge to Vote
- Cashless India
- Earthquake Mock Drill
- Swachh Bharat Abhiyann
- National Integration Camp
- National Youth Festival

Computer Science:

- Python Programming for Beginners

The University is committed to promoting social entrepreneurship through its K S Patel Centre for Entrepreneurship (KSPCE).

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Opening of new research centres has not been discussed within the University. However, creation of new collaborations with business and civil sector associations for the above-mentioned areas is welcome and should be explored in the course of upcoming activities in the frame of the INNOTAL project.

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

University priorities for research and innovation targeted at pressing challenges facing societies in Southern and Southeast Asia

The University currently works on several research areas and research priorities for future development, including (but not limited to):

- In the field of Pharmacy:
  - Isolation of rat ileum and washing it with sterile medium removing all the faecal content
  - Preparation of growth media for growth of the cells mimicking all the In-vivo conditions of the animal body
  - Preparation of cell suspension of rat ileum and dispersion in the growth media
  - Incubation and growth of the monolayer of the cells
  - Formation of three-dimensional structure from monolayer cells
- 2. Development of artificial tissue
- 3. Conjugated nanomedicine for Cancer
- 4. Generation of new chemotherapeutics agents: Needs from local level to national level
- 5. Cancer nanomedicine, Synthesis of Nitrogen Rich Adducts and Coating by "Artemisia afra" plant Extract to Generate a new Chemotherapeutic Agents
- 6. Investigating how the production, availability and supply costs of agricultural residues to produce electricity
- 7. Lean Manufacturing
- 8. Water-system response rates to climate change
- 9. Reducing Global Warming and conserving energy by the reuse of waste heat generated by Electronic Appliances
- 10. Upgrading technologies to manage and treat pollutants — from biological waste to toxins

The University sustains a research and teaching interest in the Traditional Indian System of Medicine (Ayurveda). It seeks to provide students of this field with modern techniques of learning, practical knowledge, qualified faculty and laboratories. RK University students graduate with a Bachelor of Ayurvedic Medicine & Surgery degree. Teaching excellence in the field, as well as research work, are supported by medical camps, seminars, health awareness programs, and interaction with globally known personalities of Ayurveda, as well as the continuous work of the Ayurvedic College and Hospital. Ayurvedic College and Hospital also has one of the most modern libraries in the Gujarat region providing resources on Ayurveda. Students who are interested in research work in the area of Ayurveda have opportunities to engage in such research and share their work on major platforms all over the world

The University maintains a strong research and teaching interest in the field of Radiology. The key objectives of the School of Physiotherapy is to provide qualified technologists in the field of Radiology, promoting problem solving, critical thinking and communication skills in the clinical environment and quality patient care skills including professionalism and ethical behavior.

The School of Physiotherapy has a teaching and research priority in the field of Physiotherapy. It strives to address the demands of the rapidly changing health care system through innovative methods and efforts targeted at the community. The master program in Physiotherapy offers a

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

wide range of specializations to the students, enabling them to engage in practical work in their chosen area, to engage in research and to demonstrate efficiency in clinical and classroom teaching and training. Students joining this program at RK University have the opportunity to use advanced and evidence based physiotherapy evaluation, clinical reasoning, diagnosis and treatment techniques. Students get opportunities for exposure to intensive care units and inpatient and outpatient departments serving a rural and urban population. RK University is the 1st in Gujarat and 6th among Indian universities to launch a Doctoral-level program (PhD) in Physiotherapy. The School of Physiotherapy owns the Physiotherapy and Rehabilitation Research Centers in Rajkot. Students and faculty have also created the Rajkot Knee Club, Parkinson's Disease Support Group and are publishing a newsletter in the field of Physiotherapy. The school has well-developed laboratories and research centers, as well as a computerized library, to facilitate learning and promote research activities among students.

The Sciences remain a continuing priority for teaching and research. The School of Science at RK University offers Bachelor and Master programs in Chemistry, Microbiology, Physics, Mathematics, Organic Chemistry and Analytical Chemistry. This school works to equip graduates with skills for science research and problem-solving.

Finally, agriculture will never cease to be a priority area. The School of Agricultural Science provides a Bachelor program aimed at training students to improve agriculture productivity and promote sustainable development and food security through research.

Potential opening of new research centres and creation of new collaborations with business and association for the above-mentioned priority areas is a possibility that needs to be explored.

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Areas of innovation and research activities in which students should be involved

Students from different disciplines can be involved in all priority research fields. Their involvement will be most effective at primary level of research including reading and reviewing literature and at the stage of performing basic experiments, studies and surveys. They can be involved during their full-time presence for their academic program. After completion of the study program tenure, it becomes voluntary for students to participate depending upon their availability.

The Faculty of Doctoral Studies & Research (FDSR) organizes training workshops and seminars to build capacity for research and to maintain an atmosphere conducive to research activities. It reviews applications for institutional research funding (seed money).It should be considered to what extent the current research policy can apply to students and to what extent they can benefit from the research support provided by the FDSR.

Students involved in research could definitely avail of access to URKUND which screens manuscripts for plagiarism. Researchers are also given free access to premium e-journals and to premium software programs (such as grammarly.com's MS Word add-in) to facilitate various research-related activities.

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.