

# EU-INDIA Cross-Cultural Innovation Network

## Composition of the Network

The EU-India innovation network, consisting of 9 partners, 5 from the EU and 4 from India, comprises of two inter-meshing networks: a European university network and an Indian university network (see Fig. 1 below). The European partners are: Universities of Brighton (UK), University of Wales College Newport, (Wales); IpL (Istituto per Lavoro) Bologna (Italy); Technical University of Denmark, Lyngby (Denmark); and University of Technology, Aachen (Germany). The Indian partners are: National Institute of Science and Technology Development Studies (NISTADS), (Delhi); GLS, Gujerat University, Ahmedabad, (Gujerat); Punjab Agriculture University, Ludhiana (Punjab); and Delhi University (Delhi). The EU partners represent five countries and diverse regions: UK, Denmark, Germany, Wales and Italy. The Indian partners represent three diverse regions: Delhi, Punjab and Gujerat.

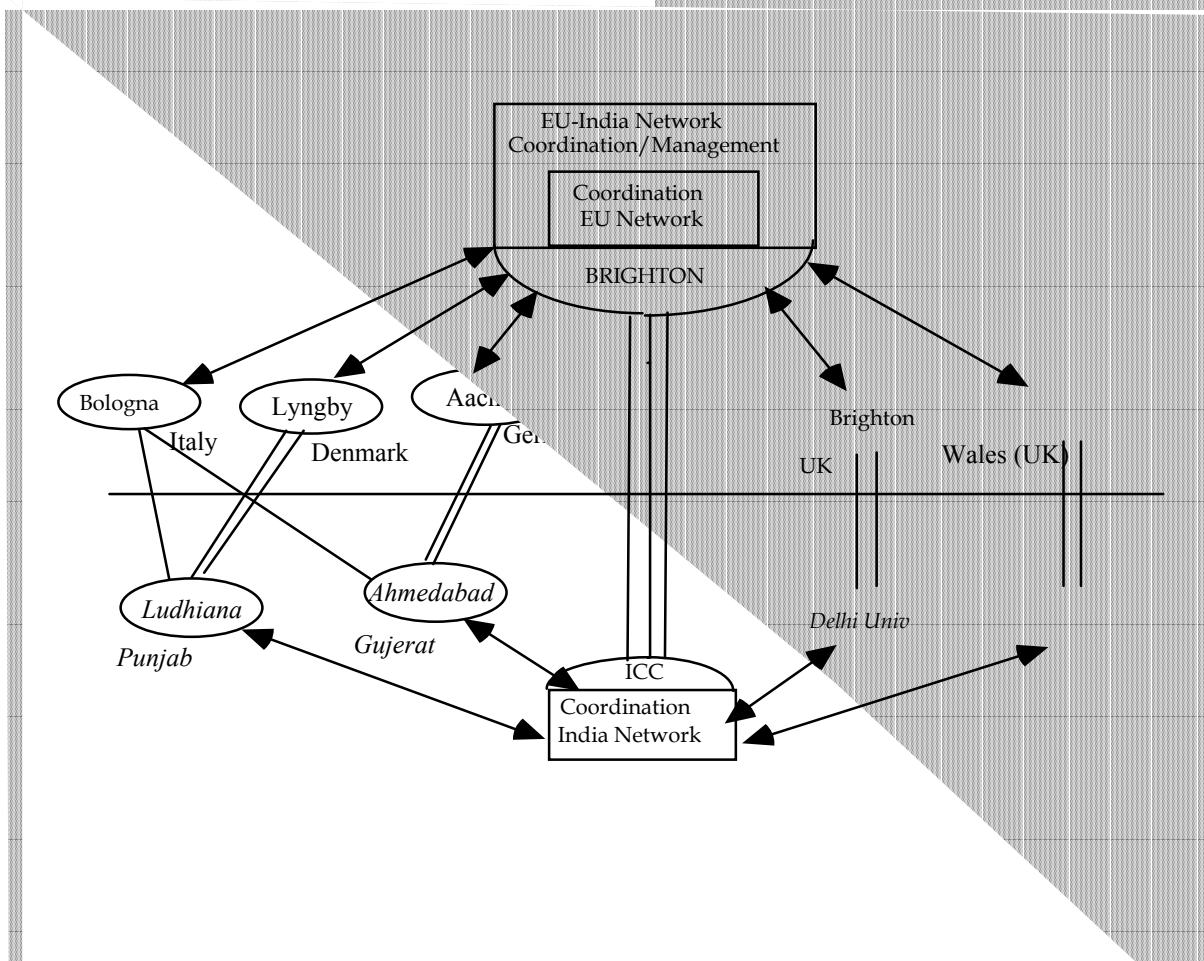


Figure 1: Cross cultural project networking and university collaboration: double lines connecting universities shows collaboration for joint R & D activities between the European and Indian partners. Double arrows show communication links between the coordination centres, Network Coordinating Centre (NCC), Brighton and the India Coordinating Centre (ICC), Delhi University, and the partners institutions in the EU and India. The triple links between Brighton and ICC show ongoing communication between the two coordination centres.

## **The Innovation Network project**

This EU-India Cross Innovation Network project is concerned with the fostering of proactive collaborations in applied research in socio-economic and entrepreneurial innovations through academic and entrepreneurial networking, including joint inter-university postgraduate and doctoral training programme, involving universities and entrepreneurs in the EU and India. The project is rooted in our commitment to human centred systems approaches in science and technology and our belief that the establishment of a direct relationship between university and industrial applications is central to the fostering of proactive entrepreneurial and industrial cultures. The central aim of this cross-cultural collaboration is to make a sustainable contribution to the EC-India cooperation on the transfer, exchange of cultural models of innovation and entrepreneurship, especially their transferability between and across regions and cultures both within India and the EU.

Innovation to us refers to new attempts to bridge the gap between the university and the entrepreneurial world. The gap here also refers to the tension between the propositional knowledge of the university and the tacit knowledge of the user, as well as the tension between local and global perceptions of technology. We believe that any sustainable collaboration between the EU and Indian universities involves the upgrading of EU-India capabilities of applied research, knowledge and know-how, and central to this upgrading is the role of academic and entrepreneurial innovations in stimulating social and economic change. This will involve the development of new techniques of problem definition and new modes of joint working and collaboration. At the heart of this project is the creation of proactive and cross-disciplinary activities.

We recognise that any sustainable cooperation on cross cultural innovation between the EU and India necessitates a deep understanding of the European traditions of social, economic, industrial innovations and of their Indian counterparts, as well as of the operational mechanisms for the integration of new technology into industrial cultures. By extending the university network to entrepreneurs and entrepreneurial organisations, and by integrating exchanges of researchers with the ongoing processes of joint R & D projects, joint seminars, workshops and network forums, the project provides an integrated model for university collaborations in applied research and postgraduate training. The project will develop a virtual innovation network consisting of a distributed knowledge data base including a dedicated Web site, email groups, news groups, and electronic newsletters. It will complement academic and entrepreneurial networks and will provide a distance learning and knowledge transfer resource, thereby contributing to the sustainability of existing collaborations and providing new possibilities of practical cooperation and joint actions between academics, entrepreneurs and other social actors.

## **EU-INDIA INNOVATION NETWORK PROJECT**

The project is now in its fourth year. During the inaugural year 1 (1998-1999), the network focused on setting up a management and organisational framework for project activities, implementing building block activities of university networking, exchanges, workshop/seminar programme, and widening project dissemination through visibility events in India and Europe. During Yr. 2 the network focused on initiating the core activities of postgraduate training, R&D projects, and the

knowledge database, and the virtual network in the form of the project and partner website. During Yr. 3 the Network focused on the R&D projects in selected areas, postgraduate training, Doctoral network, entrepreneurial collaboration, and the virtual network. Yr. 4 is focusing on the establishment of the operational framework for future collaboration and sustainability of the core collation in the area s postgraduate and doctoral training programme, university-enterprise network through R &D projects. the extension of the university network through the virtual network

The Network has made a major contribution to the development of IT education in India at postgraduate level. At the PAU, the network has facilitated the development of a new Masters course in IT programme, and has supported the further development of an existing Masters programme in Information and Communication Technologies at Delhi University. New modules in IT have been developed to run at the PAU. Training modules in IT and Multimedia have been developed and implemented at the Delhi and PAU. The network has been the catalyst for the establishment of new Centre of Enterprise Innovation at GLS, Gujerat. At Aachen, IpL, Lyngby, Wales, the network has stimulated new directions of action research, and this has moved the work of the project very swiftly in this reporting period.

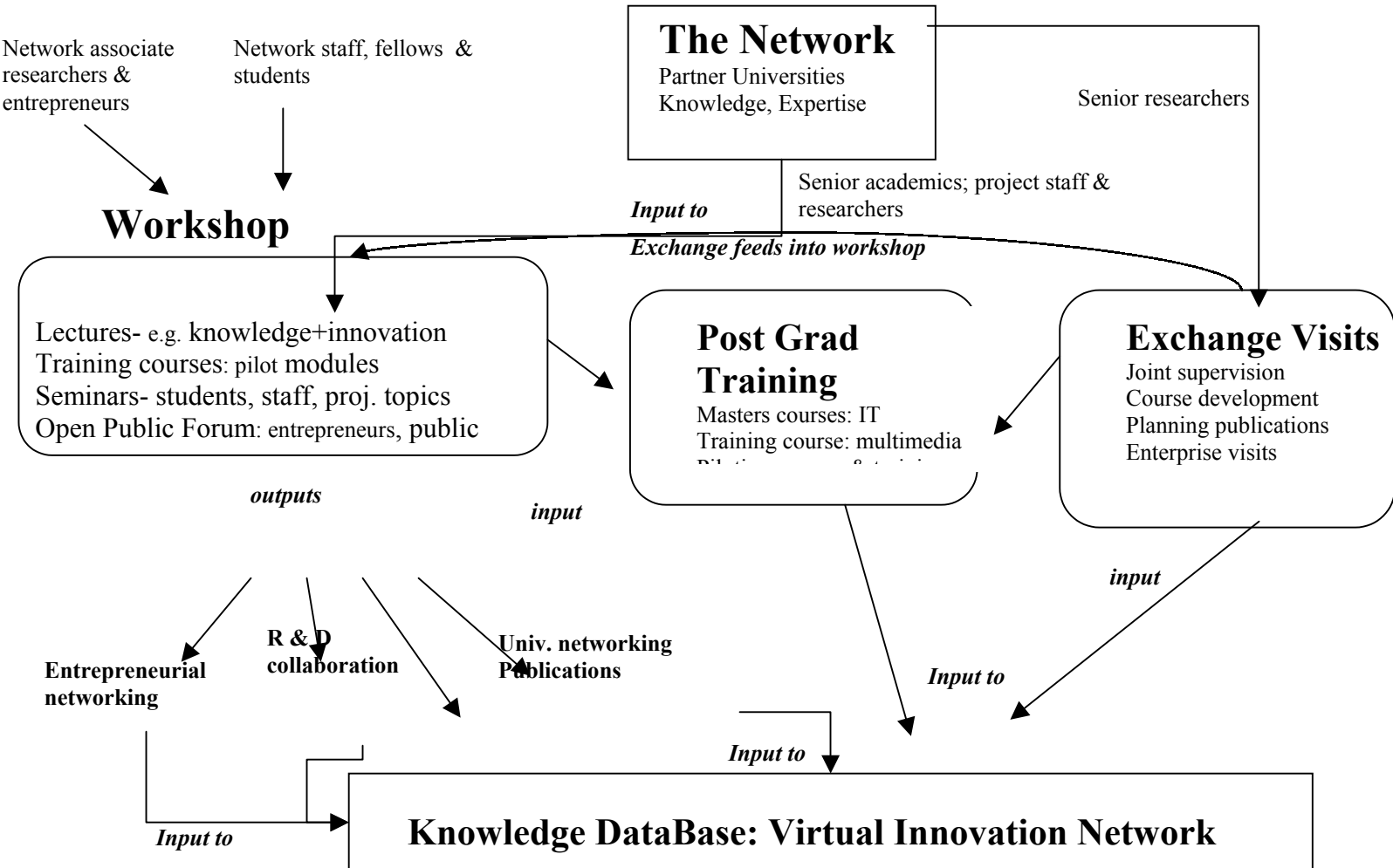
## **THE NETWORK WORKING STRUCTURE**

### **An integrated structure for inter-university collaboration**

The network has implemented an integrate structures for its network activities (Fig. 2). The postgraduate training is integrated with exchange visits of senior researchers and project workshop. The exchange visits provide an opportunity for inter-university collaboration in supervision of postgraduate and PhD students at the host University, the input to the development of new courses and course materials, and the preparation of project publications. The project workshops provide a forum for piloting new courses and training modules. Visiting senior researchers contribute to the widening the knowledge base through focused seminars and extending the project network through public lectures and visit to enterprises. Both the exchange visits and workshop activities thus provide a strong input to the postgraduate training, university networking through focused seminars, invited lectures. All these activities contribute to the development of the virtual innovation network by providing material for website development and creating links to other related research, and entrepreneurial networks.

# Integrated structure: Workshops, Exchange Visits, Post Grad Training

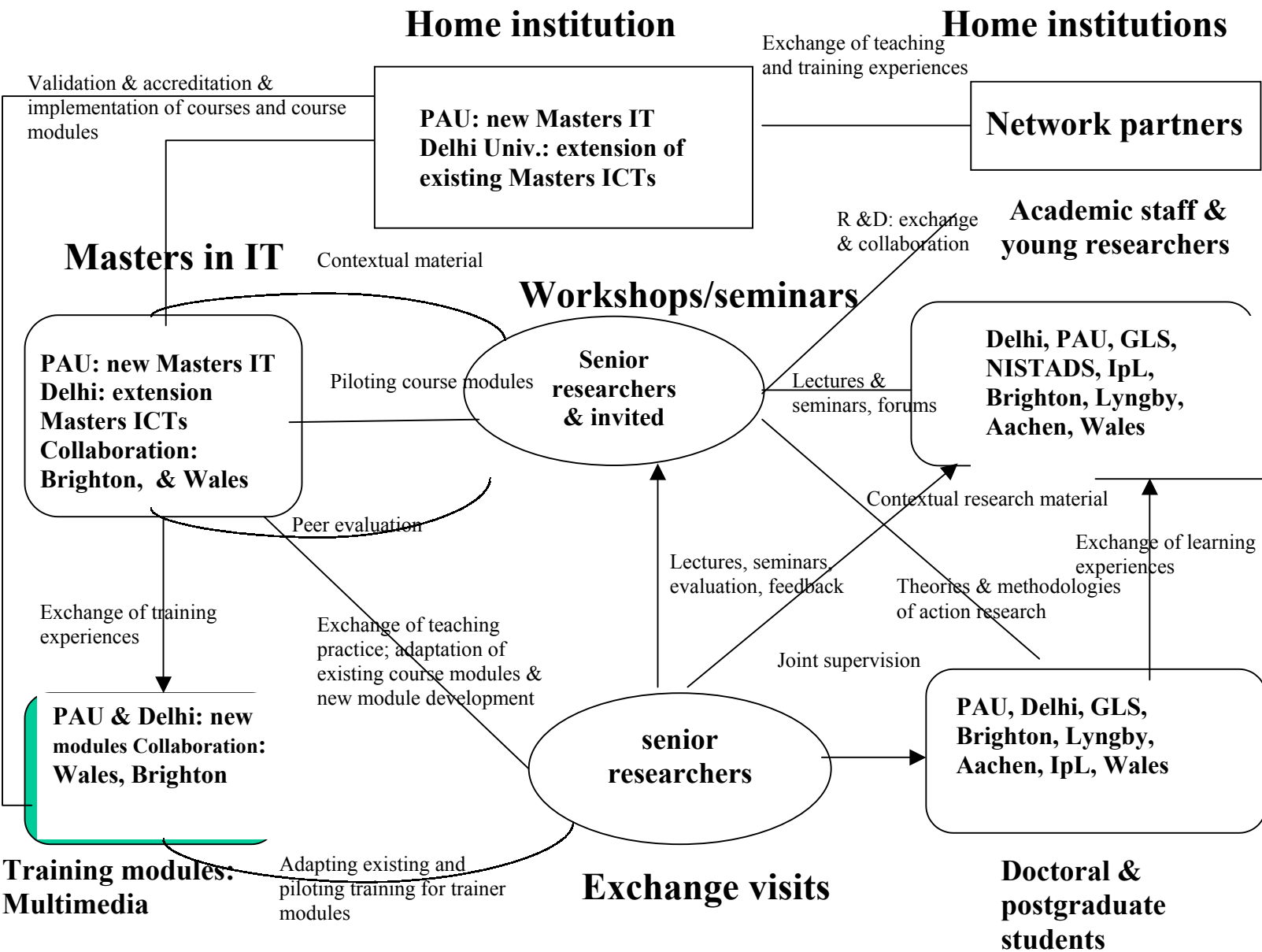
↔ Coordination & Feedback ↔



## **A network model for postgraduate training**

This activity is concerned with the design of a network model of postgraduate training. It involves creation of an overarching framework which integrates the network activities of postgraduate course development, R &D projects, work, the exchange of researches for the integration of the postgraduate and doctoral training programme into the postgraduate programmes of partner institutions (Fig.3). This involved the stimulating and facilitating the development of new Masters in IT course at Punjab Agricultural University (PAU), the expansion of the existing masters in ICT course at Delhi University, and the creation of a Centre for Enterprise Training at the GLS, Ahmedabad. This model focuses on augmenting new courses into the existing academic structures of the partner university (e.g. PG in IT course at the PAU) or augmenting existing postgraduate course through new course/training modules (e.g. multimedia training and collaborative learning modules at Delhi University), or widening existing teaching and research through project seminars and invited lectures by senior network researches (e.g. MBA course at GLS). The core activity of the model is the inter-linking of the project workshop activity with exchange visits of the senior researchers. The exchange visits provide both an expert resource and catalyst for planning, preparing new courses and training modules as well as piloting course and training modules at project workshops. Since the new courses and training modules are embedded into the academic structures of the home universities, their validation and accreditation, as well as their implementation is the responsibility of the home university. The network acts as a facilitator of transfer and exchange of course models and course materials across the partner institutions, as well as a source of domain expertise for piloting and implementing courses at the home university. The success of the innovation network has been in facilitating collaborations between India and European partners in postgraduate training. The successful collaborations include: the PAU and Brighton collaboration- New Postgraduate course in IT; Delhi University and Brighton collaboration Course and training modules in collaborative learning; Delhi University, PAU & UWCN, (Wales) and Aachen collaboration in Multimedia training; GLS, Brighton collaboration in Enterprise training. These collaborations in postgraduate training together with Action Research work in the dairy sector, artisan sector and small enterprise sector form the core of the Doctoral and Postgraduate Student network.

# A network model of postgraduate training



## **Post-graduate Training Programme**

### **IT and multimedia training modules for academic staff at the PAU**

The new Postgraduate Diploma in IT (Masters level) course has been launched at the PAU in July 2000, with first intake of 13 students. The EU partners are making a major contribution to develop new skills and teaching expertise at the PAU in the emerging areas of IT and Multimedia. The traditional PG course in IT in India has been rooted in the engineering disciplines. This new course develops new areas of skills and expertise, which are necessary for interdisciplinary applications in the agricultural society such as Punjab. This training course at the PAU aims to develop a core of academic staff as trainers in IT and multimedia. It is intended that this academic core staff will also act as training of further and future trainers for staff and students within the University, in addition to their teaching expertise for the PG in IT course. These expertise and will provide a skill pool for training of extension workers, development workers as well as rural entrepreneurs in Panjab.

### **ICT Master s of Science at University of Delhi**

This Master course is aimed at creating software and communication hard ware professional for IT industry in India. The Network partners are supporting Delhi in developing new area of postgraduate training in multimedia and IT applications in socio-economic areas. Thus the partners are contributing to the widening the scope of the existing course and enhancing employment opportunities of student in the new application area of multimedia and IT design. In addition the EU partners are contributing to the development of new areas of research in collaborative learning, collaborative working and distance learning.

### **MBA at GLS, Gujarat University**

The lecturers and seminars given by partners to the MBA students on topics such as Information society and globalisation, IT and entrepreneurial innovation. Science and society, European models of knowledge networking, human centred paradigm and development have contributed to widening the horizon of the MBA course within the context of context of inter-dependent globalisation. The project partners have made significant to the MBA course in the following respects: Broadening our horizon in the field of Economics and Business, and being informed about the work going on in the partner Institutions; Getting new perspectives on Gujarat Models of innovations; Adding a new dimension of entrepreneurship and innovation, and focussing attention to innovations rather than on traditional ways of thinking and praxis

### **“Learning while earning” model**

The very idea of transfer of knowledge and exchange of experiences between University research and enterprise application is about promoting and cultivating the models of “learning while earning”. The project work contributes to this model through the developing of workshop and seminar based intensive training courses integrated into distance and collaborative learning activities both with and outside the university. The Network model is based on the Brighton

experience of modules postgraduate training for students in employment, Aachen University experience of 'learning while working' model of doctoral research, and the UWCN (Wales) model of on-line Masters courses. These "learning while earning" models provide a basis for the development postgraduate learning models at the Indian Universities. Delhi University is first among Indian Universities to take steps in building upon these models within the Indian Higher Education context. In this model, bright students from poor families who cannot afford course fees for IT course at Delhi University are admitted to the course on the basis that they earn their fees through working as administrators, support staff in the IT labs. Delhi University is planning to extend this models to students who may work part-time with IT companies in Delhi and to students who may do extra software work within the University for IT industry. We believe that this emerging "learning while earning" model being developed at Delhi universities will provide a bench mark for similar models of learning and earning at other universities in India.

## **R &D Activities: following the practice of action research**

To the EU-India Network, the fundamental principle of action research is that the seeds of change are implicit in the very first questions we ask. What people think, perceive and talk about are the points of departure for asking questions that allow the participants to discover and multiply the alignment of knowledge and action. The questions we ask set the stage for the knowledge out of which the future opportunities are conceived and constructed. Thus, from an action research perspective, inquiry and change are simultaneous rather than separate moments of a development process. In general, action research has been defined as an approach to research that is based on collaborative problem-solving relationship between researcher and stakeholder. The purpose is to generate new knowledge as well as solving a problem by bringing together theory and practice, reflection and action in collaboration between action researchers and practical oriented actors. As action researchers we study the social issues together with those who experience these issues directly. The outcome is both an action and an increased knowledge.

Within the action research paradigm there are multiple methodologies, each of which has their own distinctive emphasis. However, they are united by three features. *First*, the action research approaches are *participatory* whereby research subjects are themselves active in collaboration with the researchers. *Secondly*, the action researchers view themselves as *change agents*. The acceptance of action research methods in new social contexts raises a critical question: Does it mean new space for change of power inequities or is it just another example of co-optation? *Thirdly*, the *empirical materials* are not limited to data collected according to strictly formalised rules, but include as well recorded dialogues and observed actions taking place as part of the action process. Action research is different from conventional academic research – it is based on different relationships, has different purposes, and has different ways of conceiving knowledge.

### **Action Research in the Dairy Sector**

*Collaboration:* Lyngby (Denmark); IpL Bologna (Italy); PAU (Punjab, India); GLS, (Gujarat, India); NISTADS (Delhi, India)

The purpose of action research in the dairy sector is to learn from each other about the agriculture enterprise, the dairy sector processing industries, regional and national models of innovation, collaboration and networking of R &D institutions and rural and village dairy sector enterprises and cooperative. And the role of ICT for communication and dissemination of knowledge between and across regions both with and across India and Europe. Our focus is on the promotion of ICT and multimedia tools for transfer of technology and knowledge between universities and SMEs, as well on the diffusion of knowledge from universities and research centres to enterprises in form of technology and know-how. As part of this collaboration the EU-India Network is acting as a catalyst in promoting collaborations between Indian and European farmers, initially between Punjabi and Danish farmers and future bilateral cooperation between Indian and Italian regions.

Action research workshops are organised both in Europe and India to share and exchange knowledge and experiences of entrepreneurial activities in India (Punjab and Gujarat states) and Europe (Danish cooperatives and Emilio Romagna region of Italy). These workshop provide a fruitful forum for knowing the strengths and weaknesses of cooperative dairies, the diversity and commonality of models and approaches being followed in different regions in India and Europe, the existence of networking patterns and socio-economic contexts for the transfer of knowledge within and across regions as well the adaptation and adoption entrepreneurial activities. The case studies on the status of Dairy Development in different countries provides an insight into the working and functioning of cooperative dairies, especially the unique cluster approach of networking of the Anand Model (Gujarat) and its transfer to dairy cooperatives in Punjab. The dairy cooperatives in Italy gives an enlightening experience of the varieties of dairy products processed, the hygiene and safety standards followed and especially code of ethics followed in real sense regarding quality approval to milk and milk products from field to table. For example, the unique cluster in networking approach of the ANAND Model (Gujarat) can be transferred dairy cooperatives of Punjab, making dairy cooperatives in Punjab more successful. The Dairy Cooperatives in Italy provide an enlightened local cultural and entrepreneurial model for promoting organic dairy cooperative in other regions of Europe and India, especially the code of ethics followed in real sense regarding quality approval to milk and milk products from field to table.

### **University –Entrepreneur Networking: Case study activities**

#### *Networking Of Dairies in Denmark*

The Danish EU-India group is collaborating with the dairy cooperative sector in Denmark to study models of dairy enterprise and dairy industry in Denmark and their importance in Danish economy. The networking of dairies is driven by 45 organic dairy farmers, producing 25 different products with well-established brands of milk and cheese.

The possible inputs to WP3 were suggested like the dissemination input, input for practitioners and scientific input. Wrapping the discussion, Dr. Garibaldo lamented that the industrial atmosphere is a mix of cultural, social and economic issues and this exemplifies the informal network.

#### *Status and Strategy for organisation of Dairy Sector on an Agro-Industry in Punjab (India)*

The EU-Indian group of the Punjab Agricultural University (PAU) is collaborating with both formal and informal dairy sectors in Punjab to study the models of enterprise and innovation in this sector. The Punjab Dairy Cooperative Structure is a three - tier system: i) village level Cooperative societies, ii) district level Milk unions and iii) state level Milk federation. The Network is concerned with the investigation of the functioning of the cooperative dairy and its benefits to farmers and their families, especially women and to society at large. This includes strengths and weaknesses of the Punjab dairy sector within the global perspective. The study focuses on the existing Knowledge Networks, Regulatory

Network and Marketing Network. The newly created marketing channels by the cooperative for milk distribution to final consumer are being elaborated.

### *Role of Women in Dairy Milk Cooperatives and its Impact on women*

The objective of the study is to learn the pattern of functioning of dairy milk cooperative, role played by women, its impact on women and to capture the practising knowledge and adoption of new technology by women folk. The study focuses on the status of women in the dairy cooperative movement at the national level and the plans of the government for its promotion. Our collaboration with a women dairy cooperative from a Punjab village illustrates that women play a decisive role in decision making in the evolution, functioning and future direction of village cooperative. Through their active participation in dairy cooperative, women are able create and promote possibilities of women empowerment. These possibilities of empowerment relate to confidence and capability building process as an integral part of the village family culture. The dairy action research group consisting researchers from Punjab Agricultural University (PAU) and NISTADS (Delhi)

A story telling framework is being used to involve members of women milk cooperative to explore the relationships between the milk production, hygiene, health, environment

### *Case Study of "Gujrat Cooperative Milk Marketing Federation" popularly known as AMUL.*

The study is concerned with the development of a Gujarat model of innovation arising from the Dairy sector enterprise in Gujarat. The starting point of this case study work is the emergence and establishment of AMUL brand as a common brand for all fifteen district cooperative milk unions in the Gujarat State. The pioneering work of dairy sector enterprise was undertaken by the local leaders and Mr. V.Kurien, a dairy expert, leading to the establishment of National Dairy Development Board as a catalyst for the dairy cooperatives. As an integral part of technology and society strategy developed by AMUL also formed the basis of the establishment of Institute of Rural Management (IRMA) offering Post-graduate Management in Agriculture, as a part of Dairy movement in Gujarat. This of AMUL model has been replicated in many other states in India. One of the hallmarks of the AMUL model is the incorporation of women networks and essence of clustering in networking in its development framework.

### *Italian case Study – Granarolo s.p.a*

Granarolo s.p.a is the leader in the Italian fresh milk market; the second largest group in dairy industry which has achieved this position by acquisition of several dairies in the region, including the milk plants of Milano and Vicenza. The focus of Granarolo s.p. is on continuous improvement and innovation process, incorporating system values of entrepreneurial vision and mission such as the customer satisfaction, code of ethics of work, positive work climate, professional improvement, creativity etc. The evolution of the Granarolo mission is achieved through active employees' participation, which is sustained by the development of the competence of the employees through vocational training activities and through information technology.

### *Parmigiano-Reggiano Cheese System*

The objective of this study is to study the working career of cheese makers, the economic performance and technological problems of Parmigiano - Reggiano cheese system. Social control among the farmers to remain organic and to follow organic practices. It is observed that the Ripening firms and the supermarkets do not have the same commitment with the values of the Parmigiano brand image and followed by the dairies and the farmers.

A special feature of the Parmigiano model is that it is a family based operation and based is on apprenticeship. It is found that the average working life of cheese maker is 24 years out of which 16 years are spent as a cheese maker and 8 years as an apprentice. In 76.8% of cases, single client buys the cheese, 13.4% for 2 clients, 4.5% for 3 clients and 5.4% for more than 3 clients. Generally one firm is contacted to sign the contract. On an average 2,608 tons of milk is processed every year.

#### Caseificio Santa Rita - Organic Dairy, Serramazzone Barbona, Modena

The organic cooperative dairy has been in operation since. The main features of this cooperative dairy are that organic agriculture milk is produced by 10 farmers as members of the cooperative. The Dairy cooperative produces, seasons and markets directly Parmigiano-Reggiano cheese. The Dairy is built with material and techniques of ecological architecture, all the dairy processes enjoys high standards of cleanliness and quality. Although the Dairy is partially mechanised from the health and safety point of view, it relies on the high level of artisans' skills. The cooperative has a clearly developed strategy for using local artisans for the manufacturing and maintenance of the dairy equipment. The organic Dairy "Caseificio Santa Rita" is a stimulating example of action research which focuses on problems within local settings, bringing continuous improvement in procuring, processing and marketing strategy, as well as, bringing improvement in cheese making through sharing of experiences and training interventions. This local entrepreneurial and cultural experience of dairy cooperative provides a model for creating organic dairy farming in other regions in Europe and India, as well as a basis for cross cultural collaboration in organic farming between small agricultural enterprises in Europe and India.

#### **Action Research in the Artisan Sector**

*Collaboration:* UWCN (Wales); NISTADS (Delhi, India)

The Dhokra Artisans of Bankura, West Bengal: A Case Study and Knowledge Archive of Technological Change in Progress

This collaborative study between UWCN and NISTADS is concerned with a process of technological change in the traditional *cire perdue* (dhokra) brass-making craft as it is practised by one group of families in Bikna Village, near Bankura in West Bengal, India. This change was initiated and coordinated by the Indian CSIR (Council for Scientific and Industrial Research) agency NISTADS (National Institute for Science, Technology and Development Studies). It involved replacing an ancient traditional but inefficient metal-foundry technique with another which is almost as ancient but more efficient. The impact of this apparently simple change on the Dhokra practice has been both profound and rapid.

The case study work carried out by the EU-India Network project suggests that that multimedia technologies make it possible to develop adequate representations of skilled performance mediated by the craftsman him- or herself. Particularly valuable in this respect is the capacity of multimedia systems to use a full range of modalities of description, including video, sound, still image, conventional text and technical diagrams. This technology makes it possible to present very complex information in a variety of formats and contexts. The study is therefore part of a wider exploration of the potential capability of multimedia as a tool for ethnographic research.

In the long term, however, the artisans face serious decisions about the craft. On one hand, they may choose to follow the route to industrialisation, illustrated here by the case of Netai Karmakar. On the other hand, and this is what they appear to prefer, they can develop towards a consumer market based on high quality high aesthetic value artefacts. This could possibly be found supplying high craft content artefacts to a growing tourist and indigenous middle class market.

The continuation and development of the Dhokra industry depends on the artisans finding a stable market niche for themselves and their products. Whatever it proves to be, this market needs to be developed and supply chains established. It is easy to demonise the middle-men, but if the economic conditions of the Karmakars become less marginal and their terms of trade can be improved, then there is no reason at all why existing middle-men may not have a major role to play in this market development.

In the end, this is not simply a matter of marginal economics. The Dhokra artisans of Bikna represent an ancient craft which has been in continuous production for thousands of years. The Bikna artisans are not 'primitive': they are twenty first century people who happen to be trapped in a cycle of poverty. Neither are they exhibit in a cultural theme park. They must be free to determine their own future. At the same time, they embody countless generations of knowledge, and this knowledge is part of the cultural heritage not only of India but also of mankind. Whatever direction the craft takes in the future, it would be tragic if all this knowledge and the accumulated wisdom of millennia were to be lost.

## **Action Research in the Small Enterprise Sector**

*Collaboration:* GLS (Gujarat, India); NISTADS (Delhi, India); Aachen (Germany); IpL Bologna (Italy)

### **Gujarat Model of Entrepreneurial Innovation**

Gujarat has been identified as an entrepreneurial hub of India primarily due to innovative behaviour of Gujarati entrepreneurs. This has led Gujarat to be known as a model of entrepreneurial innovations. This model of entrepreneurial innovations has been developed from the study of entrepreneurs in a variety of industries from the region and several industrial clusters of enterprises in Gujarat. The study points to the transformation of many communities, particularly the

Patel community which was traditionally an agriculture community into manufacturing class is a new emergent in Gujarat's industrial scenario. Gujarat, better known as entrepreneurial hub of India can be considered as a major centre for innovations happening at the grass root level with strong cultural influence. The enterprising behaviour is largely attributed to typical culture comprising of traditions, values beliefs and attitudes of the region and can be of great interest in light of cross cultural innovation model.

The model shows that Gujarati entrepreneur has such values as self-employment, openness to learn, radical economic sense, family orientation, community orientation, congeniality, venturesome and quest for the unknown which coupled with environmental stimuli such as family background, and easy availability of cheap resources result in typical entrepreneurial orientations giving rise to Pioneering-Innovative behaviour.

In this study, Heuristics or rules of thumb for decisions of the entrepreneurs are identified and are grouped to arrive at certain entrepreneurial orientations of Gujarati entrepreneur. Key entrepreneurial orientations observed are explained below with the influence of internal stimuli viz. beliefs, values, attitudes, learning (psychological make-up) and external stimuli, mainly environmental factors. Since 1960s, Gujarat has shown new patterns of entrepreneurial innovations. These innovations are made within different forms of organisations – from proprietorship, public limited companies to cooperative form of organisation. Again industries such as Brass Parts manufacturing, shipbreaking and gems and jewellery which were non-existent before 1960 have been started by thousands of small entrepreneurs. What is more important to observe is the fact that people from all walks of life and from traditionally non business classes have taken to starting and nurturing small businesses in all parts of Gujarat. This may be the beginning of a new type of non-cast based entrepreneurial culture in Gujarat

#### *Industrial Clusters: India, Germany, Italy and UK*

*Collaboration:* NISTADS (Delhi, India); GLS (Gujarat, India); Aachen (Germany)

Under the EU-India Cross Cultural Innovation Network Project, the case study work is conducted at Ahmedabad, (Gujarat, India); Aachen region of Germany, and Emilio Romagna region of Italy, including some experiences of incubators in Sussex area in the UK. The report is divided into six parts. The case studies focus on the achievements and challenges faced by Indian SMEs and adoption of a cluster approach, for example the clusters approach of the Oil engines in Rajkot, Gems and Jewellery in Surat, and Ceramic Clusters in Ahmedabad, Gujarat, India. The German Model for innovative SMEs emphasises continuous learning with strong academia – enterprise linkages. The Italian Model shows how small enterprises in the Emilio Romagna region cooperate and compete internationally.

#### *The nature of European and Indian Clusters*

The characteristic feature of the European Innovation model (German, Italian or UK) is the establishment of proactive entrepreneurial culture by establishing strong linkages between the enterprise and the universities/R&D institutions, through the establishment of Consortia, and science and technology parks e.g. in Cesena and Ravenna regions in Italy; Incubators and industrial parks and clusters e.g. in Aachen region in Germany; and incubators e.g. Sussex Innovation Centre, Brighton, UK. All these approaches have been highly successful in consolidating the SMEs with infusion of high technologies and constant learning process with the academia. Vocational training has been one of the characteristic features of this region. Co-operation and competition among the SMEs has been the crux of success in all three cases, although it is also evident in the Gujarat Model of Innovation in India. Exploitation of all knowledge resources including international, national and local (the tacit dimension), through networking with the help of information technologies and learning by doing to capture the tacit dimension has been recognised as the prime factor for competition in this globalised world. In India, although academia-industry linkages have begun to emerge in various clusters, but this needs further large-scale commitment and action.

Small in India is more than beautiful - it is efficient, adaptable and adds value in economic and social spheres. As the country integrates into the global village, the small and medium sector will have to respond accordingly. It deserves special attention as it plays a pivotal role in a country's socio-economic development. The problems faced by the SMEs particularly in accessing technology and maintaining competitiveness have been formidable. The Indian experience shows that the local and national clusters sharing are mostly informal. Information regarding the latest development and competency understanding is much less. Work sharing is not seen in the local and national clusters, as it is a fight for the same customer and in the same market. Even though the product and technology used by the entrepreneurs are similar; the tendency to share is less among the cluster participants. And as most clusters are made for production related issues such as, procurement of raw material, maintenance and corrective actions. The marketing related issues are never dealt with. The marketing related issues are the real differentiators between a multinational company and the SMEs entrepreneurs. With the creation of local and national clusters the SMEs entrepreneurs can compete with the multinational company on the issues of quality and other production aspects. But when it comes to market, the multinational companies (MNCs) are much ahead of the small-scale entrepreneurs. With the marketing muscle the multinational companies take away the market share from the small-scale entrepreneurs. Further, Local and National clusters are mostly formed for production purposes, i.e. for the issues related to production, like procurement, assembling, and maintenance. The clusters are not formed for marketing the products. As such, in local and national clusters, the entrepreneurs are less aware or even unaware of the competitors' strengths and weaknesses. Thus, the local and national clusters do not really serve the purpose of clusters for which they are created. The local and national clusters nearly miss the vital factor of knowledge sharing between elements of cluster and united marketing to face the competition from the MNCs. On the other hand, it is very well noticed in case of Italy. The creation and use of specific data basis from production to marketing (as in case of Italy and UK) is wanting. Non-sharing of information between the elements of local and national clusters creates a situation wherein the cluster's real impact is lost.

#### *PAU Plant Clinic: One Roof Integrated Service*

Agriculture is the bedrock of the India national economy. It is the largest sector of economic activity in the country. Majority of the Indian population lives in the rural areas and is directly or indirectly dependent on agriculture for their survival. Therefore progress of the nation is linked to the advancement in agriculture. Keeping in view the growth rate of India's population, there is need for increasing agricultural production per unit area and per unit time. So intensive agricultural techniques using high yielding varieties of crops and optimum and efficient use of improved inputs can meet the target production. At the same time, the intensive cultivation has many inherent risks involving indiscriminate use of agricultural inputs. Considering the different problems related with cultivation, the Punjab Agricultural University, Ludhiana took the initiative of setting up Plant Disease Clinic that provided solution to the problems of farmers related with plant diseases only. A need was felt to reorganise and expand the area of working of the clinic due to occurrence of more complex disorders. As a result of continuous

efforts of the university, a full-fledged plant clinic was established at PAU in January 1993.

The main work of the Plant Clinic involves the diagnosis and remedial measures for the plant samples brought by the farmers suffering from disorders such as those of entomological, pathological, nutritional, physiological and agronomic. The focus is on plant production and protection packages for different crops. The work also involves field visits to identify and examine complex of problems of the farmers, and then provide feed back to the university regarding new plant disorders to reorient research programmes accordingly. The Plant Clinic provides practical training to undergraduate students through plant clinic courses. The dissemination of the Plant Clinic activities includes press releases pertaining to the important plant disorders, remedial measures, new inputs etc.

The plant clinic is an excellent exemplar of integrated model of university-enterprise collaboration for sustainable development. Different scientists are deputed in the plant clinic to provide services to the farmers about plant disorders. They are from the fields of Agronomy, Entomology, Plant Pathology and Soil Science. Farmers are frequently seen visiting the plant clinic near gate no. 1 of the university campus. They visit the clinic to get information about plant diseases, to show the disordered plant sample to the scientists for its diagnosis, to show their plants under insect pests attack and also to get soil/water sample tested or to buy different varieties of seeds and books. After understanding the problems of the farmers, scientists use various methods to diagnose the disorder of the plant sample. These methods include - keen observation, laboratory analysis and the necessary discussion among the team of scientists in some cases. This is a systematic, accurate and quick process.

The Plant Clinic is a one-roof service where the problems are solved within 15 to 30 minutes. It is quite rare that the farmers have to wait for a week to get the solution. Different surveys and research works are also undertaken from time to time to bring improvement and increase efficiency of the plant clinic. Farmers after seeking the remedial measures either apply them on the total area under the crops or on the partial area to test and see the results and most of the times they are contended and give an overwhelming response.

Further development of the Plant Clinic included the creation of the Farmers Service Centre. Technical guidance is provided to the farmers for cultivation of vegetable cereal crops etc. The Framers Centre has the facility for sale of seeds, sale of agricultural publications at the book centre of plant clinic. About 50 to 60 farmers visit the service centre daily. Besides there are queries done through telephone by farmers of distant areas. The website and the E-mail ID for availing the clinic services are under plan of operations. The surveillance and the monetary committee actively keep on visiting fields and giving suggestive measures that can installed to improve the production. Certain referred cases from the university itself are also undertaken in this one roof service. Overall, the plant clinic has been successful in increasing knowledge and solving problems of the farmers in time. This has helped farmers in better farm management and using the inputs effectively.

## **NETWORK SUSTAINABILITY**

One of the major contributions of the network is to create mechanisms and processes for sustainability of the network innovations, building upon its core activities. This is being achieved by integrating IT and multimedia training within the existing academic structures of partner universities; extending collaborations in mutually beneficial areas of application; providing a R &D activities as base for future R&D collaboration; and creating links with funding sources for extension of network activities. These include: the Integration of the PG in IT course at the PAU within the academic development framework of the University: sustainability of Postgraduate Training in IT; Embedding of the multimedia training within the new course developments at PAU and Delhi: further development of the Multimedia Training; Extending IT training activities at the PAU: British Council is providing funds for teacher training in IT and building an IT Laboratory at the PAU. This complements IT training activity of the EU-India network, and extends to the area of teacher training which is not funded by the EC; Future R&D collaboration: Dairy project is providing a catalyst and a resource base for collaboration between Lyngby, IqL, Brighton and a new partner for developing an R &D project in Organic Food; Extending collaborations: Lyngby and PAU are creating a farmer network in organic farming, initially training of Punjabi farmers in Denmark. The focus will be training in organic food production methods and technologies. The training course is planned for the year 2002, and funding is being sought by Lyngby from the Danish Government; Future academic collaboration in MBA: Brighton and GLS are exploring the possibility of staff exchange leading to future exchange of doctoral and post-doctoral students; Sustainability of the R &D network: The Virtual Institute (Virtual network) network website at its core will provide a forum for both sustaining existing and building new links and R &D collaborations, thus further extending the university network

### *The EU-India "Virtual" Innovation Network*

The Virtual Innovation Network forms the core element of the sustainability of the Networking activities. All project activities, especially the university networking, entrepreneurial networking, R & D projects, Postgraduate Training contribute to the development of an EU-India "Virtual" Innovation Network. Initially, the virtual network consists of a dedicated Web site which is linked to partner websites, managed by the University of Brighton and supported by the ICC Delhi University, thereby forming a 'virtual' network of collaborating EU and Indian universities. . The Network is in the process of setting up and developing a human-centred.com, which will form the core of the International Institute of Human centred Systems an "Institute without Walls". The Institute will build upon and further develop the virtual network, extending to other universities, entrepreneurial organisations, industrial centres both within India and the EU in the form of a "Virtual Institute without Walls". The virtual network will be set up to act as a forum for supporting future applied research on cross-cultural innovation. It will also act as a forum for the creation of collaborative inter-university postgraduate and doctoral programmes between the EU and Indian universities.

The Virtual Network has been modelled on the already successful ERASMUS Inter-university Network in Human Centred System (EU Project) and the International Institute in Human Centred Systems ("without walls"). It complements and supports the

teaching and research activities of the collaborating universities as well as providing a resource for future cross cultural collaboration and entrepreneurial networking.

### **Visibility Events**

Visibility events in the form of Open Forums, one-day conferences are organised as an integral part of the workshop/seminar programme of the project. These events contribute to raising the profile of both the project and the programme through widening the participation at the workshops, seminars and Open forums to wider academic community and entrepreneurs together with newspaper articles in India.

### **Examples**

*The Public Symposium on "From Agriculture to Industrial Society in the Global Information Economy"*

Punjab Agricultural University (PAU), 6 March 1999

*Enterprise Cultures and Innovation in the Information Society*, University of Brighton, 17 September 1999

*Open Forum on IT and Higher Education in India*

Delhi University, 1 March 2000

*Open Forum on Entrepreneurial Networking in Punjab*

Punjab Agricultural University (PAU), 16 March 2000

*Cross Cultural Model of Knowledge Networking*

7<sup>th</sup> IFAC Symposium on "Automated Systems Based on Human Skill –Joint Design of Technology and Organisation"

Aachen, Germany, June 15-17, 2000.

*EU-India Innovation Network at the First World Engineers Convention*, Hannover, Germany, 19.-21 June 2000

*Special event on small business entrepreneurs*

GLS, Ahmedabad (India), 5 July 2000