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## Research Article

### ROLE OF ICT IN AGRIPRENEURSHIP AND RURAL DEVELOPMENT

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#### ABSTRACT

According to Peter Drucker, an entrepreneur searches for change, responds to it and exploits opportunities. An effective entrepreneur converts a source into a resource. One way of converting source into resource is harnessing information and communication technologies. Information and Communication Technology (ICT) may be defined as the technologies involved in collecting, processing, storing, retrieving, disseminating and implementing data and information using microelectronics, optics, telecommunications and computers. Many a times, promoting sustainable livelihoods of the rural people using ICTs is linked to the entrepreneurial development of the rural youth who may turn out to be an agripreneur. Of late, young people started using ICTs for initiating a range of entrepreneurial activities. With ICTs, it is possible to explore low income generation opportunities, involving telephony and the use of mobile-phones, role of young people as information intermediaries, e-commerce and establishment of telecasters. Many such paradigm shifts have been observed for the last one decade and have potential to be generalized for overall agripreneurship and rural development.

To achieve the goal of rural development for an economically sound and stable society through environment friendly systems of agricultural production, it is imperative to have a comprehensive Knowledge Management System(KMS). It is a process consisting of identifying valid and potentially useful data; establishment of databases and data warehouse; knowledge discovery from databases/data warehouse (KDD); development of the mechanism of dissemination of knowledge on information networks as per requirements of user groups. It is indeed a boon both for agripreneurship as well as rural development.

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#### INTRODUCTION

The world's young people now number more than they ever have. About half of the globe's population of 6.2 billion people is under the age of 25. In this backdrop, no country can afford to ignore information and communication technologies (ICT) as an employment generator, whatever their stage of development. This paper attempts to describe role of ICT and Knowledge Management in agripreneurship and rural development in the recent past and the years to come. An attempt is made to give minor details of the cases from the developing world which is considered appropriate for Indian condition.

According to Peter Drucker, an entrepreneur searches for change, responds to it and exploits opportunities. Innovation is a specific tool of an entrepreneur. Hence, an effective entrepreneur converts a source into a resource. One way of converting source into resources is harnessing information and communication technologies. ICT can be broadly defined as a

set of activities that facilitate, by electronic means, the capturing, storage, processing, transmission and display of information. The term Information and Communication Technologies (ICT) are used to encompass the production of both computer hardware and software as well as the means of transferring the information in digital form. It also includes low cost forms of communication such as radios. The most profound effect of ICT is likely to be in improving the efficiency and reach of the mainstream production of goods and services, in both public and private sectors of the economy which will lead to both agripreneurship and rural development in India.

The Indian economy has already witnessed several Revolutionary developments, viz. Green (food grain), White (Milk), Yellow (oilseeds), Blue (fishery) and now Rainbow Revolution in Agriculture, Bio-technological Revolution, Industrial Revolution and Information Technology (IT) Revolution etc. Country has made considerable progress in the communication systems, telephony and digital audio/video

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processing etc. Good communication system coupled with IT has great potential for providing needed support to the agriculture in achieving sustainable production by way of timely dissemination of agriculture technology needed by the farmers. In the wake of widely growing Internet connectivity, accessing world-wide information, on any desired aspect and providing the same at the click of a button on the desktop along with e-mail facility already replacing the postal communication all around the world coupled with Internet telephony, web – portals with discussion forums, on-line chatting, video conferencing etc., the world has really bridged the gap in terms of the reach. The use of multimedia technology has made the interactions through computers livelier with images, video clips and stereo sound capability. ICT provides access to the latest updated information on a particular technology clearly outlining the benefits of adopting that technology through multimedia graphics and video-clips. It is well recognized that that the computer images and video clips of actual application of agriculture technology can have far greater impacts on the minds and psyche of the rural ,uneducated farmers than the textual description of the technology. With the greater emphasis on establishing rural information kiosks and Kissan call centers along with the countrywide investment in creating information connectivity fiber optics backbone, the rural masses in the remotest corners of the country can have far greater access to the information through ICT. Thus ,as an alternative, ICT offers a more efficient, attractive and interactive medium for knowledge dissemination and provides a novel opportunity for taking scientific knowledge/technologies to the end users ushering agripreneurship in the remotest corner of this country leading to the rural development and prosperity.<sup>9</sup>

Agripreneurship development in the yester years was not same as today. The concept is being changed rapidly. As the basis of entrepreneurship is going to be the same, the ways that is being carried out is changing fast. ICTs are playing important role in enhancing the efficiency of entrepreneurial activities on one hand and are creating new opportunities on the other hand. Future entrepreneurial capabilities will depend largely on these dimensions and ICTs are going to play an important role in bringing about efficiency in all these dimensions.<sup>8</sup>

#### **ICTs in Creating Agripreneurial Opportunities**

Of late, young people are using ICTs as a launching pad for initiation of range of entrepreneurial activities. With ICTs, it is possible to explore low-income generation opportunities; involving telephony and the use of mobile phones, role of young people as information intermediaries, e-commerce and establishment of telecasters. Many of such paradigm shifts have been observed for last one decade and have potential to be generalized for overall entrepreneurship development. Some of the examples worth mentioning are as follows:

**Pondicherry-Information Village Research Project:** The project was implemented by the M.S Swaminathan Research Foundation, for Pondicherry fisherman. Computers were placed in the village center and connected to the Internet, through which regular weather reports of the Indian astronomical office could be accessed. The weather report is broadcast by loudspeakers and through VHF radios which enabled fisherman to determine low and high tide before sailing off to the sea to

fish. This created a lot of agripreneurship development in Pondicherry.<sup>10</sup>

**The Farmers Information and Technology Service (FITS-Techno-Pinoy):** It is a web-based information service initiative in the Philippines. FITS aims to contribute to the empowerment of farmers, processors, entrepreneurs and traders and provides information and technology service that facilitate decision-making by rural communities. This leads to improved production, processing, trading and marketing. The initiative intends to link with organizations, networks and technology services and existing resources into a centre near the farmers and uses the Internet, traditional media, and face-to-face information delivery and access at local level. This has opened a new path for rural development in Philippines.

**The Mango Information Network (MIN):** MIN is a web-based information service that provides information on market outlook, pest management, directory of players in the mango industry, a virtual meeting place and extension research. MIN is relevant to farmers, farmer organizations, co-operatives, frontline agents and entrepreneurs and offers a question and answer service. Simple “fact sheets” are also available in print or accessed on the web. This network has created a lot of entrepreneurship development especially in the field of agriculture and allied fields in Philippines.

**The Faculty of Agriculture of the University of Mauritius** has developed a computer based information system-The Potato Extension and Training Information System (PETIS).PETIS uses the internet and will test whether rural communities can use the web to access information. The system, destined principally for the small-scale potato growers, is equipped with audio file that provides information in English. Illiterate users have an option that reads the summary of the contents in Creole and Bhojpuri, and icons and pictures that enable most rural users to navigate users to navigate easily the basic levels on the site. The system has been rated very successful and the research team is now exploring touch screens (Lukeeram et al 2000).This has ushered the path for agripreneurship development especially in the field of potato marketing and cultivation.

**In Bangladesh, ICTs have transformed the lives of rural people and village women.** The women have started small-scale enterprises, through small loans from the Grameen Bank to buy mobile cell phones that have been used to telephone services and earn them good income.”Much of the voice traffic over the cell phones that have been used to provide telephone services and earn them good income.” Much of the voice traffic over the cell phones is commerce directed-access to agricultural market prices, access to agriculture trade information, facilitation of remittances from foreign workers, information on work opportunities, using the phone to reduce substantial travel costs (Don Richardson, personal communication 1999). The Grameen Bank has been so successful in providing jobs to rural poor entrepreneurs and connecting the community to the world ,and is being replicated in dozens of other countries. Most buyers are women, and meet weekly to discuss loan payment and other health and development issues. This has created a new group of women entrepreneurs in Bangladesh.<sup>13</sup>

### **Role of Knowledge Management**

To achieve the goal of an economically sound and stable society through environmental friendly system of agricultural production, it is imperative to have a comprehensive Knowledge Management System (KMS). It is a process consisting of identifying valid and potential data; establishment of database and data warehouse; knowledge discovery from database/data warehouse (KDD); development of mechanism of dissemination of knowledge or information networks as per the requirement of user groups. Knowledge is a collection of relationships between information. Some of the important roles of KMS have been discussed below.

**Provide location specific information:** Agricultural producers and small farmers require location specific information on technologies, contacts, lessons learnt and best practices, market and price information on agricultural inputs and outputs. Besides, specific information on soil, pest, crops, weather forecasts and expert system for sustainable management of production system is also required.<sup>7</sup>

**Provide essential information to Agripreneures:** Agri-businesses, including small and medium-scale enterprises are involved in various parts of production cycle e.g., seed or fertilizer supply, tools and machinery, food processing, marketing, finance or other services. They require information on a large number of aspects, including management information, information on markets, consumers, policies and legislations, technologies, producers, research projects and organizations and funding agencies.

It has been claimed that ICTs have the potential to impact the livelihood strategies of small-scale enterprises and local entrepreneurs in the following areas:

- **Natural capital** - opportunities for accessing national government policies
- **Financial capital** - communication with lending organizations, e.g., for micro-credit
- **Human capital** - increased knowledge of new skills through distance learning and processes required for certification
- **Social capital** - cultivating contacts beyond the immediate community
- **Physical capital** - lobbying for the provision of basic infrastructure

To cite an example, India Shop is an Internet-based virtual shopping mall selling Indian handicrafts. Established by the Foundation of Occupational Development (FOOD) in Chennai, India Shop involves e-marketers who promote the goods over the Internet, through chat-rooms and mail lists. They work from a computer, either at home or in a cyber café, and draw commissions on the sales that they achieve. The e-marketers respond to sales enquiries and liaise with the craftspeople, typically exchanging multiple e-mails with clients before sales are closed. There are more than 100 people marketers, earning between Rs2, 000-Rs10, 000 per month.

In Gujarat, computerized milk collection centers using embedded chip technology are helping ensure fair prices for small farmers who sell milk to dairy cooperatives. The fat content of milk used to be calculated hours after the milk was

received; farmers were paid every 10 days and had to trust the manual calculations of milk quality and quantity made by the staff of cooperatives. Farmers often claimed that the old system resulted in malfeasance and underpayments, but such charges were difficult to prove. Computerized milk collection now increases transparency, expedites processing, and provides immediate payments to farmers (World Bank, 2002).

Indeed, small-scale entrepreneurs in developing countries, especially women, have shown the ability to harness ICTs for developing their enterprises. For example, a group of ladies in Kizhur village, Pondicherry decided that they wanted to start a small business enterprise manufacturing incense sticks. They began as sub-contractors but their confidence and enterprise grew from utilizing the local telecentre. As a result of some searches by the telecentre operators, they were able to develop the necessary skills for packaging and marketing their own brand name incense. The ladies were quickly able to develop local outlets for their products and they are confidently using the telecentre to seek out more distant customers.<sup>6</sup>

ICT and e-commerce are attractive to women entrepreneurs (who in many developing countries account for the majority of small and medium-size enterprise owners), as it allows them to save time and money while trying to reach out to new clients in domestic and foreign markets. There are many success stories in business-to-consumer (B2C) retailing or e-tailing from all developing-country regions, demonstrating how women have used the Internet to expand their customer base in foreign markets while at the same time being able to combine family responsibilities with lucrative work. However, in spite of the publicity given to e-tailing, its scope and spread in the poorer parts of the world have remained small, and women working in micro-enterprises and the informal sector are far from being in a position to access and make use of the new technologies. Moreover, B2C e-commerce is small compared to business-to-business (B2B) e-commerce and thus benefits only a small number of women (UNCTAD, 2002).<sup>5</sup>

### **Supporting Agriculture**

Research suggests that increasing agricultural productivity benefits the poor and landless through increased employment opportunities. Because the vast majorities of poor people live in rural areas and derive their livelihoods directly or indirectly from agriculture, support for farming is a high priority for rural development. ICTs can deliver useful information to farmers in the form of crop care and animal husbandry, fertilizer and feedstock inputs, drought mitigation, pest control, irrigation, weather forecasting, seed sourcing and market prices. Other uses of ICTs can enable farmers to participate in advocacy and cooperative activities.

To illustrate how useful ICTs can be for farmers, consider the case of farmers in India who in the past were harvesting their tomatoes at the same time, giving rise to a market glut that pushed prices to rock bottom. At other times, when tomatoes weren't available and the prices shot up, the farmers had none to sell. Now, they use a network of telecentres to coordinate their planting so that there is a steady supply to the markets and more regulated and regular prices.

The Maharashtra State government has plans of linking 40,000 villages with Agronet, a specially developed software package

for farmers that aims to provide the latest information on agriculture.

Samaikya Agritech P. Ltd. in Hyderabad, Andhra Pradesh operates 18 “Agritech Centres”, which provide agricultural support services to farmers on a commercial basis. They are permanently operated by qualified agricultural graduates called Agriculture Technical Officers (ATO) and are equipped with computers linked to the head office in Hyderabad through a modem-to-modem telephone connection. Through these centres Samaikya provides technical assistance to member farmers; inputs such as seeds, fertilizers and pesticide, machinery hire, tools and spares for sale; soil and water analyses; weather monitoring; field mapping; weekly field inspections and field visits by specialists.

Farmers register with centres and pay per growing season (two or three seasons per year) a fee of Rs.150 (about US\$3) per acre/crop. A farmer registers by the field and receives support services that are specific to the fields registered. On registration, the farmer provides detailed information concerning his farming activities; the information is kept in the centre’s database, providing the basis for the technical support provided. The centre in the village of Choutkur has 53 registered farmers, covering 110 acres of registered land. This is out of a total of around 1,000 farmers within the centre’s catchment area. Major crops include sugar cane, padi and pulses.

Advice from the centres is based on data generated from pre-validated crop cultivation practices adopted in the State and provided by government agricultural services and local institutions. Farming information is up-linked from headquarters to the computers at the centres. If farmers have specific needs for information that cannot be satisfied immediately by the ATO at the centre, then the technician completes an on-line enquiry form on the computer and transmits this via modem to the headquarters. At the headquarters, specialists with more experience and qualifications organize and coordinate replies, which are typically transmitted back to the centre within 24 hours. The database and information systems are operated in the English language. Information is interpreted for the farmer by the ATO. Because some farmers are illiterate, the technicians have to spend time with explanations and descriptions. There is no standard for a computerized Telegu script.

Prior to setting up a centre, Samaikya performs a survey of local farming and cultivation practices and ascertains the political and cultural context of the potential centre. It conducts a pre-launch programme to familiarize farmers with the services. One centre closed down within three months of opening as no farmers registered for the service. This was due to the pressure placed on them by local marketeers, financiers and suppliers of inputs who perceived a threat to their livelihoods from the competing Samaikya services. Farmers were told that anyone who registered with the centre would not receive credit or essential supplies.

### ***Creating employment opportunities***

Two areas of employment opportunity arise from the deployment of ICTs. First, unemployed people can use ICTs to discover job opportunities. Second, they can become employed

in the new jobs that are created through the deployment of ICTs.<sup>4</sup>

Poor people in rural localities lack opportunities for employment because they often do not have access to information about them. One use of ICTs is to provide on-line services for job placement through electronic labour exchanges in public employment service or other placement agencies. Normally, job brokering is carried out as a closed system involving intermediaries on behalf of their clients. The greater transparency enabled by ICT opens up possibilities for more precise information seeking. Through open job seeker banks, for example, employers can search and directly access résumés, which in turn are linked electronically to job vacancy banks. Tools have been developed to assist employers in screening résumés, or to send e-mails automatically to jobseekers when job vacancy announcements fitting certain pre-selected criteria are posted.<sup>13</sup>

The ILO notes that some developing countries have been able to create employment for thousands of women and men through community-access points and telecentres. One common option is to purchase a mobile phone through a micro credit program and to earn income by providing low cost phone calls to others (Curtain, 2001). Telecentres can also offer use of ICT facilities for business purposes to small and micro-enterprises that do not have their own private facilities.<sup>1</sup>

In some countries in the region, telecentres are being set up through public and private initiatives in telephone shops, schools, libraries, community centers, police stations and clinics. Sharing the expense of equipment, skills and access among an ever-increasing number of users also helps to cut costs and make these services viable in remote areas. India, for example, has seen rapid growth in cyber kiosks that provide access to social communication as well as business support services for underprivileged groups. The kiosks are often upgraded Subscriber Trunk Dialing booths that are widely found in all parts of the countryside in India. These are small street shops, offering access to public phones for long distance calls. They number about 300,000 and have generated more than 600,000 jobs. Youth unemployment constitutes over 30% of total unemployment in Asia Pacific and young people are particularly well placed to take advantage of such growth areas. People with appropriate skills, possibly obtained from ICT-based learning facilities, may gain employment as a result of the growth in remote ICT processing facilities that are located outside high-income countries. The facilities provide a range of services, including help lines, technical support, reservations handling, sales, data conversion, as well as voice and data transcription. Other remote processing services are payroll accounting, internal auditing and credit appraisals. High-end remote processing includes creating digitized maps of townships, utilities, roads and other facilities. It is claimed that back office functions that are likely to grow in importance are settling insurance claims and summarizing legal documents, such as witness depositions.<sup>3</sup>

The widespread use of English on the Internet has created the need for local content and applications for non-English speakers. For the poor in particular, the vast amount of information on the Internet requires an intermediary to sift



through it to identify what is relevant and then to interpret it in the light of the local context. People with language and ICT skills are well placed to perform this role of 'information intermediary'.<sup>2</sup>

A related source of ICT-generated employment for young people is through Call Centers. These offer telephone-based services from a central office to customers in a variety of business sectors. Call Centers handle telephone calls, fax, e-mail and other types of customer contact, in live and automated formats. They have expanded rapidly in Europe and are important sources of work in Hong Kong, Taiwan, South Korea, Malaysia and the Philippines.

The Internet can also play a pre-eminent role in a pro-poor tourism marketing strategy by providing information about remote tourist locations, including photos of key features, and by providing a ready means of low cost communication via e-mail. The Namibia Community-Based Tourism Association in southwest Africa assists local communities to set up tourism enterprises in the previously neglected rural areas of Namibia. The Association has set up a web site with detailed information, including a map about each of the seven regions in rural Namibia and the community-based tourism facilities in each region.<sup>13</sup>

An example of the use of ICT to help bridge the gap between employment in the informal sector and the mainstream economy is India's Self Employed Women's Association (SEWA). Its 220,000 members are women and young women who earn a living through their own labour or through small businesses. SEWA was one of the first organizations in India to realize the potential for harnessing ICT to help women in the informal sector. It has sought to develop the organization's capacity to use computers by conducting awareness programs and imparting basic computer skills to its team leaders, "barefoot" managers and members of its various member associations. Many of SEWA's member organizations have launched their own web sites to sell their products in the global virtual market place.

### **Reinforcing social mobilization**

Social mobilization is a process for harnessing local resources that can foster sustainable forms of community self-development. This was pioneered by the UNDP South Asia Poverty Alleviation Programme (SAPAP), which was established in 1993 to enhance national capacities for integration of growth and poverty alleviation policies and to demonstrate the feasibility of functioning social mobilization mechanisms in each of the participating countries. SAPAP is UNDP's largest regional programme in Asia, with an allocation of \$11.3 million. The programme is operating in six of the seven SAARC countries: in the Syangja District in Nepal, in the state of Andhra Pradesh in India, in the Kishorganj Sadar Thana in Bangladesh, in the Kohat District of the North West Frontier Province in Pakistan, in the Nuwera-Eliya District in Sri Lanka and on the Noonu Atoll in Maldives.<sup>11</sup>

The programme's major aim is to help remove the constraints that poor rural communities face in harnessing their potential to develop themselves. To this end, a three-tier strategy is followed, based on social organization, capital formation and human resource development. First, villagers are brought

together to discuss local development issues of common interest and to initiate local development initiatives. Second, they are persuaded of the need to save, which after some time becomes an important source for credit operations. Third, they are trained, mainly in management techniques and income generating activities, in order to create the foundation for grass-roots institutional development, to improve sectoral service delivery and to support those who want to undertake socio-economic activities.

What is relevant here is not just that all these activities can be facilitated through the use of ICTs, but that such activities have been demonstrated to be instrumental in helping communities make the most out of ICTs.

The key best practical principle concerns the use of ICT-based employment opportunities to assist the most vulnerable among young people. One way this can be done is through the use by young people of acquired ICT skills to assist local development agencies and operates to deliver services to those most in need. For example, the internet can be used to deliver health care training to remote locations. A leading non-profit organization in the field of reproductive health has developed for delivery via the internet a course in infection prevention designed for health staff who works in developing countries. Topics include disease transmission, aseptic technique, use of disposal of needles and other sharp instruments, and waste disposal. However, access to this course and others like it requires people with technical skills to show health care workers how to use the Internet. Tele-medicine application now available also makes it possible to deliver health-care to people in isolated locations. The use of low-cost communication based on the internet in the health system will create the need for young people with ICT skills in rural locations. The skills required are to be able to establish a local area network or at least, once it is set up, to be able to maintain the network and to provide 'Help-Desk' assistance for health staff to enable them to use the system easily, thus, paving the way for rural development on the whole.

### **CONCLUSION**

On the whole, it can be concluded that ICT may be used effectively for a plethora of activities ranging from creation of entrepreneurial skills to successful rural development. The role of School of Agriculture of Indira Gandhi National University (IGNOU) can be cited as an important beginning to inculcate entrepreneurial skills and education through distance education with extensive use of ICT and virtual education to the rural mass so that they become aware of their hidden potential and strengthen their human resource base in agriculture and allied activities. The use of ICT and Knowledge Management in the context of rural development has taken a great start from the last one decade and the time is not very far when it will serve as a light house for agripreneurship and rural development in the entire world.

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