Abstract: - Due to the wide-spreading of the Information and Communication Technology, citizens have started to demand a variety of alternative choices, and therefore strategies, business and institutions have to change to fulfill their needs. This new citizen-driven society is drawing users together to learn, share and act in a more informed and responsive way. Citizen-centered ICT can make substantial contributions to resolve various issues resulting from the aging society. Health Education Informatics Systems have the potential to play an important role in achieving well-being, independent living and delaying of the aging process. “Multidisciplinary Complex System for the Efficient Management of the Anti-Aging Information – AgingNice” creates an environment for developing an efficient age management, aiming to provide reliable, relevant, and understandable online health information for different type of users.

Key-Words: - Aging society, Active aging, Citizen empowerment, Usability, Accessibility, Health education information systems

1 Introduction
The Age of Aging explores a unique phenomenon for mankind and, therefore, one that takes us into uncharted territory. [1] People are living longer and, in some parts of the world, healthier lives. An important feature of population aging is the progressive aging of the older population itself; over time, more older people survive to even more advanced ages. Some countries are witnessing a historically unprecedented demographic phenomenon: simultaneous population aging and population decline. [2] While global aging represents a triumph of medical, social, and economic advances over disease, it also presents tremendous challenges to which society must be prepared.

A citizen-driven society is a society in which the emphasis is on individual. His actions are based on self-determination, self-responsibility and access to information and knowledge. Making his own decisions, taking actions and being responsible for the consequences implies first being informed, and this can be done with the help of the advances in Information and Communication Technology (ICT) that enhance the ability of the citizen to inform himself and through the rapid and easy dissemination of the information.

This must lead to the development of tools and environments in which necessary information can be obtained and used whenever needed, fairly, easily, and safely, to create a society that can support lives and connections among people.

There is a need to invest in the smart use of technology and exploitation of information because they can help us to address the challenges facing society, like the aging population. This society, a digital one, must be envisioned as a society with better outcomes for all. The deployment of ICT is becoming a critical element for delivering policy objectives like supporting an aging society, climate change, reducing energy consumption, improving transportation efficiency and mobility, empowering patients and ensuring the inclusion of persons with disabilities. [3]

An aging population also increases the pressure felt by the healthcare system, as the demand for services rises. Health Education Information Systems aims to support the improvement of gaining knowledge and healthcare by increasing the capacity of citizens and health professionals to make decisions based on accurate, up-to-date and customized information. Knowing how to prevent diseases and how to delay some of the aging processes will prolong the active life, with long term benefits at the society level.

2 Risk Factors Affecting Our Aging Society
Although life expectancy has increased, it is unclear how long this trend will continue. The aging of the population
should be seen as a transition, not a crisis, with opportunities as well as challenges in society’s response to the aging problem.

The decline in the ratio of workers to pensioners causes a great burden on those who are still working. The main challenge is to promote healthy and active aging and to adjust societal practices and structures to include older people as contributors to society. It is important to use existing resources more effectively, that is to extend the retirement age and keep more people in work, fostering the participation and employment rates of elderly.

Another risk factor is the changing of the family structure. As people live longer and have fewer children, family structures are transformed. This has important implications in terms of providing care to older people.

Aging process often implies loss of status and social isolation. But the increasing number of older people might offer a growing market for education and training, as well for new technologies. Lifelong learning is important, not only for staving off cognitive decline and furthering personal development, but also for upgrading knowledge and skills that can be used in a prolonged active and healthier life.

The aging of the population has a major impact on the organization and delivery of healthcare. In the next 10 to 15 years, the loss of health and life in every region of the world, including Africa, will be greater from chronic diseases, such as heart disease, cancer, and diabetes, than from infectious and parasitic diseases. Aging persons are at risk for chronic conditions because of factors that cannot be modified, such as genetic predisposition or gender. Risk factors related to health behaviors, however, can be modified, promising significant returns in terms of better health for individuals and a longer, healthier life, if the citizens are better informed and if they become self-responsible.

The growth in aging population is occurring at the same time as an explosion in technology. Technology has also created challenges for some everyday activities such as banking, telephoning, and finding health information that may increasingly involve unfamiliar or different ways of doing things. Access, literacy, cost, design, privacy and attitudes play a role in how we choose to use technology.

All citizens should be made aware of the potential of ICT for making life easier, including elderly or people with disabilities. This calls for multi-stakeholder partnerships, increased learning, recognition about digital competences in formal education and training systems, as well as awareness raising and effective ICT training outside formal education systems.[3]

While aging population is usually described as a threat or burden for society, the economic potential of it and the role of elderly people as consumers, on the other hand, are widely neglected.

3 ICT Supporting Active Aging in a Citizen-Driven Society

According to the World Health Organization, active aging is “the process of optimising opportunities for health, participation and security in order to enhance the quality of life as people age” [4].

Information and Communication Technology must have an important role in supporting citizens to be actively involved in any activity related to them, throughout their life, anytime and anywhere.

Citizens call for timely and high-quality information for reasons of awareness and personal well-being. (see Fig.1) Only an informed citizen will be in the position to participate in taking decisions concerning himself or the community to which he belongs. This interest recommends an easy-to-understand and easy-to-access presentation of such up-to-date information. Rather than presenting raw data in an extensive fashion, new adapted ICT should be able to provide customizable information services that can be tailored to individual user groups, be it for reasons of content or be it for reasons of citizen’s ease of access.

![Fig. 1 The use of Internet by age](image)

In an aging society, elderly should be seen not only as subject of “care” or “treatment,” but the invaluable resources of knowledge and competence for our societies. Therefore, it is crucial to build, with the help of ICT, tools and environments from the perspective of usability and accessibility, so aging citizens might be able to increase their active participation in society by:

- prolonging working life, thus increasing productivity and reducing pension costs;
- having access to better healthcare, thus extending the quality of life and ultimately reducing health costs;
- enabling participation in society, thus diminishing isolation and loss of self-esteem;
4 Health Education Information Systems

Concerns about poor health information have stimulated efforts at many levels to design more integrated systems able to provide reliable information to inform decisions. Because of a more demanding citizen, IT and health specialists have been seeking ways to enhance the quality of information, to broaden its range, and to integrate information from a variety of sources to address more complex issues.

Health Education Information Systems (HEIS) are changing the way health information is disseminated and managed, but implementation is a difficult task in which social and cultural issues must be addressed.

4.1 Benefits of HEIS

There are three main types of benefits that must arise from a Health Education Information System (HEIS): quality, access and efficiency. The impact on quality and access can be direct for citizens, or indirect, by enabling healthcare professionals to improve the quality and efficiency of healthcare that they provide.

Among the factors that facilitate the benefits to quality are:

- more informed citizens
- health information designed around the citizen
- effectiveness.

More informed citizens implies those demanding to have direct access to data, information and knowledge about their conditions, diagnoses, treatment options and healthcare facilities, in order to enable them to take effective decisions about their health and lifestyles.

Health information designed around the citizen allows a better understanding of it for the non-professionals users and for healthcare specialists to have access to more complete and focused information. As a result, they can be more citizen-focused in their work.

Effectiveness of a HEIS is directly related to how well it satisfies its users' information needs. This effectiveness can be characterized by the system's readability, browsability, searchability, and finally, interactive assistance. Making the best decision on the most appropriate healthcare depends on information about the possible service options and their outcomes.

It is important that everyone regardless of socio-economic status, disabilities, and physical location have equal access to health information. ICT have come down in cost and have become very prevalent in almost all countries on the globe. For instance, mobile phones provide personal and wireless access to networks and to the Internet where available, while PDA's provide personal, portable computing and wireless access to the Internet. This liberation from control over access is a very important element in democratization of information access.

The efficient health education and sharing of health information is indispensable for adopting a healthy way of living and also for the effective delivery of care. This is particularly important for aging people and those with chronic conditions, who often have several physicians. HEIS can ensure the timely and accurate collection and exchange of health information data that are likely to foster better care co-ordination, and the more efficient use of resources.

4.2 Challenges for Designing HEIS Customized for Aging Persons

The first step in creating an accessible design is to get to know the users and their limitations. The limitations of aging persons are functional impairment due to age (e.g., limitations of visual perception, hand–motor function and dexterity, cognitive and perceptual abilities) and inexperience in the use of computers.

Managing health and medical data in electronic format for aging or elderly users brings significant challenges that have to be resolved. These include:

- how to identify the impairments of specific aging citizens in terms of access;
- how to cope with user’s changing needs;
- how to facilitate information retrieval by users with different disabilities and objectives;
- how to store the large amount of complex and diverse data;
- how to balance data privacy concerns against clinical and research benefits of data availability;
- how to ensure that the captured data will effectively transfer into knowledge that facilitates healthcare decision making.
For a user-friendly HEIS we have to design multimodal user interfaces appropriate to the target population, and assistive systems that help users with navigation.

A HEIS designed for aging persons should provide context and orientation information, and ensure that presented information and data are clear and simple. The language and layout of the display have to be designed to be as simple as possible to ensure readability and comprehension by all users.

Icons should be simple, and concrete symbols should be designed to look like the object they represent and be distinguishable from others. Because of a general decline in acuity among elderly, the font sizes should be larger.

A context-sensitive help prevents the user from having to search through several items. Error messages should offer constructive advice and provide suggestions. The message should not only report the occurrence of an error but also provide an explanation of its cause and offer possible solutions.

Aging affects the hearing function as well as the ability to concentrate on audio and text at the same time. Therefore, avoidance of sound effects is recommended unless a specific application requires their use.

Aging disturbs the reaction time to environmental stimulation and increases the time required to process displayed information. Therefore, features like pop-up windows and animated banners can be distracting and should be avoided.

Allowing the user easy control of font, color and contrast setting, as well as window resizing, scroll rate and zooming, is generally recommended.

Elderly users may experience changes in motor skills, including slower response times, declines in ability to maintain continuous movements, disruptions in coordination and balance, loss of flexibility, and greater variability in movement.[6] Thus, it may become a challenge to be steady with the mouse, or any other control device. Small targets and moving interface elements are known to be difficult for older people, and should best be avoided.[7]

Up till now, the designers for user-interfaces have focused primarily on the design requirements that make interactive applications usable for elderly users. Indeed, usability is indispensable; however, usability in itself is not a sufficient motivation to use an information system.

Ideally, an optimal management of the health knowledge will motivate or mobilize citizens to use a specific HEIS. The design and development of an appropriate HEIS should focus on providing an immediate benefit to those in search of health information or support, taking into consideration all the particularities imposed by aging.

4.3 Multidisciplinary System for the Efficient Management of the Anti-Aging Information – AgingNice

The multidisciplinary complex system AgingNice belongs to the health education information systems with particularization in the anti-aging domain and allows the sharing of the knowledge concerning the specific research and the promotion of the theoretical and practical information, both among the stakeholders from the medical area and at the person level. AgingNice is a research project developed inside the National Research, Development and Innovation Plan for the period 2007-2013 (NP II) is the main instrument by which the Romanina National Authority for Scientific Research (NASR) is implementing the National Strategy for RDI.

To achieve a web application that aligns the latest European strategy in the field of anti-aging, the partnership of the project has identified specific priorities adapted to the Romanian environment and it has correlated them with the European ones, taking into account the particularities of the Information Society in Romania.

The practical results of AgingNice put into value the measurable, positive, sustainable economic performance of a health education informatics systems.

Estimated benefits of using AgingNice consist in a better quality of care, access to education, efficiency and time savings.

The application with database available via Internet comprises an interconnected database system concerning anti-aging methods and strategies, clinical and laboratory investigations for aging preventing, anatomical modifications, educational models, self-evaluation tests, defining a personalized demeanor, tendencies in the anti-aging biomedicine, anti-aging campaigns and also applications for facilitating the dissemination of the therapeutic protocol, study cases and recent research among the specialists from large range of medical domains.[8]
AgingNice is at the final phase and in December 2010 it will be completely functional and implemented. Databases are filled by the health specialists from the project consortium and the application is tested both by professionals and average citizens.

5 Conclusion

The world's population is aging at an accelerated rate. Aging is not an issue to be addressed through a single, confined approach or solution but rather a multi-faceted one presenting challenges.

The coming wave of aging citizens are more educated, more demanding, and have experienced more technology throughout their lives than any previous generation.

They are viewed as consumers of information who can actively participate in achieving a healthy and active aging.

ICT can facilitate the involvement of citizens in becoming more self-responsible, but it can also become a barrier if they cannot easily and effectively use it to meet their needs.

Health Education Information Systems empower the citizen to become a stakeholder in his own health, who seeks greater participation in his healthcare and therefore greater access to his own health information.

The success of a HEIS depends on how well it serves the needs of the target population. Thus, crucial characteristics of the users, especially the aging ones, must be defined and addressed.

References: