CHAPTER 1

INTRODUCTION

1.1 Background of the Study

The British left India 70 years back, but the division still exists between India and Bharat. There is India and there is Bharat- both of them coexist in urban and rural areas, respectively. Both of them were born as twins in 1947 but their prosperity, lifestyles and standards of living are different. Around 70% of Indian population resides in villages(Bharat). The villages epitomize the soul of India. Biggest challenge for the policy makers is to create income opportunities in the agricultural sector which is the primary occupation of rural population. Census of India 2011 defines rural as any habitation with a population density less than 400 per sq. km, where at least 75 percent of the male working population is engaged in agriculture and where there exists no municipality or board.

In a country like India farms are small and fragmented, majorly dependent on rainfall for irrigation and agricultural average output is low. Given the natural resource constraints on agricultural productivity, it is suggested that technological applications should be the focus to improve farm productivity and rural incomes. Value enhancement in agriculture requires technological, infrastructural and market mechanism changes designed to increase the productivity of the small farmers.

Development of rural backward areas by technological breakthrough has become essential from the viewpoint of equity, national integration and above all political expediency.

India is fortunate to have bio resources including extensive variety of crops and a favourable climate for vegetation. But agricultural performance has not been remarkable in the past years. It is characterized by lack of critical rural infrastructure, inadequate access to advanced technologies, unfair market practices, high logistics costs accounting for low performance in this sector.

In earlier times, farmers obtained information from members of their community or their own trial and error as cost of obtaining information via traditional means, like newspaper was costly and illiterates could not read it. Farmers had no information regarding prevalent market prices which forced them to load and get their entire agricultural produce to the physical market for price negotiations with intermediaries which involved huge financial and physical costs. (Shankaraiah, et.al., 1982)

Farmers have been following certain market practices for generations. They moved from one mandi (market place) to another in search of better market price for their produce. They negotiated with various intermediaries (Aadat) for a better deal. They soughted information about fertilizers, pesticides and better quality of seeds from various cooperative shops, sales representatives of manufacturers of these items and
Government authorized shops selling inputs. Majority of farmers still rely on these practices and continue to face challenges of production and distribution of their produce.

Traditionally, farmers have been dependent on intermediaries to sell their produce in the markets (Mandi). They faced various challenges ranging from exploitation from intermediaries, no transparency in prices, high degree of wastage, and improper weighing of produce. Knowledge and information for rural people are significant elements for accelerating agricultural development through increased production and improved marketing and distribution. Information dissemination has been given supreme importance for efficacious agricultural development (Aker, 2010).

Agricultural extension emerged as a field in 1960s with an objective to provide support and guidance to rural farmers and reduce information asymmetries related to technology adoption in both developed and developing countries. Agricultural scientists helped farmers by sharing innovative technologies and effective strategies to increase yields through extension services (Singh, 2002). Agricultural extension is considered vital for growth in agriculture sector. Objective of agriculture extension was to simplify delivery of strategic knowledge and information to farmers in an effective manner.

Different Information Communication Technology (ICT) technologies such as radio, TV (Traditional ICT) have been extensively deployed to disseminate information to farmers across the world. The potential application of ICTs to agricultural extension is the ability to reach a large number of people with radio, television and Internet. Application of ICT is an essential requirement for dissemination of knowledge and advice to farmers to modernize their farm operations. (Jones, 1997). It also facilitates training programs to make extension procedures more effective with real time information. Countries like China and Korea have invested heavily on agriculture reach and extension to raise productivity and income of the poor who are engaged in agriculture (UNECA, 2012). But now extension is losing its appeal as there is dissatisfaction with public systems due to non-adaptability to changes like globalization and information technology revolution (Qamar, 2006) which calls for a need of communication technologies like internet and mobile phone which provide timely and relevant information to farmers.

National policy for farmers (2007) specified that the ICT technologies could become more effective by establishment of Knowledge centres known as “Gyan Choupals” in villages. Department of Information Technology has established common Service Centres (CSCs) along with private ICT initiatives like e-choupal and other technologies like broadband internet, community radio or internet-mobile phone synergies with an objective of holistic development in rural market. ICT technologies can facilitate extension workers circulate comprehensive information to small farmers about better prices of inputs and outputs, storage facilities, transportation connectivity and weather information. For more effective extension support, better information delivery services by digital mediums should be deployed for better reach and impact (Balaji, et al., 2007).

Quizon and Binwanger (1986) found that improvements in farm incomes during green revolution did not impact the plight of majority of farmers and efforts need to be directed towards income improvement for majority of rural people. ICTs have emerged as a new approach to agriculture and achieving the objective of rural development. Information and communication technologies are defined, as a “diverse set of technological tools and resources used to communicate, create, disseminate, store, and manage information.” ICTs include all types of computer and
communications systems such as Telecommunications, internet, broadcasting technologies (radio and television), mobile commerce, as well as reprographics methodologies. New ICTs i.e. Mobiles and Internet facilitate dissemination of vast amounts of information to rural population which is timely, comprehensive, cost effective and spread in an interactive manner. They help in creating gainful livelihood opportunities in agriculture and improving the lives of rural people. Expansion of agricultural technologies has the potential of communicating farm information with large number of farmers and creates economic benefits for them (Patil, et al., 2008).

The intricacies of the agricultural production create the need for information on an array of issues beforehand in adoption of any technology. Farmers need to take pertinent decisions with respect to seeding, planting, growing, harvesting and selling (de Silva and Ratnadiwakara 2008, Ghandhi, Mittal and Tripathi, 2009). Farmers also face problems such as new diseases, pests, different growing seasons or droughts because of changing climatic conditions on earth. Small-scale farmers are the worst hit and seek pertinent information in order to cope and survive such challenges. Given the natural resource constraints on agricultural productivity, use of Information and Communication Technology (ICT) could be a sustainable and more inclusive solution which has the potential to improve farm productivity and rural incomes (Aker, 2010). ICT technologies have been instrumental in socioeconomic development and improvement in lives of many (Krishna & Madon, 2003; Avgerou, 2009; Thompson & Walsham, 2010). They do, however, also highlight several issues and concerns associated with social exclusion, the digital divide, poverty and lack of access for sustaining basic human needs.

Farmers require a variety of agricultural information to increase their livelihood (Li and Baoguo, 2011) which varied according to the growing and harvesting season irrespective of the type of crops grown and the location of the farm. farm related information as what to plant, weather updates, seed variety; farm inputs, type of insecticides/pesticides and their consumption quantity are critically sought by farmers in their first stage of production cycle (growing) (Mittal and Tripathi, 2009). ICT technologies can disseminate personalised expert information on a continuous basis by evaluating crop situations of farmers (Kramer, Noronha, and Vergo, 2000). Internet technology is used to provide timely, personalised and expert agricultural advice on farm related information to the needy farmers to improve farm efficiency and reducing the cost of production (Reddy, 2004; Rawat and Singh, 2013; Rao, 2007).

ICT technologies can empower the farmers with adequate market information and facilitate transactions leading to higher productivity by minimizing the usage of resources and getting a good market price (Upton and Fuller, 2004). Delays in this information can have serious consequences for farmers as it can lead to fall in supply of agricultural produce and increased transaction costs (Aker and Mbiti, 2010). ICT could make a meaningful contribution by minimizing distances and cost of interaction between stakeholders. It has the potential to help farmers in the entire cycle of production, i.e., from production to sales. Efforts are being made to make ICT technologies available to rural farmers and focus is on improving the availability and quality of information by extension workers or by ICT technologies like radio information services, tele-centres, and mobile messaging service (Bertolini, 2004). ICT is measured as a fourth factor of production in the production function (Acharya and Agarwal 2004). Information is a dynamic source for social, economic, and technological change in society in current times (Gill, 1996).

Richardson (1997) classified information technology usage in agriculture and rural context under five categories; economic development of farmers, community
development programs, research and education, development of SME and media networks. This study would concentrate on the first aspect of classification provided by Richardson that is how usage of ICT can lead to economic development of farmers in rural market who represent a major chunk of consumer segment in Indian market today.

Mobile phones are adopted by rural population and help in sustainable rural poverty reduction (Bhavnani et al., 2008). Ovum (2005) stated that mobile services have a significant contribution of $7.8 billion in GDP of India. Authors such as Sekabira (2012) opine that farmers using ICTs considered it beneficial to agriculture and mobile phone was the most used new ICT component used by farmers. New information technologies like mobile offers tremendous scope in agriculture.

Information technology enables rural people to become more productive and competent in their economic activities which are essential for development. The author emphasized on increasing the capacity to select and access information of individuals in rural communities along with other developmental efforts which will lead to their empowerment (Neelameghan, 1998).

Farmers need to have comprehensive information, related not only to best practices and technologies for crop production and weather but also information regarding marketing, storage, and handling of produce (van den Ban, 1998). Telecenters are public facilities which provide computers with internet facility to make available information and communication services to the general public. Telecentre is a generic term used for information kiosk, village knowledge centre or rural knowledge centre in rural market. They act as knowledge centres which provide information to rural people about products and services and their market selling prices. There are many telecentre projects implemented in India by various state governments and private organizations (Mukerji, 2008).

Farmer’s are appreciating the transformational change resulting from the deployment of digital technologies such as internet and mobile phones (modern ICT) especially in agriculture parlance which has significantly altered the ways of information dissemination. Spread of the internet in 90s and the creation of Millennium Development Goals (MDGs) by the United Nations, led to formation of Information Communication Technologies for Developing (ICTD). Proliferation of ICT technologies presents an opportunity to provide valuable information to places and people that could not be reached before. ICT could make a meaningful contribution by minimizing distances and cost of interaction between stakeholders. It has the potential to help farmers in the entire cycle of production, i.e., from production to sales.

Diffusion of technology is a dynamic and a gradual process. The respondents considered in the present study did not immediately start using the ICT technologies for agricultural information. Initially they were aware only of simple communication uses or using ICT technology for entertainment purpose. When young members of the society and organizations like Krishi Vigyan Kendra (Government agencies) made them aware about the potential benefits of the ICT technologies, the message spread and farmers started adopting these technologies for advancement in farming apart from personal uses.

Indian rural market offers huge potential for organizations which is still unexploited and generation of income opportunities in rural areas is majorly dependent on agriculture and related activities. (Pareek, 1999). Development of rural markets is majorly dependent on the progress of agriculture. Higher growth in agriculture shoulders prodigious significance and is an issue of anxiety for policy planners and research scholars in recent times (Chand et al., 2007).
It is widely accepted that ICT adds to social and economic welfare of people in developing countries (Walsham et al., 2007), but how ICT implementation or awareness of internet is contributing to this development is not always clear (Kuriyan and Toyama, 2007). There is limited research on the enabling role of ICT in agriculture which is the most important occupation in rural market; this study tries to fill the relevant research gap.

As, diffusion of Information and communication technologies started to increase in developing countries, the application of these technologies to agriculture and rural development caught the interests of researchers and policy makers. Dissemination of information through ICT is a newly emerging concept in Indian agriculture and allied sector. Deployment of ICT in Indian rural society has to be viewed as a process marked by promises, opportunities, ironies and complexities. It is important to provide critical analyses of the impacts of communication technologies including computers, the Internet, and mobile phones on economic development in India.

Agriculture Ministry has initiated an innovative act by the name of Agricultural Produce Market Committee (APMC) Act which proposes single market fee first at the state level and gradually across States at the national level for cost-effectiveness of transactions and increasing farmer’s welfare. The act will promote transparency in the pricing structure all agricultural commodities and also focus on providing extension services to the farmers. Farmers in various States can interact through an online platform e-NAM (e-National Agriculture Market) which was started in April 2016 for trading agricultural commodities. The objective is to eliminate the concept of notified market area across all states and union territories and support consolidation of agriculture markets which is currently fragmented. According to the act, traditional Mandis need to embrace innovative marketing strategies to cater to diverse needs and diversified agricultural marketable surplus. Act focuses on building marketing infrastructure, providing the required marketing skills and helping farmers to grow diversified crops to minimize their income risks. Government also aim to promote agricultural processing by adding value to agricultural produce and encourage public private partnership in managing agricultural markets through this initiative.

Ravallion and Dutt (1996) believe that economic growth in India, especially in the agriculture sector helped reduce the incidence of poverty. Findings of Rao (2005) are in sync with those of Ravallion and Dutt (1996). The former two stresses on the importance of agricultural growth in contributing towards the economic growth and wellbeing of the country. According to the World Bank (2007) growth generated by improvement in agriculture creates more welfare for the poor section of the entire population as compared to the growth generated by non-agriculture sector. Kumar (2011) further elucidates that agriculture productivity, farm wages and rural literacy in India are of prime importance for the overall development of the country. Use of ICT to promote Indian agricultural development can be a strategic move to improve its current position in terms of productivity, income and consumption of those engaged in this sector.

Therefore it is vital to measure the impact of Information and Communication Technology on agriculture as it is the main occupation (source of income generation) of the rural population in India. In this study ICT adopters are defined as farmers who use ICTs for getting market information about agriculture. There are farmers who may use ICTs for other purposes but this study defines ICT adopters as specifically those who use ICTs for agricultural purposes. The study undertakes the assumption that ICT is a positive contributing factor to farmers' economic benefits and rural demand. The study solicited responses and suggests to promote the use of ICT in
agriculture. This is a pioneering work for understanding how ICT interventions in agriculture can help create social and economic benefits in rural market. Farmers are the target respondents of present research study and study will use the responses from those farmers who voluntarily filled the survey instrument.

1.2 Rationale for the Study

The socio economic conditions in India at the time of independence were dismal. All social and economic indicators reflected a grim past especially in rural India. Economy was caught in a ‘vicious circle of poverty’ and had the infamous distinction of being one of the nations with the lowest per capita income and consumption levels. Rural population constituted around 85% of the entire population couple with very high rate of illiteracy (84%) and high mortality rates (Kapila, 2008).

Sarangi (2008) discussed observations from the survey of literature(on consumption, inequality and poverty) about the plight of masses due to frequent failure of crops, diseases, illiteracy and poverty in ancient times. Low agricultural productivity due to use of traditional method of cultivation and complete reliance on monsoons for irrigation has been reasoned for extreme poverty among rural consumers. When India began their Independence story of development, agricultural growth was one of the primary tasks taken up fundamentally by the leaders of the country, as majority of population was dependent on it for employment and income generation.

After Independence agricultural performance improved during the green revolution but has seen a substantial decline in growth rate of total output and crop yields across states after liberalisation period which has led to severe agricultural distress. Annual rate of growth in agriculture was less than 2.5 per cent in 9th and 10th five year plan. In spite of several initiatives like building irrigation facilities, extension services, land reforms, credit and marketing support taken by the central and state governments to revive the agriculture sector, it only grew at 3.7 per cent during the 11th Five Year Plan. Still it is a very important sector for the economic development of any country. It must provide food for domestic consumption as well as produce surplus for generation of additional earnings.

Farmers in India face natural challenges of drought, flood, deforestation and natural calamities due to vast geographical disparities along with infrastructural challenges. Farmer’ bargaining power is not strong as they pay high prices for input and are not able to sell their produce in market at high prices which results in overall loss in net earnings of farmers.

Digital India” an initiative of Mr Modi Government launched in the year 2015, emphasizes on three factors viz. digital infrastructure, digital services and digital literacy. mAgriculture is an important component which is directly going to impact agricultural extension and marketing services. It seeks to change rural India into a digitally-empowered knowledge economy, by providing universal phone connectivity and access to broadband in 250,000 villages, extend timely services to farmers through information technology and its tools and enhance efficiency in agricultural governance through digital literacy and electronic delivery of services.

Kiplang’at J. (1999) proposed that dissemination of real time information to the farmers can enable effective use of agricultural inputs and selling the products in the markets at better price. However, lack of information across the stakeholders of supply chain in agriculture is a major challenge faced in developing countries.
The significance of telecommunications and other ICTs in contributing to social and economic development has received increasing emphasis in development discourse over the past decade. Due to liberalization of Telecommunication industry and entry of multiple players in mobile Handset manufacturing, there has been substantial reduction in time and cost of acquiring and disseminating information.

There are various ICT projects implemented by the government and private enterprises like Gyandoot, Akshya, ITC e choupal, N logue etc which provide information dissemination services to farmers and enable them to take farm decisions effectively. One of the most successful e governance project has been project Bhumi in which records of land ownership of more than 6 million farmers were computerized in Karnataka in 2001 to provide ease of information to farmers. Under this project, farmers can access their Records in their regional language (Kannada) by paying a nominal fee online through Bhoomi centers in 168 taluk offices and more than 200 kiosks established across the state. This entire project works on a software called “BHoomi” which is completely developed and managed by National Informatics Center(NIC), Bangalore. The Department of Information Technology, plans to scale up the project in other states of the country also.

According to the World Bank Report (2005), ICTs affect poverty reduction through three primary mechanisms that is by increasing efficiency and global competitiveness of the economy as a whole with positive impacts on growth and development, enabling better delivery of public services such as health and education and creating multiple avenues of income and employment for poor population. A 10 per cent increase in broadband connection results in a 1.3 per cent increase in real per capita GDP. Increased internet penetration will lead to effective governance and help in areas like agriculture, health, education, social upliftment and the scope is vast.

India is currently one of the biggest IT capitals in the world. Broadband service has added to the growth of GDP and lead to enhancement in quality of life by creation of applications like tele-education, tele-medicine, e-governance, entertainment which has added positive value for people in society. ICT is an important source of growth for India in terms of employment generation and creation of IT-related advantages to various sectors of economy including agricultural sector. Advancements in science and technology are also one of the big achievements managed over six decades by Government. However the gains from technology improvements have been insufficient keeping in view the fluctuations in growth rates and agricultural productivity in rural markets.

There is significant bi-directional causality between the three variables ICT, Agricultural growth and GDP. In developing countries like India, ICT capacity must be built up first and there has to be a trickle down to the grass root level to see productivity changes, especially since 2/3rd of the country is agriculture dependent (Veeramacheneni, et al., 2010). ICT infrastructure facilitates systematic flow of relevant information and connects various stakeholders in the Agri value chain for better integration (Halewood and Surya, 2012).

Indian agriculture is characterized by ownership of fragmented farms, feeble infrastructure and numerous intermediaries in the agriculture supply chains. Real-time information provided to farmers by adoption of ICT helps access information of high quality inputs and align farmer’s output with market demand significantly reducing transaction costs. ICT can create increased earnings for the farmer (Soriano, 2007). ICT has the potential of empowering the rural masses majorly engaged in agriculture and can change the face of rural India. ICT innovations are imperative for upliftment of bottom of the pyramid comprising a major percentage of rural consumers.

The size of rural population is almost three times the size of urban population which makes them the major target market for different product categories including consumer durables other than the market for agri products (Singh, 1997). Increase in income, consumption and expenditure of rural consumers coupled with higher literacy rates, higher aspirations and modernized outlook of rural people makes them an ideal target market for organizations.
Rural Consumers as a segment have a different pattern of income generation and consumption of goods compared to their urban counterparts. This calls for a unique approach to study and analyse the consumption behaviour of rural people. Marketers need to recognize the income generation in different villages spread nationally to understand buying behaviour of rural consumers. The quantum of income and source of earnings are the primary deciding factors for customer purchase patterns. Majority of consumers in rural markets have low incomes and are dependent on agriculture. The rural consumer creates a range of contradictions and puzzles which can create huge impediments for marketers targeting this segment. Rural markets are huge, widely scattered and have inadequate Points of purchase (Begum, 1980).

ICT adoption in agriculture and rural development currently is being considered and discussed at regional, national, and international forums but very little scholarly attention has been done on qualitatively studying rural consumers and their relationship with ICT adoption in India. This study focuses on ICT creating more income and employment opportunities for the rural people which will have an impact on their demand or change in consumption patterns.

1.3 Statement of the Problem

Rural areas suffer with inadequate IT infrastructure. Rural people require adequate ICT infrastructure to remain viable as ICT has the potential to reduce the obstacle of distance by connecting people and giving access to diverse essential and desirable resources (Kumar and Roberts, 1999).

The speed with which access to telephony and related ICTs has expanded in the past decade has not been matched by a corresponding increase in research into their impact in low-income communities. Although a large number of pilot ICT projects have been undertaken and evaluated, there is little researched evidence concerning the impact of ICTs beyond the implemented projects by the central and State Government, i.e. in a normal market environment, or in larger territorial areas. Substantial number of consumers with availability and accessibility of technology concerns is rural farmers across the world.

The factors that influence ICT acceptance in rural areas need attention. Once the ICT acceptance increases in rural areas, then how will it affect farmer’s income and consumption of consumer durables is worth exploring. ICT adoption effect on the income of the farmer need deliberation because it will complete the loop of consumption of consumer durables.

There have not been any specific studies on ICT applications in increasing rural market consumption in India. This study is likely to result in showing that ICT in rural market would have a positive impact in increasing the consumption of consumer durable goods with a focus on white goods such as Air conditioner, Washing machine, Refrigerator, Mixer/Grinder and Television. Hence the work will focus on an Indian farmer and his/her consumption pattern influenced by ICT usage in their farm.

1.4 Problem Question

What are the dimensions affecting ICT acceptance among farmers which lead to income and the consumption of consumer durables? The research will identify factors influencing the ICT acceptance, its impact on income and the consumption of consumer durables. The goal is to reach comprehensible results relevant for marketers, academicians, farmers and other stakeholders.

1.5 Problem Statement

How much influence does ICT have on farmers income both with regard to their productivity and on their consumption pattern.
Research questions

RQ 1 : How does ICT (Internet, Mobile, Television and Radio) impact the income of the farmers?

RQ 2 : How does income of the farmer impact their consumption of consumer durables?

RQ 3 : What are the various barriers faced by farmers in ICT adoption?

RQ 4 : What are the various reasons for using Information and communication technology by farmers?

RQ 4 : How can this research advice marketers based on the knowledge attained on various dimensions?

1.6 Objectives of the Study

1. To ascertain relationship between Information and Communication Technology and Rural Market Consumption for consumer Durable Goods in Haryana.

2. To assess the impact of ICT on agriculture income and performance in rural Haryana.

3. To ascertain the relationship of agriculture income in consumption of consumer durables (white goods) in rural Haryana.

4. To study the reasons and barriers for implementing ICT applications in rural areas of Haryana.

1.7 Conceptual Framework of the Study

In present research, Technology acceptance model (TAM) has been used, which is considered the most popular model in understanding adoption of technology among individuals. TAM model is built on a strong theoretical base in the field of Information Technology and is a well-researched, empirically tested model with validated inventory of measurement scales across different contexts. It is used to explain consumer perception of behaviour with respect to technology acceptance. TAM model is considered a robust and parsimonious model in the case of Internet and mobile technologies in diverse contexts (Wang et al. 2006; Crabbe et al., 2009; Kuo and Yen, 2009; Schierz, et al., 2010). In the field of agriculture and rural market, TAM has been extensively used in different studies (Folorunso and Ogunseye (2008); Zhang et al. (2009); Tohidyan and Moghaddam (2015).

Various authors have indicated that TAM is a very important tool in explaining adoption behaviour of technological innovations (Calantone et al, 2006; Davis, 1989; Musa, 2006; Gardner and Amoroso, 2004). Keeping in view the acceptability of TAM as an indicator of technology acceptance, TAM is adopted for the present study to find out the acceptance of ICT technologies ranging from Internet, Mobile, Television and Radio.

Davis developed TAM on two primary perceptions: Perceived usability (PU) and perceived ease of use (PEOU). Availability of technology in developing countries was the major reason influencing adoption of technology by rural farmers (Musa, 2006). Author proposed that farmers readily adopted Technology if there was required infrastructure, Government stability and economic resources which were considered as availability factors. Calantone et al. (2006) also agreed that government created infrastructure, increased the adoption rate of technology. Usage of modern ICT tools like mobile phone and internet doesn’t require any formal education and can be accessed by users with basic training and ability to use which is referred as ‘Digital
Literacy’ as per National Digital Literacy Mission of Government of India (Sharma, 2016). Farmers can easily access the relevant agricultural information through these platforms and content can also be made available in regional languages which is helpful in eliminating the language barriers.

This study has implications for understanding the impact of accepting Information and communication technology in agriculture and rural people’s income. It may take considerable amount of time for rural consumer to realize the real benefits of technology usage. So TAM model was altered in context of the present study. In the present study variables of TAM perceived Usefulness variable, Ease of use and Behavioral intention seeks to address the actual outcome of three constructs on farmer’s income and thereby on consumption of consumer durables (white goods).

The study conceptualised ICT acceptance and its three parameters (perceived Usefulness, Ease of Use and Behavioral Intention) as possibly related to agricultural income and thereby consumption of consumer durables (white goods). Detailed framework of relationship between variables of ICT acceptance and agricultural income and Agricultural income with consumption of consumer durables are presented in the given Fig. 1.1.

![Figure 1.1: Conceptual Framework of the Study](image)

**Perceived Usefulness**

Perceived usefulness involves manifestation of individual beliefs as the foundation for attitudes towards technology acceptance (Davis, 1989; Ajzen, 1991; Brown and Venkatesh, 2005). Davis defined Perceived usefulness as “the degree to which a person believes that using a particular system would enhance his or her job performance”. Perceived Usefulness is the probability that using a technology would improve the performance of an individual in an assigned task. Technological innovation will be considered useful if its adoption is relatively more advantageous as compared to those who do not adopt the new technology (Davis, 1989). Further, Davis (1992) defined perceived usefulness as “an individual consumer’s perception about the outcome of the experience”. Later in 1993 he defined it as the “individual’s perception that using the technology would improve his/her performance”. In the context of present study, performance is centred on the benefits ICT technologies can create for farmers in rural market.

**Perceived Ease of Use**

Davis (1989) defined Perceived ease of use, as “the degree to which the user expects the target system to be free of efforts”. Various studies have highlighted that perceived ease of use has a strong impact on technology adoption (Adams et al., 1992; Chau, 1996; Agarwal and Prasad, 1997; Igbaria et al., 1997; Karahanna and Limayen, 2000). Perceived Ease of use is determined on the knowledge of an individual’s concept of self. An individual’s education level, life experiences and shared social information constitutes knowledge component. A person may face knowledge barriers...
which determine an individual’s perception of Ease of use with respect to usage of various technological innovations (Gardner and Amoroso, 2004).

**Behavioral Intention to use Technology**

Originally TAM was determined by two primary factors, Perceived usability and Ease of use. A third factor of Intention to use technology was identified which affects adoption of technology (Lee et al. 2003; Lin, Chan, & Wei 2006; Oncu et al. 2008). Behavioral attitudes and subjective and subjective norms affects the adoption of technology (Lin et al. 2006) whereas Davis (1989) agreed intent to use technology as a characteristic of adopters. Davis (1989) established that perceived usefulness and perceived ease of use of a technological medium ensures its actual usage Calantone et al. 2006; Gardner & Amoroso, 2004; Musa, 2006; proposed the extension of original TAM by including the construct of Behavioral intention due to the variances found in earlier studies.

**Agricultural Income**

Agricultural Income for the farmer is the payment he receives for their farm produce. The income for farmers is seasonal in nature(post-harvest). Income determines the buying pattern of the consumer in a market. Income has been considered as a significant variable for classifying different market segments. It is an indicator of the ability to pay for a particular product or service. Various models like relative income hypothesis Duesenberry (1949), Life-cycle hypothesis Modigliani and Brumberg (1954) and Permanent income hypotheses Friedman (1957) highlighted that increases in income will give rise to increase in consumption which is also emphasized by Keynes (1936).

Relevant agricultural information enables farmers to improve their farm income and reduce their farm cost. Dey et al. (2011) investigates the use of ICTs by rural farmers in Bangladesh and found that ICT technologies enables farmers to obtain information on input and output prices, the weather and many other agriculture related issues which helps to improve their farm efficiency and income.

Zhang et al., (2010) revealed that there is a direct relationship between perceived usefulness of agricultural information and income of farmers. Pradhan and Saluja (1998) asserts that agricultural performance has a significant impact on income levels in context of Indian economy. Aker (2010) conducted a study on grain trade in Niger, in West Africa. He conducted a survey during 2005-07, in which it was observed that farmers and traders of grains with cell phone usage have been able to search more number of markets and sell more in newer markets. This has resulted in the welfare of farmers and traders. Use of cell phones has led to reduction in search cost and getting better prices for grain in the market.

**Consumption of Consumer Durables**

Consumer durables can be defined as goods that render a stream of benefits/services, usually for more than one year. Durable products are tangible, are not used one time and can be repetitively used by consumers. and The consumer durables category can broadly be classified into consumer electronics (TVs, VCD players and Audio systems etc.) and Home appliances (also known as white goods) comprising of products like Refrigerators, Washing Machines, Air Conditioners, Microwave Ovens and Vacuum Cleaners. Consumer durables were regarded as luxury in the 1970s by rural consumers but increased economic growth in the 1990s led to the proliferation of demand in this industry.

Rural population, supported by government’s development focused policies like MGNREGA, loan waiver for farmers and creation of better rural infrastructure, are spending their increased incomes on discretionary items and product categories like consumer durables, healthcare, education, transportation and personal care. Consumer durables are within the financial reach of rural households in recent years, because of rising agricultural incomes and affordable prices of durables.
1.8 Research Hypothesis

These research objectives have been converted to a number of hypotheses based on the relevant literature review. And to fulfill the research objectives a series of testable hypotheses is posited as discussed.

Hypothesis 1: Perceived Usefulness, Ease of Use and Behavioral intention of internet adoption affect the agricultural income of the farmer.

Hypothesis 2: Perceived Usefulness, Ease of Use and Behavioral intention of Mobile adoption affect the agricultural income of the farmer.

Hypothesis 3: Perceived Usefulness, Ease of Use and Behavioral intention of Television adoption affect the agricultural income of the farmer.

Hypothesis 4: Perceived Usefulness, Ease of Use and Behavioral intention of Radio adoption affect the agricultural income of the farmer.

Hypothesis 5: Perceived Usefulness, Ease of Use and Behavioral intention (Internet acceptance) have relationship with consumption of consumer durables of rural farmers.

Hypothesis 6: Perceived Usefulness, Ease of Use and Behavioral intention (Mobile acceptance) have relationship with consumption of consumer durables of rural farmers.

Hypothesis 7: Perceived Usefulness, Ease of Use and Behavioral intention (Television acceptance) have relationship with consumption of consumer durables of rural farmers.

Hypothesis 8: Perceived Usefulness, Ease of Use and Behavioral intention (Radio acceptance) have relationship with consumption of consumer durables of rural farmers.

1.9 Significance of the Study

Communication needs of rural consumers are high as they are unaware and use of ICT can facilitate information exchange which can significantly benefit the masses. The study gives vital insights into the new technological age in the agriculture setting which follows the acceptance of modern ICT like internet and mobile in the farm operations to increase their efficiencies. Timeliness and availability of critical information to the farmer can enable them to improve the quality of their produce. In India, agriculture accounts for the overwhelming majority of rural employment. Majority of rural population in India have low per capita income, low literacy rate, poor infrastructure and hardly any employment opportunities except agriculture.

The proposed study will be of significance to policy makers who aim to attain ICT-enabled development in the rural market which is the backbone of our economy. Economic development provides a basis for improvement in the employment and income levels which can improve the overall standard of living of people and enhance consumption of people. Many e-government projects for rural populations have been initiated in this context. The study aims to analyse constructive role of ICT in harnessing the potential of agriculture sector in India.
Indian farmers face multiple challenges like erratic monsoons, high cost of agricultural inputs, low prices of produce, inadequate market access and many localised problems. To overcome these challenges it has become a necessity to transform agriculture in a scientific manner. ICT in agriculture is an emerging field which aims on the enhancement of agriculture and rural development in India. It involves application of advanced ways to use ICT in domain of rural market. ICTs can benefit by reducing the information asymmetry existing in agricultural sector and help in improving farm productivity and profitability. Availability of quick, relevant and reliable information can improve the decision making capability of the farmer and can increase their bargaining power in the market. The current study will help in understanding the various aspects of ICT usage on farmers.

The study is of great relevance to the academicians because it provides a peep into the role of ICT in farmer’s consumption pattern. There are individual differences between Indian farmers and their western counterparts which can be compared. In the Indian context, ICT influences are very different from the western and developed countries, which should be explored. Such knowledge is not only essential for academicians to take up further research in this field but also lays down guiding principles for those stakeholders who are battling to make effective sales to the huge consumer group comprising of farmers.

The Indian rural market with its enormous size and consumer base proposes to be a huge opportunity that companies cannot afford to ignore. There are 833 million people spread across 6,27,000 villages. Rural market offers tremendous growth potential for companies and will help them achieve their double digit growth targets in future.

During 1960s rural marketing was synonymous with agricultural marketing as majorly agricultural products like food grains and industrial raw materials like oil seeds, sugarcane, cotton were the most traded product categories. This was followed by green revolution which led to surge in food production, especially in states like Punjab, Haryana and Uttar Pradesh. Focus during the period was on using scientific methods of farming and usage of high-yielding varieties of wheat. In the mid 90s, Indian market saw the emergence of middle class due to a steady increase of income which led to splurge in demand of FMCG and durable goods in both rural as well as urban markets.

Organizations will be able to survive cut throat competition if they are able to delight their customers and not just meet their needs and wants. In this process, ample understanding about target market’s buying behaviour, decision making process and sources of income generation are necessary to cater to the needs of rural market.

It is pertinent to study this segment from both the dimensions, as what affects the rural consumers (farmers) purchasing power and also what are the purchase outcomes in terms of consumption of consumer durables. The work will offer the marketers a platform to understand the consumer’s purchase pattern. Therefore, this research will provide insights to the marketers to comprehend the Indian farmer as consumers in rural market.

Consequently it can be stated that there is no doubt or debate that ICT acceptance provides a basis for improvement in the income and consumption levels of the rural consumers. This makes the issue of ICT acceptance in agriculture worthy of discussion not only because of its intrinsic enormity but more so due to its development perspective.
1.10 Thesis Structure

The thesis attempts to examine the issues from the point of view of the target beneficiaries – the rural consumers majorly farmers. Below is the thesis structure with a short reading guide, providing the reader with a better overview of the thesis’s key sections. The results obtained are encouraging. A brief outline of various chapters is as follows:

Chapter 1 deals with the introduction, leading to a problem statement and research questions on the said topic. The introduction includes a broad outline on rural consumer especially the farmer. It also underlines the importance of conducting the study in Indian environment. It also covers background of the study along with significance, rationale, conceptual framework, research questions and hypothesis.

Chapter 2 includes a comprehensive review of literature on meaning of ICT, its growth and penetration levels globally as well as in India. It also outlines the extent of Mobile and Internet diffusion in Haryana as they are the new modern ICT used in present times.

Chapter 3 covers socio economic and cultural study of Rural Population in Haryana and its consumption pattern.

Chapter 4 reviews the existing literature matching the holistic understanding of the role of Information and communication technology in rural market to enable streamlining the study towards the achievement of research objectives.

Chapter 5 focuses on the methodology employed to investigate the research problems of the study. A detailed description of the sample, data collection, scoring methods, reliability of data, details of the questionnaire, pilot study is presented.

Chapter 6 presents quantitative analysis and interpretation of data completed by rural consumers using descriptive statistics, correlation, regression, and comparison of means. It also covers an explanation of the results and examines the relationships between ICT adoption, its measurement, influence in the agricultural income and implications for demand for durable goods in rural Haryana.

Chapter 7 covers discussion about the findings of the study.

Chapter 8 covers recommendations for future study, conclusions, limitations, implications of the study and directions for future research.