

DIGITAL-ENABLED SERVICES FOR AGRICULTURE DEVELOPMENT

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ABSTRACT

Digital technology has had an enormous impact on society. The role of digital technology to develop agriculture and quality of life in rural area is well established. Digital technology can help a farmer to get relevant information regarding agro-inputs, crop production technologies, agro processing, market support, agro-finance and management of farm Agri-business. Agriculture sector faces major challenges of enhancing production in a situation of falling natural resources necessary for production. The growing demand for agriculture products, however, also offers opportunities for farmers to sustain and improve their livelihood. A digital technology has a major role in addressing these challenges and uplifting the livelihood of the farming community. This paper attempts to review the significance of digital technology in agriculture, discuss their opportunities in agricultural development in India.

Keywords: digital - enabled serices, agricultural development

INTRODUCTION

Digital technology is likely to continue to be a major driver of agriculture development in India. The capabilities of local entrepreneurs, start-ups and businesses to provide services such as technical assistance and finance are growing significantly due to greater access to mobile and internet technology. As such digital solutions are likely to make a huge contribution to addressing local concerns, connecting people in remote areas and to reaching greater numbers of people than more traditional development initiatives. Such technologies are already transforming the way in which smallholder farmers' work and interact. The digital Technology in this era of globalization has accentuated new modes of knowledge transformation and communication patterns. Digital has opened up uncommon opportunities for developing countries in terms of providing low cost access to information. This is the fastest growing tool of communication ever with the number of users growing from 150 million in 1998 to more than 700 million in 2001 (Brown, 2002). Today, there are more than 7 billion people on the planet, a figure that's expected to reach 9.6 billion by 2050. By then, the middle class—who typically have more money available for food, leading to greater demand—could reach 5 billion people by 2030. If these numbers hold, overall food

production will need to double in a relatively short period of time to meet demand to feed the world's population (https://www.accenture.com/_acnmedia/Conversion-Assets/DotCom/Documents/Global/PDF/Digital_3/Accenture-Digital-Agriculture-Point-of-View.pdf). India has 70% of its population, which is dependent on Agriculture for its livelihood. Considering this, use of digital Technology in agricultural development is of strategic importance in a country like India. Digital Technology has tremendous potential in timely collection of data and distributing it to the potential users even in developing countries. Thus, providing low cost access to information. German mathematician, Gottfried Wilhelm Leibniz (<http://www.encyclopedia.com/history/dictionaries-thesauruses-pictures-and-press-releases/digital-technology#>), defines it as “Digital technology is a base two process. Digitized information is recorded in binary code of combinations of the digits 0 and 1, also called bits, which represent words and images. Digital technology enables immense amounts of information to be compressed on small storage devices that can be easily preserved and transported. Digitization also quickens data transmission speeds. Digital technology has transformed how people communicate, learn, and work“. In some economically developed countries, digital technology (IT) continues to develop rapidly and is

widely and successfully employed in the agricultural sector. Large central computers with millions of farm's field files, operated by program, have been operational for decades to provide the farmers with information (Xiong B H, et al.,2005; Nuthall, P, et al., 2004; Warren, M, et al.2000). Data bases are also increasingly used in a decentralized way on low cost personal computers, by farmers and farm advisors, in the so-called management information systems. Veterinary practitioners use such systems to support a new methodology for safeguarding agriculture animals health under the prevailing intensive production conditions (Vaarst, M, et al., 2006; Hamilton, C, et al., 2006; Nyman, A, et al.2007).

METHODOLOGY

Digital technology has been implemented as a layered structure having three layers viz., User Interface layer (UIL), Application layer (APL) and Database layer (DBL). Each layer has its own specific functions. Applications are usually broken into logical chunks called “tiers”, where every tier is assigned a role. Traditional applications consist only of 1 tier, which resides on the client machine, but web applications lend themselves to an n-tiered approach by nature. Though many variations are possible, the most common structure is the three-tiered application. In its most common form, the three tiers are called presentation, application and storage, in this order. A web browser is the first tier (presentation), an engine using some dynamic Web content technology (such as ASP, ASP.NET, CGI, ColdFusion, JSP/Java, PHP, Perl, Python, Ruby on Rails or Struts2) is the middle tier (application logic), and a database is the third tier (storage).

The web browser sends requests to the middle tier, which services them by making queries and updates against the database and generates a user interface. In a three-tier architecture (also known as a multi-tier architecture), there are three or more interacting tiers, each with its own specific responsibilities (see Fig. 1).

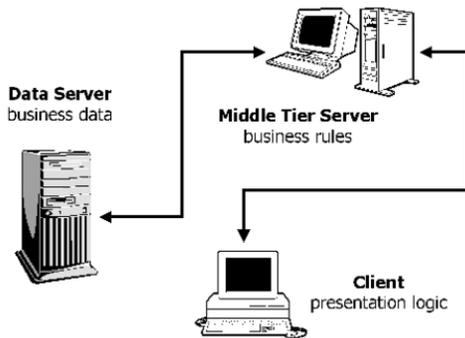


Fig. 1: Three-Tier Architecture
 (<http://www.linuxjournal.com/article/3508>)

RESULTS AND DISCUSSION

The Government has over the past few years launched far reaching reforms aimed at enhancing agricultural productivity and improving the lot of farmers in the State. As a result of these initiatives, there has been a marked increase in agricultural productivity and production, with the State recording significantly higher levels of growth compared to the national average. The Government has also launched a major drive to harness digital technologies to promote knowledge based farming practices to ensure a more robust and sustainable system of agriculture. The role and potential of digital technologies in the effective dissemination of information and knowledge, as well as in improving service delivery to farmers is well recognised; and various initiatives have been both launched both by the Central and State Governments to promote the use of such tools and technologies.

Digital Technologies are indispensable catalysts of agricultural development. It helps scientists to provide quick solutions to farmers, agriculture extension department to disseminate information to farmers and government to create awareness amongst farmers. Some Digital-enabled services for agriculture development are as follows:

Knowledge Hubs

The knowledge hubs have house servers, Studio and high speed link to the central server for Video conferencing / Virtual classrooms at the village level.

Activities

- ◆ Online guidance to the farmers through virtual classrooms by the scientists
- ◆ Generation and digitization of clips on the FAQs by farmers and their solutions given by the scientists
- ◆ Integration and Uploading of FAQ clips with the main application database
- ◆ Production of Audio-video CD / DVD on crops and cropping practices, seminars, trainings etc.

Mobile Based Agriculture - Information Services

The mobile based agriculture - information services envisage sending daily SMS feeds to subscribed farmers on agricultural commodity prices of their choice and weather information from a weather station closest to them.

Activities

- ♦ Mobile based agro information services to farmers using SMS gateways
- ♦ Integration with APMC, Agmarknet, Weather Information portals
- ♦ Agricultural Directory Services
- ♦ Management of Agrinet portals with Audio-visual contents

Agriculture Online Content Management

The agriculture online content management envisages creation of an online repository of agricultural contents. The contents shall be indexed with respect to Commodity/Variety and geographical reference if any to ensure relevance of the information served to farmer.

Activities

- ♦ Indexed, categorized & sub categorized browsable contents
- ♦ Easy search and book-marking
- ♦ Agricultural best practices documents videos in local language covering all major Crops

Agriculture Directory Services

The agriculture directory services platform will provide the farmers a facility to search for agricultural inputs suppliers and service providers servicing his village. Such listing would include information such as Name , Address, Tel number, Contact person, Mobile , Email, Products & Services, GeoCodes, Bank info, Category & Sub Category of Services , Rating etc. Wherever relevant, Google facility for location map etc. shall be leveraged for impactful delivery of directory information to farmers.

Knowledge Dissemination through Agriculture Universities

The knowledge dissemination through agriculture universities will cater to the farmers' requirement to seek expert advice for the problems they face. The advisory shall be enabled both on an HTML based Helpdesk services and video conferencing. It is also envisaged to set up a multicasting/broadcasting facility at the agricultural universities in the State that will enable scheduled transmission of agricultural advisories on common problems. The services anchored

at SAUs will answer to voice calls; web based queries from farmers also. To ensure that the advice provided to the farmers is specific and authentic, the Soil Health card reference also shall be referred to while providing advisories. To facilitate this, while accepting the query from farmer, the SHC reference also shall be captured.

Agriculture E-Trade Platform:

The trade centre services envisages providing a web based interactive platform for the farmers and buyers to exchange information on availability of their agricultural produce for sale and the buyers to view commodities of their interest offered on sale filtered by geography.

The platform shall facilitate contacting the farmer/buyer from the information available in the posting for next steps in the trading activity cycle. The platform shall include facility for posting pictures of agricultural produce being offered.

Agriculture of the future will be digitally integrated at all stages of production, from understanding genetics to transport logistics. We are using our expertise in digital innovation and agriculture to improve decision making for farmers, agribusiness, policy-makers and researchers.

(<http://www.csiro.au/en/Research/AF/Areas/Digital-agriculture>).

'Digital agriculture' includes activities such as the development, testing and deployment of information and communication technologies for agricultural research, development and delivery. By generating detailed insights, farmers can make data-based operational decisions that will optimize yield and boost revenue while minimizing expenses and the chances of crop failure. A mobile application on the field agent's hand-held device is the hub for connecting the farmer to the agro-input company with a steady stream of information and advice for improving crop yield throughout a season (<http://www.gps.gov/applications/agriculture>).

CONCLUSION

- ♦ Digital technologies now make it possible to collect and leverage huge amounts of critical data at minimal costs—thus making a farm's field operations more insight driven, and potentially more productive and efficient.
- ♦ Digital technology is a technological innovation to promote one farmer at a time concept, each farmer will get personalized attention, and solutions to their

problems.

- ♦ Digital technology have a major role to play in the life of farmers as they provide them with latest know-how on agriculture, on line selling and buying, daily weather forecasts, information on cropping patterns, soil conservation, and government schemes.
- ♦ India would benefit from approaching the issue by using digital technology in agriculture by focusing on providing broadband connectivity and a centric development approach.

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