



# Technical & Entrepreneurial Research Information System: An applied e-model For Sustainable Entrepreneurship Development

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*Areas of interest: (1) E- Business. (2) Information and Communication Technologies (ICT) implementations for sustainable development in India and Digital divide. (3) Analysis of requirements and defining solution architecture fore-Business transformations.*

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## Abstract

This article stresses on the need for an e-application like Technical and Entrepreneurial Research Information System (TERIS), which enables interaction among academia, industry and various agencies related to researchers for sustainable entrepreneurship development. The functional details of the model are also discussed. This article is based on inputs with reference to the state of Rajasthan. However, the model can very well be replicated elsewhere.

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The word entrepreneur is French and literally means between-taker or go-between. Entrepreneurship is the process of creating something new with value by devoting the necessary time and effort, assuming the accompanying financial, psychic, and social risks, and receiving the resulting rewards of monetary and personal satisfaction and independence. (Hisrich, Peters, 2002)

## Entrepreneurship In State: Background

Rajasthan is the largest state (342,214 sq. km) of India, which has a very large arid zone (56%). With its 76% population in rural areas, the state literacy rate 38.8% is among the lowest in the country, 27.4% people are below poverty line.(Manorama, 2003) Most of the state's economy is based on agriculture and traditional industrial setup. Industries dependent on natural resources like, cotton processing, textiles, handloom, limestone, marble, gypsum exist. Also, some numbers of manufacturing units like cement, steel re-rolling, oil mills, chemicals etc and some ancillary units. State has only 3.2% of total registered factories in India, giving employment to only 3% of total workforce. Scores of degree holders are roaming around due to limited number of employment. Rural youth is migrating towards cities in large numbers. The state is in a very poor condition as far as the development of service and technology based industry is concerned. Also, there is a very dilute interest in the young people for establishing some business or production unit of their own. The prime reason is lack of exposure to the entrepreneurial avenues and opportunities and thus a rigid mindset.

## Entrepreneurial depletion: The vicious cycle

In spite of several efforts by state and central governments, entrepreneurial development is in its infant stage, which is one of the reason for scanty economic growth and severe unemployment. State government is having cumulative loan burden of more than Rs 1000 crores. Further more, the state has good number of technical institutions but the education system is constantly producing job seekers rather than job creators and job providers. No inputs towards self-employment are envisaged in the curriculum. On the top of this, the professionally qualified youth, i.e., engineers, MBAs, polytechnic diploma holders are constantly moving out of the state in search of jobs, leaving the state further talent deprived.



Exhibit 1 Entrepreneurial depletion is a vicious cycle

The diagram above tries to explain the situation. Where, a vicious cycle exists and the various factors in an unending loop have a cause and effect relationship. Summing up in words, the lack of opportunity causes the migration of technically trained manpower capable of shouldering the entrepreneurial development in the state. Due to this migration, there is a constant depletion of talent in the state. So, the existing opportunities are not properly explored, and the potential in different novel business activities is yet to be tapped, which gives rise to the lack of opportunities.

## ICT Based Intermediation

This can only be dealt by the reversal of the above cycle and intervention in the exploration process and/or to facilitate the further exploration of potential areas in the state. There is a need to develop a suitable mechanism, which can perform the task of this intervention and reversal of the cycle, and can also be sustained. Various conceptual approaches have been developed by some government agencies. However, the results are far from satisfactory. The time has come when the applied management research should come to the rescue in various developmental issues by suggesting various process and model improvements.

Technical and Entrepreneurial Research Information System (called TERIS hereafter) proposed here is an ICT (Information and Communications Technology) based implementation model which aims to develop entrepreneurship related exploration in the region and hence to boost overall economic activity and growth by disseminating the new entrepreneurial opportunities to the local trained manpower, hence encouraging the young talent to stay in the state and contribute towards the upliftment of the state.

This model, although proposed with reference to the conditions existing in Rajasthan state, can very well be replicated and sustained elsewhere. If implemented and sustained successfully, it would be a unique mechanism for sustainable entrepreneurship development.

## Primary Objectives:

- ◆ Entrepreneurial Development, hence, employment opportunity creation.
- ◆ Real life project development and Industry worthy research.
- ◆ Development of Research knowledge Pool, boosting research activity.
- ◆ Providing a common platform to researchers.

- ◆ Establishing Web presence of the technical institutions.

### Secondary Objectives:

- ◆ Searchable job Database for job seekers as well as employers of the region (to be achieved at a later stage).

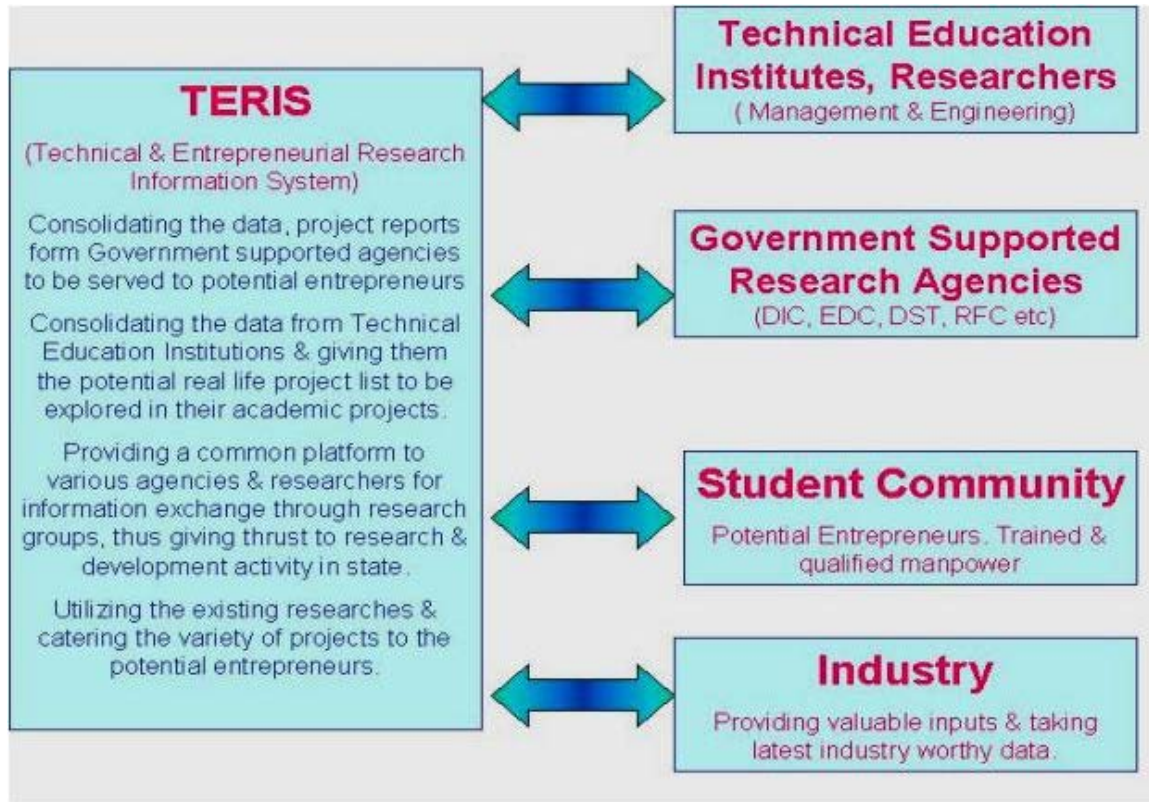


Exhibit 2 Technical and Entrepreneurial Research Information System: Functional layout.

### Entrepreneurial Development:

This system aims to achieve higher level of entrepreneurship awareness in the masses so as to foster new business development. Thus, opening before them a brave new world of opportunities, transforming them from mere job seekers to job creators.

TERIS, implemented with the help of Internet based application will primarily be an information disseminator. As mentioned earlier, number of technical institutions, providing education to a large number of students have almost no access to the practical knowledge, which is required to develop a small or medium sized business entity. This project is going to provide first hand information compiled by various agencies to the students under professional & technical courses, as they have got the potential to lead and establish a real project or business unit by utilizing their technical and professional skills.

Various government agencies like: District Information Centres, Department of Science & Technology, Entrepreneurship Development Cell etc are working in this direction and they develop different kind of projects to be utilized by any competent person. But presently all the project research largely remains dumped and the competent professionals after struggling with the limited job openings leave the state. Also, the different management departments and engineering faculties of the universities in the region carry out some researches for project development but it is of no use when not applied productively.

TERIS will bridge this gap. It will not only be an Internet based research hub but will largely be responsible for the transformation of the mindsets of the professionally qualified people. This will be achieved by serving latest entrepreneurial information to the opportunity seeking youth in technical institutions (explained at length in methodology section).

### Research knowledge Pool for boosting research activity:

All the research work carried out by the regional research agencies, which can be utilized for the development of entrepreneurship is generally dumped in the stores. Hence, very less productive use can be extracted. TERIS will integrate all the existing researches in the form of a searchable storage/database. This will also include the thesis work of the doctoral candidates, research papers of professors, intitutional researchers & project reports. Providing a common platform to researchers:

User groups will be created so as to promote information sharing among the researchers of the region. At present there is complete anonymity among the academic researchers of even the same field.

### **Real life project development and Industry worthy research:**

TERIS team, with the help of inputs from various government agencies will sort out a list of potential projects and the students in the technical and professional institutions will be required to take up these projects as their academic project. This updated list will be available online and students will be encouraged to work on these projects (can also be implemented as a policy). Students will be exposed to various sources of project finance and different agencies in aiding entrepreneurial development.

This will give a direction to the project researches and make it industry worthy. Real life project development will orient students towards entrepreneurship. Selected potential and standard reports will become a part of TERIS database.

### **Web presence of Technical Institutions:**

TERIS will also be responsible for web presence of the selected management and engineering departments in the region by developing some dedicated portals.

### **Job Database:**

Searchable job Database for job seekers well as employers in the region will be created. At present, no such facility exists in the region.

### **TERIS beneficiaries**

Technically trained manpower and students: As they will be able to explore and realize number of good opportunities existing in the region, which they can utilize for their benefit.

Employment seeking youth in large numbers: A number of job opportunities are created with entrepreneurial development, which will provide employment to a number of people. This will largely include rural youth who will be directed towards better avenues in their respective agricultural practices.

Academic and institutional researchers in the region: At present, very scanty regional data is available in a consolidated updated manner. TERIS will pave the way for creation of an information hub for the region, which will provide a bulk of industrial, economic, agricultural and regional project data.

Management and Engineering departments in the region: TERIS will also be responsible for web presence of the selected management and engineering departments in the region.

### **Sustainability of TERIS**

The sustainability of this implementation can be maintained in the following ways:

1. Respective universities can fund the Computer related infrastructure, where a person can be nominated to coordinate with TERIS cell (the project development team) . This person (normally be a Lecturer) will not only be supplying the latest thesis, project reports etc to the TERIS cell but will also be responsible for initiating a process of generating industry worthy reports by the students.
2. Further, funding can also be taken from Department of Science and Technology (Govt. of India) or the state government can adopt the project after initiation.

### **Methodology for Implementation**

As explained earlier, Technical and Entrepreneurial Research Information System is an information hub, providing elaborate project knowledge to potential entrepreneurs and researchers.

Pilot project may include selected departments and colleges. The complete project implementation is divided in the following stages:

1. Collection of Project data, industrial and institutional researches.
2. Making the data available to the potential entrepreneurs, researchers & students.
3. Nucleating the process of further generation of project data and industry worthy reports.

#### **1. Collection of Project data, industrial and institutional researches:**

This will be done with the help of various technical departments in the universities across the state, along with the government agencies like District Information Centres and Entrepreneurship Development Cells. DIC & EDC will provide the latest project reports. TERIS team will sort out latest and industry worthy researches and projects from the technical institutions. This will emphasize upon the development of technology

based modern businesses and development of service industry up till the international levels.

As a greater part of the state's economy is still agriculture based, so, at a later stage, data will also be collected from some agricultural research institutes in the region, like CAZRI (Central Arid Zone Research Institute) and AFRI (Arid Forest Research Institute). They can provide very valuable data on the alternative crops for the region and agricultural practices. This will be a great help to the educated rural youth, who leave their native place and agricultural occupation, as they are not explored to newer opportunities in the region. Example Herbal products, medicinal plants, seed extracts and oils.

## 2. Making the data available to the potential entrepreneurs, researchers & students:

This stage is the implementation of TERIS as an Internet based application. As in the first stage we will be collecting the relevant data from different sources, now this enormous data will be uploaded to the TERIS server in order to make it accessible for all the users. The following diagram explains a basic layout of the TERIS Internet based application.

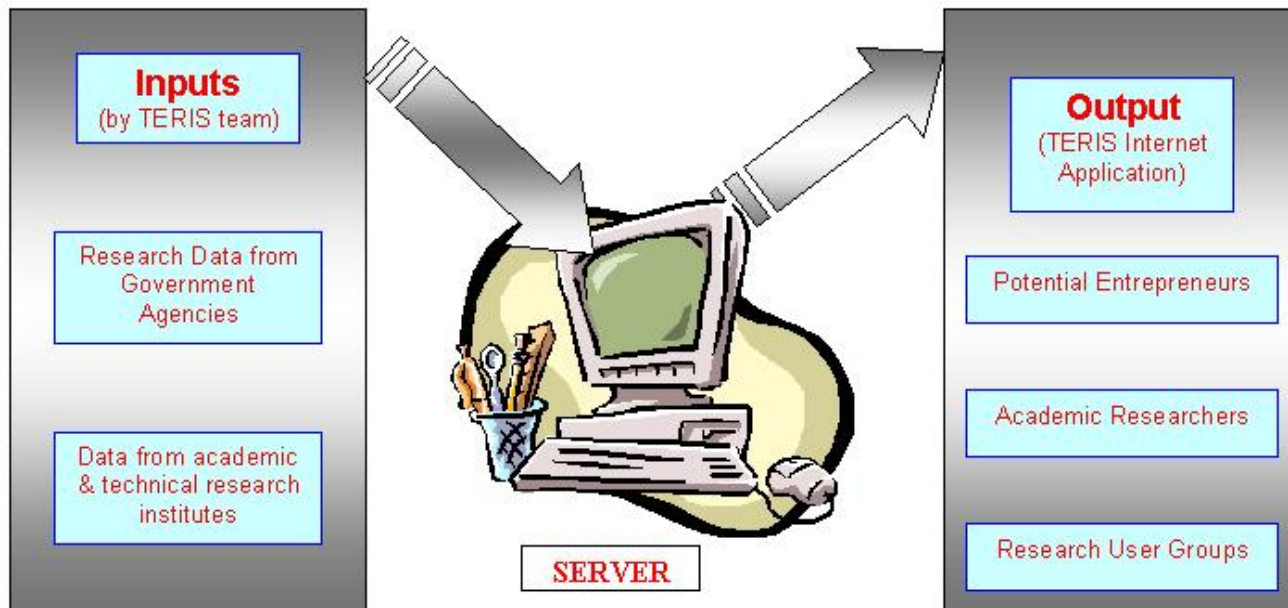


Exhibit 3 TERIS implementation.

### Note on Technologies to be used:

As TERIS is an Internet based information system and deals with enormous project and research data, we require a dedicated server for the purpose of hosting the complete data. This web/application server will be connected to the Internet through a leased line. This dedicated server will further help in the web enabling of the technical institutes and departments.

For the development of Internet application following tools/technologies can be used:

Front-end: HTML (Hyper Text Markup Language)

Scripting: JavaScript and VBScript.

Server Side Scripting: PHP (Hypertext Pre Processor) or ASP (Active Server Pages)

Database: MySQL or MS-SQL.

For hosting and serving:

Network operating system: Windows 2000, Linux

Web Server: MS-Internet Information Server / Chilisoft etc.

The note above is only descriptive. The complete solution architecture can be designed after analyzing the specific requirements based on the broad features proposed here. Application development and Hosting can also be outsourced to professional software developers.

### Mode of dissemination of information:

We are using Internet as the mode of disseminating the information. Our prime audiences are the students of the technical education institutions who are seeking opportunities. Thus, with the help of TERIS, they are required to just log into the system and browse through the projects of their interest area.

TERIS will organize project reports and researches in various searchable categories.

## 3. Nucleating the process of further generation of project data and industry worthy reports

This is done by giving out a potential project list to the various management and engineering departments of the universities. Students will be encouraged to take up these projects as their academic projects. These projects upon completion will be submitted to TERIS cell. TERIS cell



will scrutinize these projects to be uploaded to the server. This will lead to a two-way mobilization of the students towards project orientation. At present no such mechanism exists. Of course, the other bulk of project data will keep coming from the government agencies and researchers.

### **Proposed Time-line for TERIS implementation**

0-3 months- Contacting the agencies & departments for collection of existing project & research data. Sorting of reports & thesis. Algorithm development for Internet based Application. Server acquisition and installation. Internet based application development starts.

3-6 months- Implementing Internet based application and its testing. Simultaneous collection & uploading of data. Devising the mechanism for the sustained coordination with agencies & departments. Nucleating the process of continuous project data generation.

6-9 months- All of the above processes of collection & uploading the data. Developing the dedicated portals for technical departments.

9-12 months- Furthering the data collection to specific research agencies in the fields of agricultural, economic and industrial research. Development of Job portal for the region.

### **Specific Outputs**

1. A giant information hub for the development of entrepreneurial & research activity in the region. This is done by the Internet application running on the TERIS server.
2. Linkage between government agencies, researchers and students to promote industry worthy (applied) researches in the region and widening the perspective of the students by showing them the different opportunities.
3. Fostering entrepreneurship by providing sound project inputs to the potential manpower.
4. Paving the way for the development of technology based & service industry.
5. Preventing the brain drain from the region and also migration of rural youth towards cities as TERIS also aims to develop the traditional occupations like farming by giving new research inputs to existing manpower.
6. Web presence of technical institutes by developing their specific portals.
7. Development of a job portal using the TERIS server.

### **Comparison with Other existing Initiatives:**

There are various government and corporate initiatives in the field of entrepreneurship development. Entrepreneurship Development Cell under Department of Science and Technology, Centre for Technical Entrepreneurship, Centre for Entrepreneurial Leadership, BITS Pilani, GIAN-Grassroots Innovation Augmentation Network, Centre for Innovation, Incubation and Entrepreneurship, IIM Ahmedabad etc. However, TERIS is different in its scope and application. While most of the programs and efforts are concerned with developing entrepreneurship among various segments of society, none of the programs are integrated with curriculum, making entrepreneurship a far flung option for the people who are technically qualified and should really take-up the initiative; and have less to do with development of entrepreneurial attitude in technical education. TERIS would foster interaction among various outfits, which are involved in the actual project setup, making it easier for the students to pick up entrepreneurial options.

Also, the ICT based approach is novel idea as it makes possible the emulation of various circumstances in entrepreneurship. It also culminates as a common pool where the concerned agencies can always amplify the entrepreneurial process.

### **Recommendations**

In the world where the meaning of ♦instantaneous♦ is changing very fast, there is a severe need to have a mechanism, which enables prompt interaction among academia, industry and various agencies into entrepreneurial development and researchers. Therefore, An e-application like TERIS is the need of the hour. It is something, which is, ought to happen for sustainable research and entrepreneurship development. The sooner it is implemented the better it is.

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