

ICT and IT: Challenges and Opportunities

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Introduction

The revolution in ICTs has profound implications for economic and social development. It has pervaded every aspect of human life whether it is health, education, economics, governance, entertainment etc. Dissemination, propagation and accessibility of these technologies are viewed to be integral to a country's development strategy. The most important benefit associated with the access to the new technologies is the increase in the supply of information. Information is shared and disseminated to larger audience. Secondly it reduces the cost of production. Knowledge is produced, transmitted, accessed and shared at the minimum cost. With the reduction in the transactional costs, there is also a reduction in the degree of inefficiencies and uncertainty. Thirdly it has overcome the constraints of distance and geography. ICTs have cut across the geographic boundaries of the nation states. Buyers and sellers are able to share information, specifications, production process etc across the national borders. It enables all to know the comparative advantage in the market economy. It leads to the larger markets and increased access to global supply chains. Fourthly it has led to more transparency. Networking and information sharing definitely leads to demands for greater openness and transparency. Whether you want to know the status of the central banks' foreign exchange agency or the cost prize of potatoes in the local market, ICTs empowers the individual with the information access, which is transparent. Efforts are under way to integrate ICTs to all sectors and developmental activity. IT is one such potential area. IT and economy are closely interconnected.

Discussion on IT involves the discussion on economic enterprise also.

ICT and Economic growth

Development of Information and Communication Technologies (ICT) has transformed the contemporary business environment. It has led to new information economy which is digital in nature. ICT is a broad terminology referring to multiple communication technologies which range from simple and complex namely Cell Phone applications (SMS), Digital Cameras, Internet, Wireless (WiFi and WiMAN), VOIP, GPS, GIS, Convergence (data, voice, media), Digital radio, These technologies are creating a new global market place, which is more competitive. With e-commerce and e business the market has more opportunities and possibilities than ever before. The ability to reach a global audience, obtain instant market information and conduct electronic business transactions has increased economic efficiency and has opened markets for goods and services from the developing world.

E-commerce is expected to benefit economic development in several ways:

1. Through allowing local business access to global markets
2. By providing new opportunities to export a wider range of goods and services
3. By improving the internal efficiency with in the firms.

First, e-commerce allows business to reach a global audience. In Africa, for example, the IT and handicrafts industries are realizing their ability to deliver their product information directly to consumers. IT lodges, hotels, and governments across the continent now maintain sophisticated

websites advertising their unique features, handling booking order, and promoting specials to interested consumers. Similarly, small manufacturers of traditional handicrafts are discovering how ICTs can assist the marketing and distribution of their wares. Secondly opportunities created by e-commerce and its predecessor technologies is that ICTs can create digital market places to manage supply chains and automate transaction, increasing efficiency and opening previously closed markets to firms in developing countries. Thirdly, e-commerce is improving the culture of business. There are now better intra-firm communications, cost savings procedures, and reductions in the inventory costs leading to better management. Thus ICTs are the backbone of the capital accumulation. They are connected with new business opportunities, increased trade and investment although they are risks involved sometimes. It suggests a positive relationship between ICT development and economic growth. Indeed an often cited achievements of Indian economy during the last decade has been the emergence of an ICT sector which has shown remarkably vibrancy in terms of output and export growth. However, the contribution of ICT to an economy can be viewed at two different levels. They are contribution on account on ICT growth and contribution on account of ICT diffusion. While the former refers to the contribution in output, employment, export earning etc on account of the production of ICT related goods and services, the later refers to ICT induced development through enhanced productivity, competitiveness, growth and human welfare on account of the diffusion of this technology to the different sectors of the economy and society. (Karmer and Derick 1992).

IT industry

IT is currently one of the fastest growing industries across the world. It is primarily a service industry as it does not produce goods but renders services to various classes of people. It is an combination of various interrelated industries

and trade like food industry, transport industry etc. It is an complicated business because it involves multiple socio-economic activities like attracting people to a destination, transporting them, housing, feeding and entertaining etc. In the process it brings about tremendous infrastructural improvements and helps in the development of the region. Perhaps IT is one such rare industry, which earns foreign exchange without exporting national wealth. IT is the main stay of economics of many countries and in India it has emerged as a single largest net earner of foreign exchange. IT, like other economic activities flourishes best when it fits into the context of general economic policies and programmes designed to lead to the optimum growth of the economy of a country as a whole. (Gupta and Bansal 2001).

IT industry is currently an extremely sensitive hybrid industry and incorporates distinct features of information society. Although the core product in the industry is physical services, which are produced and consumed in the physical world, it is dominated and achieved through information services. The perfect integration of information and physical services is the challenge for the contemporary IT industry across the globe. Hence it is largely a information product. For instance, IT destinations are those places the environment are assumed to be unique and different from the everyday experience. One has to travel to the place of consumption to test the product or services and which cannot be done in advance for a trial. Since, IT services are consumed the very time they are produced, it is largely based social interaction between the supplier and the consumer. The quality of the service or product is mainly defined by the interaction. To be more elaborate, consumer has access to only an abstract model of the product at the time of decision-making and contractual agreement. Hence decision-making and consumption are separated in time and space. Such gaps can be overcome by the information about the product, which is available in advance to the consumer. Thus IT services and product are based on confidence, information and

communication. The mechanism leads to the establishment of specific product distribution and long information and value adding chains. (Werthner and Klein 1999).

ICT and IT

Contemporary information society has made a highly information-intensive industry as ICT has a potential impact on IT business. The role of ICT in IT industry cannot be underestimated and it is crucial driving force in the current information driven society. It has provided new tools and enabled new distribution channels, thus creating a new business environment. ICT tools have facilitated business transaction in the industry by networking with trading partners, distribution of product services and providing information to consumers across the globe. On the other hand consumers are also using online to obtain information and plan their trip and travel. Information is the key element in the IT industry. ICT pervades almost all aspects of IT and related industry. For instance, we depend upon it right from the scratch while identifying and developing ITs site and destinations itself. The use of Geospatial Information Technologies in the recent years across the globe for varied purposes is popularly known and IT industry has not been an exception in availing its advantages. It can be used by IT professionals to define the boundaries of the proposed IT site as well its surrounding areas and the communities living in it. It can also get information on roads linking to the sites and availability of other utilities like water, power, market etc. Such technologies are also useful for site management and monitoring. The role of ICT tools in the industry for marketing, operation, and management of customer is widely known. Marketing techniques can be more innovative through ICT tools. The table below reveals the potential use of ICT tools in the industry.

Different aspects of industry: Application

Site development: GIS used for identification of IT site and destinations

Marketing: Advertisement, promotion

Operations: Buying and management of supplies and services

Customer services: Management of customer relationships through booking travel, lodge etc

Monitoring: GIS and GPS is also used for managing and monitoring IT sites.

Key factors for applying ICT in IT

1. IT education and training for policy makers, managers and other players in the industry
2. Integration of various sectors like transport, lodge etc.
3. Technical Infrastructure
4. Human Infrastructure, which includes skilled people, vision and management.
5. Legal Infrastructure
 - a. Regulation of telecommunication providers
 - b. Subsidies for Internet service providers
 - c. Legal framework for online advertisement or official endorsement for online marketing.
6. ICT culture
 - a. Create and sustain ICT environment
 - b. Maintenance and updation of websites
 - c. ICT training for all level of workers
 - d. Establish electronic linkages between all related sectors

Nexus between ICT and IT: A Review

Recent Studies on ICT and IT has revealed the transition in the industry as a result of ICT impact and have explored its possibility and potential. Poon (1993) analyses some of the major challenges facing IT industry and outlines the nexus between IT and ICT. He traces the rapid shift-taking place between 'traditional IT sector' and 'new IT industry'. Technology has a strategic role in reshaping the value chain in the industry and in the process, consumers are gradually adapting to the new values, lifestyles and new IT products, which has re-engineered by the new technologies. Although some of the technologies described are now obsolete, the implicit message is relevant and gives an overall review of the changing face of the IT industry. Inkpen (1998) and Sheldon (1997) have examined the main characteristics of the industry structure and the operation of the new technologies in it. ICT

applications in different sectors like airlines, hotels, tour operators, road and rail transport etc is dealt in detail with informative case studies. Some of the world's largest GDS (Global Distribution System) namely Sabre, Galileo, Amadeus and World span are examined. Besides analyzing the telecommunication technologies in the industry, the hospitality sector, entertainment sector, transport sector, management sector and other intermediaries have been diligently explored. Werthner (1999) provides a more detailed and logical understating of the industry's structure by focusing on the concepts, definitions, consumer behaviour, economic aspect, market transactions, etc. Information Technology (hardware & software developments), information management, intelligent applications and system integration etc are examined carefully. Additional information on business strategy exploring the relationship between ICT, strategy and organization is also articulated. Buhalis (2003) also stressed on strategic management in his book providing a comprehensive overview of both operational and strategic management. Buhalis and Laws (2001) deals with the theory, practice and issues related to IT distribution. The distribution strategies and approaches from a destination point of view is explored and discusses the possible future research in IT distribution channels. It needs to be noted that the distributional structures are mainly from Europe, UK and other western nations and hence may or may not be useful for developing country's strategies.

Connor's (1999) work serves as a textbook on electronic distribution with its logical explanation and case studies. GDS, CRS and DMS are analyzed with example of cases from across the western world. The growing phenomenon of travel distribution through Internet and its impact on distribution channels structure and functionality is explored with rigor. Carter & Bedard (2001) and Carter & Richer (1999) have focused on the operators in the IT industry. Developments of the e commerce and DMO

(Development Management Organizations) and their changing value chains are analyzed intelligently and clearly so that importance of internet presence for consumers, intermediaries, travel media and other players in the industry is noted and understood through their works. Marcussen (1999) attempts to provide an overview of innovative developments in distribution of travel and IT services in Europe. It documents the wealth of statistical data on travel and related transactions in the European IT industry. However, most of the experiences are based on the western developed world, which could possibly a limitation while trying to understand the nexus of ICT and IT in an Indian context. Jennifer et al (2003) have examined the way ICT and Internet have gradually changed the IT industry in China.

They have used the existing theoretical framework on ICT and e-IT developments in other parts of the world namely Europe and America to examine their impact of ICT application in the IT industry contemporary China. There have been tremendous developments at the destinations levels in the recent years. Internet, Intranet etc have been extensively employed by the (DMOs) which has integrated the functioning process and made the system more efficient. Studies like (Poon 1993, Sheldon 1997, Werthner & Klein 1999, Alford 2000, Werthner and Klein 1999, Alford 2000, WTO 2001) have revealed that Internet and strategic implementation of IT is now critical for companies to survive in the global economy.

However, not many efforts are made to study e-IT developments in India and other developing countries

Transition in the Industry

Technological progress in the recent decades has made ITs enterprise across the globe more innovative than even before. The three important innovations, which have redefined the organizational structure of world tourism industry, are the following.

1. Development of the Computer Reservation System (CRS)

2. Development of the Global Distribution System (GDS)

3. The Internet.

GDS refers to the network connection integrating the automated booking systems of different organizations which enables the user to access it through the intermediation of a travel agency. The supply of services is presently concentrated with four global suppliers owned by airline companies namely Sabre, Amadeus, Galileo International and World span. The functioning of these companies depend upon a network of agreements with local partners which ensures access to travel agencies all over the world. Important features include:

1. Network which is based on proprietary system accessible only to professional users
2. High cost of implementation and maintenance.
3. Involvement of multinational players (network of hotel chains and airline companies).
4. Invisible in the market and unknown to the final users as they are not commercial brands. However its non-visibility does pose constraints, as it cannot be the successfully exploited by the end user's market.

GDS technology has also broadened the gap between large and medium or small suppliers of IT services as the former are more benefited. (European e- business market Watch, 2003). The advantages and evolution of CRS and Internet are well known. Internet strategy has provided all players in the industry an easy access to the end user. Exploitation of opportunities through Internet depends upon marketing strategy, communication strategy, pricing strategy etc. Direct communication with the clients, which is facilitated by the Internet, has made the industry more effective and efficient. For instance, following figures demonstrates the transformation in the industry. **Figure 1** presents the traditional values of chains while **figure 2** represents the Internet based value chains. They represent the changing face of IT in recent years.

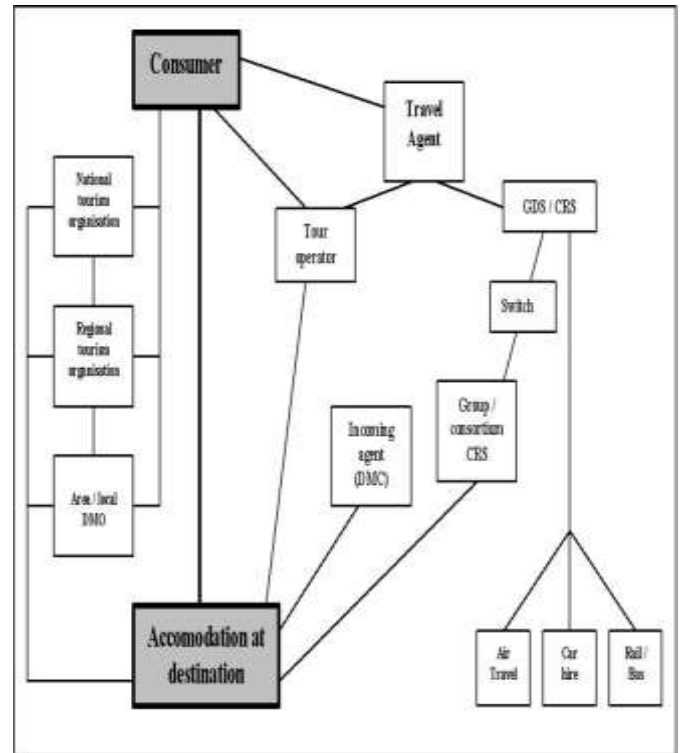


Figure 1 presents the traditional values of chains

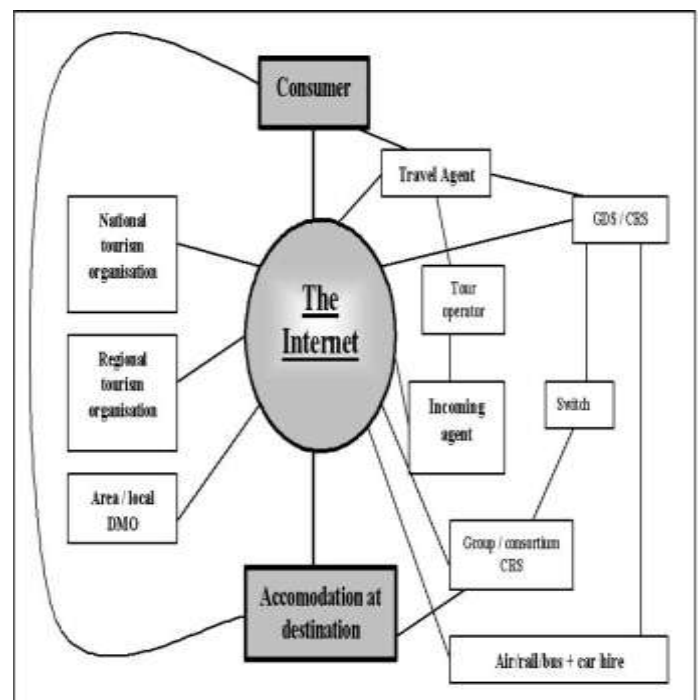


Figure 2 represents the Internet based value chains

The overall structure of the industry has been transformed ever since Internet has been the essential communication tool for the industry. Several new developments can be noted.

1. Direct selling to the customer has increased
2. Increase in new intermediaries such as Internet portals specialized in selling IT products.

3. Customers have access to the distribution channels traditionally used by tour operators through Internet.

4. Companies can regularly alter products and services based on the needs and expectations of clients through regular interaction through Internet.

5. Increase in the transparency and the efficient relationship between customer and management.

6. Change in the consumer behaviour. Consumers are now asking better services. They are more specific with regard to content and the details of the arrangement. They are more cost conscious and often tend to make comparisons between two products.

However, the increase in the distribution channels is been an serious challenge for the industry. It demands critical cooperation across different sectors within IT industry. While IT destination management organizations develop internet portals to distribute information and products, transportation companies offer services for transport. Communication and network skills are essential in the industry as volumes of information need to be analyzed and exchanged every day between clients and companies. Industry needs professionals who are technically trained to deal with ICT tools, systems and information sources. IT professionals also need profound knowledge in areas of marketing, finance, management, statistics, distribution trend etc since it also involves rigorous revenue management. Successful navigation is possible only if professionals have the skill to identify efficient combination of distribution channels and opportunities for cross promotion and cross selling. While such skills get sharpened during work, education on IT and related areas can be a platform for training the professionals. The role of ICT is crucial both in theory, practice and praxis. It must be understood in the context of its application as a part of marketing, customer service, revenue management etc. (Sabado 2005) There has been a paradigm shift in the management of contemporary organizations

related to IT industry as a result of the more established relationships between business and technology. Information and communication tools are indispensable to the IT industry as the ICT system is being rapidly diffused throughout the industry allowing none of the players to break free from its impacts.

Limitations and Future Possibilities

There is a need for a well-structured Information System or Intelligent System technologies in IT industry to facilitate the access of IT information by the users. The current ICT system has certain limitations. For instance, accessing information through Internet and www is an intelligent mean of getting the information, but many a times, the information is highly fragmented. One shall arrive at it only after intelligent navigation, which is time consuming and may mislead in the process. Sometimes, presentation of information in the web is not intelligent too. Search engines for IT should be developed. Facilities to browse according to the topic portals can be made. Wireless is likely to be the next major event in the history of technology. Its application in IT industry is also likely to increase in future. Mobile services shall continue to be an important channel of information and IT services distribution for both providers and consumers. Future mobiles might decrease in size, weight ad prize and likely to increase in power, storage, connectivity, position and capabilities. Electronic personal guide might be in frequent usage. Besides SMS (short message services), WAP (Wireless Application Protocol) standard for accessing the Internet with wireless devices like mobile phones should be increased. GNSS (Global Navigation Satellite System), which gives the position and GPRS (General Packet Radio Services) enabled mobiles which can handle larger amounts of data than the GSM network shall be useful in IT industry. W-LAN (Wireless Local Area Networks) and Blue tooth, which gives wireless access at short distance about few meters, can be useful too.

It is also essential that usability studies and research is conducted to examine the ICT

integration in IT and its impact. Usability is the measure to the quality of a user's experience while using the ICT tools. It could be a product of a system, website, a software application, mobile technology, or any related technology. It is important to note the technology and application to work together with respect to bandwidth, user interface, position etc. All applications, technology and services should be user-friendly which can be used both by the veterans as well as the new-bees effectively. Hence technology and services should be effective, efficient and safe. It should have utility value and simple to comprehend. Customer relations management can be improved by a strategy which sustains the old customers' interest besides attracting new prospective clients. Planning of the trip should be inclusive such that booking should take care of travel, lodge, local tours etc. It should take care of the trip from the beginning till the end. Pre trip session, during trip session and post trip sessions should be properly laid out and implemented. Such activities can be better streamlined if the reservations facility can be outsourced as much as possible. Arrangement should be made for 'Live Chat' so that all queries of the customer is answered at any time. Reviews by the customer, feed backs and surveys should be in progress to know the gaps if any. SMS can also be used for logistic updates.

IT: Developing countries and the Digital Divide

It is important to examine the characteristics and dynamics of the industry in the developing countries. While the opportunities are many, challenges are nevertheless increasing especially for the developing countries. It is crucial for the developing countries to design efficient destination managements systems to compete with international IT market with equal footing. Often, it is found that developing countries are unable to adopt ICT despite the competitive advantage of such application. It is however firmly believed that adoption of e-business will facilitate traditional IT system to be gradually integrated with the digital economy.

ICT has enabled to create business linkages across regions, cultures and different business sectors. However, many parts of the world do not have access to these technologies. This is especially true in the least developed countries (LCD). Inequality arising out of such issues is referred to as Digital Divide. It is a reflection of economic and social inequity between two regions, counties or two groups etc. Hence it becomes all the more important for the developing countries who are sufferers of digital divide to integrate themselves into the new Information society and participate in it effectively. Failing to do so, might leave them behind in the periphery in e-IT might exclude them from several opportunities, innovation and possibilities. The strategies for national and regional e-IT should be developed in the developing countries with adequate research keeping in mind the broad framework of ICT strategies for development. Practices of e-IT strategies in various countries differ and exchange of ideas might help developing countries to adopt new strategies. It may offer new solution to overcome challenges and barriers of ICT adoption in the industry at different levels like business-to-business and business to consumer levels etc. If the digital divide is overcome, then many developing economies can distribute their products and increase their customer base and have both trading partnerships. E-IT shall enable IT stakeholders across the globe to access the information. It might increase the sales and generate more revenue into local economy. Imbalance between competing destinations in global markets can also to some extent be addressed through IT. Developing countries should be more aggressive in understanding the implications of ICT developments in IT industry. Policy makers should be involved in the process so that planning and implementation becomes more effective and strategic. It is believed that now e-development strategies should be an integral part of all policy planning. It also includes policy planning related to IT industry.

While stressing on e-development initiatives on IT industry, Paul Ridoutt recommends some policy implications. She feels that e-IT strategies should be integrated with broader framework of national ICT policies. Contributions and involvement of public authorities is essential in providing infrastructure and human capacity, which encourages the ICT usage. IT Niche products should be identified as a part of national IT development plans which can be easily and effectively marketed using ICT tools. ICT's use should be supported and promoted by SME's and consumers especially from remote areas. Low cost access to ICT solutions can be made available. Regular meetings and interactions should be facilitated between different destinations to share information, knowledge and define ICT strategies and implementation. She urges that it is important for developing countries to develop and promote sustainable IT. Unless the respective national government understands these opportunities and challenges and attempts to address them by adopting strategic policies, IT industry might fail to take advantage of IT and its products. A long-term sustainable IT industry cannot be developed without government's support and cooperation. Developing countries especially should develop an ICT environment, which involves multiple factors like access, infrastructure, education, capacity building, and legal framework etc. for a promotion of ICT enabled IT industry. There is a need for better public and private partnership to be established in the country like India for e- IT to actually flourish.

IT facilitates regional and IT

Extensive and intensive Rural IT can be promoted through ICT application. Rural IT can be main economic activity and can be crucial for agribusiness and rural development. It gives an opportunity for the farmers to profit from IT directly besides generating new market for the agrarian products in the region. Activities revolving around rural IT can be streamlined to support sustainable development and hence, it can be user friendly and environmental friendly.

Rural IT is largely individual oriented and may or may not have a mass appeal unlike the industrial IT. Budget constraints are bound to exist as small farmers may lack resources for advertise and promote their products. Rural IT might bring many ancient historical monuments, galleries, museums, theatres and sites into mainstream IT. While those in ruins are rescued and renovated, unknown heritages like old castles houses, villages etc may be rediscovered. It is essential to build a user-friendly model for rural IT, keeping in mind the ICT tools, cultural policy, state and local region. Information from the local communities can be also protest and preserve cultural heritage. The use of ICT in IT can have significant impact on the management and development of heritage sites. However intervention of the state and cultural policies is essential to make ICT application meaningful. Another obstacle to the development of local cultural heritage through ICT tools is the fact that it is the subject of initiatives targeted on the local population. While the major players in the IT industry have adopted ICT tools for sales and promotion, cultural sector are yet to comprehend the potential of ICT applications for preserving cultural heritage. They are yet to discover that heritage preservation is possible through e-IT. Sustainable IT can be the tool for preservation and development of natural and cultural heritage. ICT can open up new prospects for cultural and IT policies through the convergence of resources preservation and development. A common ICT based heritage IT development strategy can be evolved using the points of convergence between cultural sector and IT industry. Such a strategy common to the culture and IT sectors on a regional level could be an appropriate solution to overcome major challenges associated with ICT based heritage IT development. It enables a delicate balance between both accessibility to heritage and its preservation.

IT: From Information to Knowledge industry

The dynamics of Information exchange among the IT industry players has drastically changed in the

recent years. The industry is now more complicated as there has been considerable changes in the distribution and sales. Distribution cooperation is expanding. While transport companies now provide opportunity to book accommodation, destination management organizations are developing internet portal to distribute information.

It is essential for the IT professional to understand the **IT Value Net**. They also need to know the main players in the industry. Statistical database should be developed and research should be undertaken. Educational institutions should have access to such knowledge. Educational institute should promote ICT based courses. It should be supported with technical training as well as field based training and practical experience in the industry. Educational institute specialized on IT education, IT educational institutions and IT industry players like travel agencies, tour operators, hotels, technology providers etc should have a network and have constant interaction in order to develop a skill base for successful IT industry and a successful navigation. The industry is generating excessive information and indeed information is the strategic and important resources for the industry. ICT tools are providing new means for analyzing the information for the industry. Emphasis should be upon converting this valuable information to knowledge system. There should be gradual transition from data system to profound knowledge system for the benefit of future generations.

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