1. INTRODUCTION

1.1 Background and Context Overview

India is experiencing speedy urbanization and rapid economic development. This has brought about a complete shift in the lifestyle of the people. This is due to the gaining popularity of the nuclear family system in the major metros and the migration of the younger generation to other cities in India and abroad for their careers. This leaves the senior citizens in India to fend for themselves. Indian population is dominated by the young covering nearly 65%. Population Bureau (2012) reports indicate that currently the Indian population falls in the age group of below 35 years and the population of the senior citizens is about 90 million. This makes India a country with the world’s second largest number of senior citizens and Indian population is experiencing aging. Trends indicate that by 2020 the elderly population will rise by 15% and by 2050, 20% of Indian Population will be senior citizens. The bulging population bubble of the elderly is a cause of concern, as this will result in an up thrust in the demand for health care services and other services. Some of the seniors need health care while others just need some help in their day-to-day life. Some of them want access to information relevant to senior citizens in particular. Yet many others just want to be connected with their peers. The Government of India and many NGOs are working for this cause. Still they are not able to reach out to the entire community. Government of India and many NGOs are working for this cause. The work of the following NGOs Agewell Foundation, Helpage India, Silver Innings The Foundation were used for the study.

1.1.1. Government of India

The Government of India on its part to care for the elderly population in India announced the National Policy for older Persons in 1999 with an action plan to implement it. In the context of the foregoing, they proposed the usefulness Helpage India (2007) of establishing Senior Citizens Service and Information Centers (SECSINCEN) at the district level. This center will provide the essential information pertaining to the welfare measures and services available to the senior citizens undertaken by the Government and other agencies and details of services available in the district. Many developed countries have established such centers successfully. This step
would become a very useful and practical measure envisaged by the Government. This center cannot operate independently, but they need to take the assistance of medical, nursing, physiotherapy, arts and sciences colleges in the region. Assitance from groups like NSS, NCC, scout units of colleges and social institutions, could also be involved by their community outreach program. This center would primarily help in the following ways:

- Create awareness among senior citizens about the different programmes, services, camps and other services available for the senior citizens.
- Provide services required by the senior citizens by planning, assessment of the needs of the senior citizens.

Currently the Government of India is running in 100 districts the NPHCE progam Helpage India (2009); Government of India (2011). The program seeks to provide easy access to services for the promoting, curing, and rehabilitation of the elderly by community programs for primary health care, it aims to build a database of the medical and other health professionals and identify some people who can become care takers from the family, and provide assistance by given the reference of different required services to elderly patients through district hospitals and regional medical institutions.

1.1.2. Agewell Foundation, New Delhi

Agewell Foundation, India is a not-for-profit NGO and this organization involved in social work for the welfare and empowerment of senior citizens since 1999. Agewell strength is its huge network of 7500 primary members and they also have about 80000 secondary volunteers who come from about 640 districts across different corners of India. They interact with over 25000 senior citizens on a day-to-day basis through its volunteers. ECOSOC has granted Agewell Foundation a Special Consultative Status at United Nations since 2011. Agewell also works in close association with Department of Public Information, United Nations (UN-DPI). Agewell is an active member of different groups and committees who are working and steering in different Social Sectors as a part of some of the five-Year-Plan of Planning Commission of India since 2002.

1 http://www.agewellfoundation.org/
Agewell foundation is a team of individuals from different fields, who share the emotions of concern and care for the old. Many of them are seniors who have come together so that they are helped to come out of their lonely shell that most old people are constrained to. Their team comprises of many professionals, some are academicians from the university, senior bureaucrats, people from the field of art, some of them are writers, and even judges – all people who share the same emotions for the cause. They are ably supported in their efforts by a dedicated management, comprising of a team of professionals and suitably trained counsellors who have the charged with zeal to work for the society. Agewell Foundation currently is seeking for means to reach out to larger community base of older persons and accelerate the change and abridge the gap between generations in order to ensure a life of dignity and comfort for older people. Agewell Foundation interacts with elder citizens and their caregivers at different levels Family, Community and State. The highlights of their establishments include:

**Agewell Interaction Center for older persons,**

This is a platform that enables Agewell to understand the problems of ageing better from a social angle. It also acts as a suitable platform for the aged and all the people who are interested to interact, share and care.

**Agewell Training Program**

Agewell gives a suitable training to the seekers who wish to be associated with this cause. This program mainly intends to sensitize and train different stakeholders like the Police personnel and others about needs and rights of senior citizens.

**Free Health care campaigns for Destitute Elderly**

Agewell takes this an initiative in order to determine all the requisite healthcare of senior citizens who are dwelling in the impoverished slums and give them the required medical or healthcare assistance.
Agewell Share the warmth Campaign

Share the Warmth provides relief to the destitute seniors by sharing and caring for them in the bone chilling winters of Delhi-NCR.

Agewell Monitoring and Evaluation Center

Agewell also take initiatives for research about senior citizens. The team at the center undertakes innovative research studies, supervises and evaluates the need for routine social projects. These monitoring and evaluation activities are performed with an intention to cover a broad range of different sectors linking old people. Issues concerning old age are the main focus of on-going research activities at this center. United Nations have recognized some of Agewell study reports as its background documents.

1.1.3. Helpage India

In a developing country like India which is facing a rapidly increasing elder population and subsequent growth in the demand for services to provide them economic and social security and dignity, HelpAge runs various programs. Their main focus has primarily been on the destitute elder, ensuring that the underprivileged elderly are reached through its various services in the areas of financial, health and emotional security. However there is now a growing focus on the disadvantaged urban seniors as well. HelpAge is also slowly moving from Welfare to Development services for the elderly in urban and rural areas. In rural India its main focus finding ways for long term sustainability of programs through formation of Elder Self Help Groups, restoring dignity and economic independence among the poor elder community, while in urban India it is urging elders to stay active and form AdvantAge Groups under its AdvantAge Card program, which not only helps provides the urban elder with benefits and discounts of various services, but also urges them to ‘Get Active, Stay Active’. There are many initiatives taken up by Helpage India:

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Mobile Medical Units (MMU)\(^3\)

In a developing nation like India where public health facilities fails to the reach out to the major masses and it is affordability of health care on a private basis is low, the aged after their retirement years cannot afford are facing great problems to gain access to medical attention. Apart from this the major problem is that geriatric medical skill and treatment is nearly absent in the vicinity. India has demographics of people over the age of 80 crossing above 80 million elders in the nation, who do not have any access to required specialised care and attention. HelpAge India is facing the strenuous challenge of reaching its Health Care outreach programme to the elderly in urban and rural areas. The objective of their initiative is to help the basic healthcare to be reached out to one million underprivileged rural and urban people, in particular the seniors in communities that are under-served, and located in remote geographical location and difficult terrain. They are currently commissioning MMUs in 87 districts and in the next two years they aim to establish make at least one MMU functional in each of the poorest 200 districts of the country and extend it over to the other districts in next three years to cover all 621 districts. The HelpAge mobile health services are indented to reach out free healthcare to deprived elders in rural and urban areas. The main services that would be to provide on-site would include doctor consultation, basic diagnostics, medicines and home visits for bedridden patients. A link with the local health facilities would also ensure that they could be referred to specialist doctors if required. The medical team comprises of a doctor, pharmacist, paramedic, patient facilitator. This team is supervised by a qualified social worker. Typically, the MMUs functions for six days a week. They reach the first site around 9.00 AM and work round the clock till 5 PM. A cluster of 10-15 community sites/villages is covered on a weekly schedule averaging 200 km per week. Thus, each MMU reaches out with a target of access to medical services to 100-150 patients per day in remote rural locations and around 200 patients in urban areas. This way each MMU provides approximately 30,000 treatments on an annual basis.

AdvantAge – Active Aging Centers\(^4\)

Most of the senior citizens have an active work life during their youth after which they find it difficult to manage after retirement. Some of them have no place to go, no connection with


colleagues, and community or support group of any form. Many studies undertaken in this direction indicate that in many cases this situation manifests into a feeling of complete isolation, negligence and lack of confidence and self-esteem that often results in depression and health problems. This situation is serious, and calls for urgent, remedial action. If this situation is not dealt with now, it will lead to alarming consequences considering the fact that India’s elderly population is projected to reach 200 million by 2030. Health professionals opine that, elders who are part of a social or work group are doing much better in terms of physical and emotional well-being. The solution proposed is for like-minded elders should form small groups and work together for socially useful projects which not only benefits society but is of immense benefit to the elders themselves. This will keeps them socially engaged and imparts a sense of self-esteem. HelpAge India, the country’s leading advocate of Active Ageing with the intent has launched a unique programme that strives to meet these objectives. HelpAge has been a source of motivation to encourage Senior Citizen Associations to form small groups of like-minded people to engage in socially useful community work. However, to realize this dream, these groups of elders need a physical space with basic infrastructure for them to collaborate and engage in social work and pursue their interests. To fulfill this need, AdvantAge Centres were set up in different locations. HelpAge India is planning to set up AdvantAge Centres across the country at many locations. This will enable the success of AdvantAge Active Ageing programme and is structured along the lines of the already well-established Agecare Centres supported by HelpAge India in multiple locations. This centre will be set up at a location which belongs to or is rented by a Senior Citizen Association and will be managed by senior citizens. As far as the investment is concerned, the start-up infrastructure would be funded by Helpage India and, the socially useful work that the elders will engage in is required to become self-funding by the seniors within a specified time period. This way the model can sustain itself. Apart from this, most of the seniors required physiotherapy, now this facility with enhance and prolong active lifestyle for many elders so there is quiet a demand for physiotherapy. Hence these AdvantAge Centres would surely be equipped with a set of physiotherapy machines and a trained physiotherapist. A token therapy charge would be demanded from non-members which will contribute towards the running cost of the centre.
Health Camps

It is now decades after India has attained independence, yet India is still struggling to provide facilities for basic health care to most of its citizens. Basic Health care facilities provisions in especially in rural areas of India are few and far fetched. The reality is that these services barely reach the elderly in these locations.

One of the important features of HelpAge India's health care initiative for the senior citizens is organizing of health camps in many rural as well as urban areas in the country. Since 2010, HelpAge has joined hands with its network and has successfully organised camps for both general and specialized medical camps for the elderly. A team for general camp team has a general physician, pharmacist and assistant. In case of specialised health camps there are teams of specialised health practitioners like dentists, ophthalmologists, gynaecologist, orthopaedic apart from general physician, pharmacist and assistant. The health camps help in diagnosis, treatment and referrals for general ailments, dental care, gynaecological conditions and ophthalmic diseases are carried out. These camps also give importance to spread the awareness of preventive health care programme through Information, Education and Communication and Behaviour Change Communication activities among the community.

The other initiatives of Helpage India include includes support a gran, old age homes, cancer care, livelihood support and a lot more. Helpage India also pursues research studies in this direction by collaborating with different organizations. Ageing is a recent phenomenon for India and it is not very well understood in the context of its emerging economy. This justifies the need to pursue research in this direction in order to understand the bio-medical and social aspects of ageing. The result of this understanding and study will help the development and unravel the possible challenges this phenomenon would pose to our society. It will also provide guidance and throw light and useful insights to deal with the challenges in effective ways. Demographers, Gerontologist and Geriatricians all around the world over are making efforts to understand nuances of ageing population. Apart from this, there are multilateral bodies like WHO and

5 http://www.helpageindia.org/our-work/programmes/health-camps.html
UNFPA who are the leaders in the research work on comparative international data on health and other aspects of ageing. There are voluntary organisations like HelpAge International that are making effort to raise issues to pursue research. These organisations are pursuing research in many social areas and on many aspects of ageing that they encounter while implementing related programmes. HelpAge India is a voluntary organisation and its research work is mainly focused on the areas of the policy related research on ageing issues particularly on urgent concerns like poverty, isolation and neglect. This research work is done with the intention to mainstream the issues pertaining to aged and ageing in the country. The research efforts of Helpage India are evident from the extensive experience, programmes of HelpAge in the field. Suitable efforts were taken in accordance from time to time in order to understand poverty in old age and possible ways of poverty alleviation in old age. Another important aspect that requires urgent attention is safety and security of the vulnerable older persons. So every year Helpage brings out the distinct shades of elder abuse that prevails in the society.

1.1.4. Silver Innings The Foundation

Silver Innings is another organization that is working for the cause of the senior citizens. This organization guides the elders through a new path, on a wonderful journey for successful ageing. Four youngsters though separated in distance but united in the cause of Elders have started this initiative. The team’s motto is “Who’s afraid of Ageing?”. This team is ably lead in all their effort by their founder Sailesh Mishra. He has his own perception, experience and also the feedback that he has received from many elders. Sailesh opines that data about Elders that is currently available in the public domain is inaccurate, obsolete and inadequate. There are many websites to cater to the seniors, but most of the websites carry information about the organization which is hosting the web site and it showcases the activities and services provided by them. But, there is no website that gives the complete information to solve the problems and the issues of senior citizens. This gave rise for the need to have a dedicated website, like a super market where the senior citizens can order everything under a single roof. This was the motivation for the team to create a website to serve the cause. The team also wanted to share their mantras and concept of productive ageing through this website. They have been striving to collect information to

6 http://www.silverinnings.com/
create content for this website and make it informative and interactive. This is still an ongoing process, and they intent to add and update the website periodically. The success of this website depends on the membership based growing and the support and active participation of seniors and their family members.

1.2 Motivation for Research

Government of India wants to establish a senior citizen’s service and information center through which they want to create awareness among senior citizens about the different programmes, services, camps and other services available for the senior citizens. They also want to provide services required by the senior citizens by planning, assessment of the needs of the senior citizens. Agewell Foundation currently is seeking for means to reach out to larger community base of older persons and accelerate the change and abridge the gap between generations in order to ensure a life of dignity and comfort for older people. Helpage India wants services to reach out to a large community of senior citizens. They want to help like-minded elders to form small groups and work together for socially useful projects which not only benefit society but are of immense benefit to the elders themselves. This will keeps them socially engaged and imparts a sense of self-esteem. The Silver Innings team also wants to share their ideas about the concept of productive ageing and the new mantra for aging gracefully through the internet gateway. Many big time IT companies are motivating and supporting IT developers to pursue innovation that address the societal needs. As the community needs and number of uses grow on a global scale; technology like Cloud computing has the potential to deliver scalable IT solutions. The cloud computing paradigm will initiate the formation of a community of technology users dedicated to work as a team and collaborate and learn from each other and exchange information to develop best practices that can benefit the entire NGO and nonprofit sector. Hence cloud computing is a good option for non-governmental organizations to optimize their operations more effectively, and deliver a broader array of services at much lower costs and thus make a greater impact on the communities they serve. With this background it is obvious that if we need to think of a solution for a social cause that is scalable, cost effective and web based, to make an impact on a large scale then it should be hosted on the cloud as a service. This was the motivation to pursue this research. The work would be undertaken to understand the needs of the senior citizens community and understand the existing technology and work done in this direction and analyze
if the services need to be scaled up to reach out to the entire community by leveraging Cloud computing so that it can help to serve them better.

1.3 Purpose of the Research

India has witnessed a surge in the demand for services in the health care sector in the last decade, which is due to the rise in middle-class population. The rapid growth of the health care technology in India has been due to the changing medical technology landscape, improving health care delivery, financing and changing patient profile. Increase in life expectancy is due to the improvement in the standards of living and health care services and technology advancement. Hence, the demand for aggregate health care services over a longer period of time will increase due to the increase in the number of senior population. It is already evident that the proportion of aged population is increasing, the population of the people above 65 years has risen from 5% of the population in 2005 and it is expected to become 15% in 2030 Helpage India (2009). Hence, it is vital to plan for the future of the senior citizens, as it will benefit both the individual and country. Current population demographics state that nearly 90 million people in India are in the ranks of senior citizens. The Government of India is working to initiate in about a 100-selected districts, the NPHCE program Helpage India (2009); Government of India (2011). The program seeks to provide easy access to services for the promoting, curing, and rehabilitating the elderly through community based primary health care, it aims to build a database of the medical and paramedical professionals as well as the care takers within the family, and to assist them by providing different referral services to elderly patients through district hospitals and regional medical institutions. The focus of the study is to support the Government of India’s initiative so that it can reach out and serve a larger section of the senior citizen community. Sedentary lifestyle and lack of awareness has resulted in the increase in the incidence of NCDs WHO & Government of India (2009); TNS India (2008); Team of Sigma Research and Consulting (2009) among the senior citizens. So the prevention of these diseases can be achieved by educating and improving their awareness about these diseases and help them to prevent it by adopting a healthy lifestyle. Health is a product of overall emotional wellbeing; this can be achieved if they are provided assistance in their day-to-day life through essential services, keeping them socially connected with their peers and also keep them well informed with
necessary information needed for their wellness. This will promote healthy ageing and overall Wellness.

1.4 Focus and approach of Research

Research initiatives in computer science, usually involves taking into account, the detailed knowledge of a technology, the computer system, after which the study could focus on details of the usefulness of the technology to people and what are its effects on them. The main focus in this approach is the technology, the working and understanding of the logical steps of a system. This approach also concerns with taking a real-world problem, the steps and algorithms used to decompose it so that a computerized solution can be developed. A totally new system is developed from scratch after understanding the end user requirements and conducting a detailed study or sometimes if there is a necessity, they study existing systems and then design a novel integrated solution. In this approach the focus is not completely technical in nature. There is a need to retrospect from the people or the stakeholders about what are their requirements, problems and impact of the existing technology if any exists and then work to create a new system or customize an existing one.

Moving on to the information technology (IT) approach, the buzzword until a few years ago was “information” which has now changed to “services”. The growth in this direction has made the enterprises to strategize so that technology is not the driver, but the enterprises have to adopt strategies to retain the existing technology, and add new functionality so that they satisfy the expectations of the people by providing services to them. As a result, the Information Technology industry has manifested into a service oriented one. This revolutionary wave has swept people in so many ways. It has resulted in the creation of totally new work cultures and also created a new way of living. Now, the needs of the end users who avail these services are changing across the globe. This has resulted in the evolution of new services. To cope with the ever blowing winds of change in service requirements, strategies are adapted so that, infrastructure, software and platforms are not service specific. The research in this direction is to design models that are oriented better to provide services at a higher level of abstraction and also provide means for efficient management of services in the existent infrastructure and yet deliver the services with quality assurance at an optimum cost. So we can say that the research should be
modeled to design so that it caters to the motto “Serve more for less cost”. Hence the research approach in IT is to enable the service providers to provide the best services to the customers by the optimum use of technology in such a way that they can also generate maximum revenue from their service. This approach deals in empowering the service providers to sustain their position in the competitive marketplace, by deploying their services in a unified, standards-based platform which has a potential to enhance performance, simplify infrastructure management and contribute for efficient management of cost and power savings.

Many big time IT companies are motivating and supporting IT developers to pursue innovation that address the societal needs. The research to design and develop any system that is meant to serve a community is complete only if the end user’s needs are accounted for. So the best approach is to adapt a socio-technical approach. The stakeholders are the central focus of the study. This research approach involves in understanding their needs, and study of the existing systems that exists and the technology that could provide a better solution for their progress. The approach also involves a thorough study of the technology applicable for the context and the stakeholders, taking into account the impact of this technology in the future so that the system is usable by the service providers and the end users. This approach involves seeking ways to implement a new IT system by efficient design by using currently available software. The approach also concerns about study of the effects of using the software solution and obtain reliable results which benefits all the stakeholders. To achieve this, the end users are also made a part of the design and development process. Checkpoints are created at every stage and the end users feedback and approval is taken. The additional points identified are then implemented at every stage so that the final product is flawless and usable by the end users. The socio-technical approach is appropriate here. The stakeholders in question are the senior citizens and the NGOs or users who provide them with services. Currently there are some systems in health care that partly serve the cause of senior citizens, so these systems also need to be studied so that a better system can be created to serve the senior citizens. The senior citizens would be made an integral part of the research and development process. The prototype of the systems would be demonstrated in front of the senior citizens community, feedback would be collected and the changes would be incorporated. This is the approach adopted for the research work.
1.5 Role of Technology for the Social Cause

IT has touched and changed the lives of most of the youngsters in our country. The youth and even the kids have benefitted tremendously by IT in many ways. IT especially the internet has changed the social interactions, education, shopping and generally it has formulated a new way of life. This kind of transformation was easily welcomed and adapted by the new generation, but IT still has its role to play in making a difference to the lives of senior citizens in a better way.

Most of the senior citizens communities live in impoverished and remote locations, which lack sufficient healthcare services. This study is undertaken to address the objective of using technology to provide affordable health care and other essential services for senior citizens. This study will involve understanding the needs of the senior citizens in India. The study will then focus on designing a system by the use of IT so that this system is accessible by every senior citizen across the country and it should open up to a world of services for their wellness management. The research will involve understanding and finally specifying the functional and technical requirements, exploring the technology options available and help in determining the best technology option for designing a cost effective and scalable system to cater to the senior citizens. The design proposed would facilitate the senior citizens sitting in the comfort of their home to get online consultation/advice with doctors, schedule appointments and get reminders for appointments and taking medicines. They can also be well informed about the nearest health care centers even if they move to a new locality. The other services will provide assistance for availing domestic help and other day-to-day activities, which many of them are unable to carry out, due to their age. As many of the senior citizens live alone, this system aims to give them services from authentic, well known and trust worthy sources for the benefit of the senior citizens that can give them a feeling of security. There are many health related services available on the web, but not particularly to serve the senior citizens. The project will focus on health management specifically for the senior citizens which will be implemented so that data can be universally accessible anywhere, anytime. The interface would be web based and it would be designed so that the senior citizens can use the system without any formal training. The system can be extended and hosted as a mobile application also if required in the future. IT solutions for social causes need to accommodate the growing number of users globally. The Cloud computing paradigm enables to deliver scalable IT solutions, it also helps the NGOs to optimize their
operations more effectively, and deliver a broader array of services at much lower costs and thus make a greater impact on the communities they serve. With this background it is obvious that if we need to think of a solution for a social cause that is scalable, cost effective and web based, to make an impact on a mass scale then Cloud computing option would the best one to consider. Hence the study is to understand the needs of the senior citizens community and also analyze if the best technology can be leveraged to serve them better. The result of the study would be the design of an application for Senior Citizens Wellness Management- SCWM.

1.6 Assumptions, Dependencies, and Requirements

The application will support the initiatives taken by the NGOs, Government Organizations in this direction, by helping them to build an elderly friendly eco system to promote senior citizens wellness. The design of the project would be a web based system, based on the assumption that the senior citizens have access to internet. The knowledge required will be basic computing skills to operate the internet and to upload the correct information. The system design would enable the administrators to use the system, without the need for huge investment for infrastructure or training. The design would also support the business model needed for maintaining membership, operations and utility of the system that makes it easy for billing.

The requirements and dependencies that may be addressed might include:

- The system has to be implemented by an NGO or any organization associated with the cause, they need staff who are familiar with using the internet and also computers with internet connection and staff for customer support.
- The administrative tasks in the system including, regular upload of information, coordination, authentication of the service providers would be the responsibility of the enterprise who cater to the senior citizen’s needs.
- The senior citizens who are familiar with using the internet, and must have a computer with internet connection. Senior citizens who do not have access to the internet or they need assistance to use the system, can approach the organizations for support.
- To have consultation with a doctor online the senior citizen must have a web camera.
- The medical records have to be uploaded online by the senior citizens using the system interface.
• The success of the running of the project will be mainly dependent on the quality of the internet connection, regular updations and maintenance of the application.
• The system will act as an enabler for the process of building of the eco-system and the community for support and services. It will provide a platform for the senior citizens community to get easy access to health and other services and it will also be a doorway for the service provides to get visibility for their services.

1.7 Limitations and Scope of the Research

The focus of the study is to support the Government of India’s initiative for the senior citizen’s cause so that it can reach out and serve a larger section of the community. Hence, the scope of the research is limited to understanding the needs of the senior citizens community. It is being pursued with a social perspective to serve humanity by the innovative use of technology. The research begins with study of literature about the social cause to understand the needs of the senior citizens. The secondary data from the literature is analyzed and then to reinforce and identify additional requirements primary data is collected by survey. The next stage of research is limited to the design for web based system interface and developing a prototype for the same. The design for other devices like mobile will not be covered. The details of high level design, platform and framework and the steps to host the service on the Cloud will be analyzed and specified in the report.

1.8 Problem Definition

Information Technology advancement has transformed the internet to become a gateway that opens up to a world of services. Technology to provide the services are developed to serve humanity in a better way by adopting a socio-technical approach. Social and human needs are put at the center of the development process. Proceeding with the socio-technical approach that aims to prioritize the needs of the senior citizens, the problem can be stated as follows:

“To design a cost efficient web based system with a user friendly interface that will provide the functionality based on the needs of the senior citizens. The system should be easily accessible by every senior citizen, or NGO or any other organization working for the cause, across the country anywhere, anytime. The system design should enable the administrators to use the system,
without the need of huge investment for infrastructure or training of IT operations staff. The design should also support the business model needed for managing the billing, administrative operations utility of the system and providing customer support."

1.9 Objectives

1. To understand the needs of the senior citizens community in India from proprietary reports of research agencies.
2. To conduct discussions with domain experts from the medical field and other health practitioners in order to understand the requirements of the senior citizens to help to serve them better.
3. To conduct discussions with NGOs who have already taken initiatives in this direction so as to understand what kind of support would they require to serve the senior citizens better.
4. To validate the needs and requirements of the senior citizens deduced from the proprietary reports by primary data collection from selected sample.
5. Evaluation of technology options for design of scalable and cost effective system.
6. Study of technology options to create a web based system architecture.
7. To develop a working prototype of the system.
8. To get the system design evaluated by the end users and add the additional requirements.
9. To test the deployment of the prototype on the Cloud.
10. To get the final system prototype design evaluated by the end users.

1.10 Beneficiaries

1. **Senior Citizens Community**: The senior citizens will be the primary end users who will access the system to avail the services.

2. **Health Service Providers**
   a. Health Practitioners: Doctors, Ayurveda doctors, dieticians, yoga specialists, physiotherapists, psychologists and others.
   b. Health Professionals: Nurses, attendants, pathologists
   c. Health Centers: Hospitals, pharmacy, diagnostic centers.
   d. Health Care Payers: Insurance companies
3. **Essential Service Providers**: Service providers for housekeeping, cooking, tiffin services, bill payment assistants, banking assistants, consultants for tax, finance and legal.

4. **Administrators**: NGOs or government organizations, who would control the administration of the system, provide support for the system.

### 1.11 Organization of Dissertation

**Chapter 1**: This chapter covers the Introduction, background and context, research approach, the role of ICT for the social cause, objectives and scope, methodology, design of research report.

**Chapter 2**: Literature Review: This chapter covers the details about the literature related to the social cause, this is followed by study of existing technical systems in the technical review section and review of literature on Cloud computing technology.

**Chapter 3**: Research Methodology

This chapter covers the details of the research approach and the methodology adapted to pursue the research. The details covered are categorized into two stages Research stage 1 and stage 2.

**Research Stage 1**

Requirements gathering: Analysis of requirements from secondary data from the proprietary reports and primary data from survey. Analysis of technology options for system design, design of prototype for presentation at senior citizens associations.

**Research Stage 2**

This chapter involves design of the prototype, demonstration of the prototype to the end users, collecting end user response, analysis of the end user response, and adding the additional requirements to the prototype. This will be followed by technical feasibility study and modeling research.

**Chapter 4**: Technical Feasibility Study. This chapter covers the details of the technical feasibility study. The details covered include study of existing options. This approach helped to understand how to re-use these options in a better way, and the kind of customization required. It
also helped to unveil the problems in implementing these systems. The study was then focused on the new technology that could eliminate these problems and also have a futuristic approach to serve the stakeholders on a large scale. Cloud computing technology was studied in detail as a solution to the problem. Feasibility to re-use existing blocks and integrate them on the cloud platform was the primary focus of the technical study. SOA approach was adopted to implement the same. The final technical framework was again studied with two approaches based on the cloud platform. The frame work of best feasible solution is described.

**Chapter 5: Modeling Research.** Research stage I and the part of research stage II, was pursued with a focus to understand the user requirements. This was followed by technical feasibility study, based which the functional model was proposed. A pilot of this model was demonstrated to the end users. Their feedback was taken, and analyzed; this helped in the further refinement of the requirements. Based on this, the requirements specifications for the system were formulated. This chapter covers how the Cloud based model for SCWM has evolved as a result of modeling research. The details covered include the functional design, business model, modular design, high level architecture, low level design, implementation, testing of deployment on the Cloud.

**Chapter 6: Results and Conclusions**

This chapter covers the steps to deploy the prototype and test the same. End user response on the prototype, consolidation of survey results, conclusions, benefits to end users and scope for further enhancements.

**Chapter 7: References**

**Chapter 8: Publications made in conferences and research in the research area.**

**Chapter 9:**

Appendix A- This section contains the research instruments used for survey.

Appendix B- This section contains the class, activity and sequence diagrams.

Appendix C- This section contains the letter of approval from the NGOs and health practitioners about the research work.
1.12 Target Audience

The research report will cater to serve people from the community of academics, research and other organizations associated with the social cause of the senior citizens. It details the requirements of the senior citizens based on secondary data from the literature and primary data collected from Jyeshta Nagrik Associations and Senior citizens. The report gives a gist of the literature related to the social cause, published by Government of India and NGOs actively working for the cause like Agewell and Helpage India. The report also covers the existing technical systems available in the health care field. The report would be informative to the end users who are apprehensive about using internet based services. It attempts to enhance their clarity about designing a system that can provide assistance right from the comfort of their home. The service providers in the health care and other essential areas can understand the challenges about the oncoming demand in services so that they can be better prepared to face the same. It also suggests the steps involved to adapt a Cloud based model that is based on a framework that would be compatible with most platforms. It gives an end user perspective in terms of enhanced services that they can avail and an enterpriser’s perspective for the design of a cost effective system with minimal capital expenditure. This is a suggestive roadmap to adopt a Cloud based model for a social cause like senior citizens and is not the authority to prove the same. The report suggests a design based on the requirements gathered that can enable in building an elderly friendly eco-system and a community of services.