UNIVERSITY OF HALMSTAD
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E-HEALTH – THE USAGE OF ICT DEVELOPING HEALTH CARE SYSTEM:
MULTIPLE-CASE STUDY OF EUROPEAN COUNTRIES DENMARK AND LITHUANIA

Dissertation in International Marketing, 61-80 points

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ACKNOWLEDGEMENTS

The study work of e-Health development in European countries has been started couple years ago when the idea stirred to me after gaining information about the intention to implement ICT in Lithuanian health care system. The first step for the research wouldn't be taken without encouragement of Professor Paliulis N. K., the manager of Business Technology Department in Vilnius Gediminas Technical University in Lithuania. Thanks to him, the plan and first investigations for this study were made. Developing study work further for the great ideas and advices, listening and contradictions, understanding and collaboration I am very grateful to the Professor Venilton Reinert met in Halmstad University in Sweden. The critical input and review of Mr. Reinert led me to finish study work in an advantage way for European countries developing their e-Health systems.

I thank to news editor of Delfi portal Mr. Bagdonas T., who was interesting in this e-Health development study and published the investigation question on Delfi website not asking for consideration. Without this survey the research in Lithuanian case would loose the reliability and validity. Findings in published survey induced me to make research further and also meet interesting people contributed to this study.

I am grateful to employees of Vilnius University Hospitals Santariškių Klinikos, particularly to Mr. Kizlaitis and Miss Lukošaitytė further the investigation of e-Health system in Lithuania. During the Interview they both willingly shared information and experience about the work of innovative system in Lithuanian health care sector. Other physicians and institution administrators with pleasure showed how e-Health system works in reality and explained the advantages of innovative system in their work place comparing with previous.

All those people forward the investigation of e-Health in Lithuania and led to compare findings with Danish e-Health work principles what was useful reaching the aim of research and conducing the e-Health development in other European countries.
ABSTRACT

Electronic health – this is the object of study work. The focus of research is European countries, which use Information and Communication Technologies improving their Health care system and it is not excepted is the country advanced in developing e-Health or it just started to create or improve this system. As it is a new developing research area, there are not so many direct relevant researches about it previously found. Therefore it encourages the investigation of this topic, which according to European Commission and Enterprise Directorate General (2003) could reach greatest economy on saving costs in whole service sector. Thus the guidelines for efficient e-Health development should be given as soon as possible. The study work is exactly aimed on this. Chapter 2 is specially intended to create a base for general frame of references which should be useful organizing the research further before choosing the methods of investigation.

As there is not found many relevant theories related to e-Health business and development, Chapter 3 is intended to present the methods of further effective research. For efficient investigation of e-Health there are two quantitative and qualitative methods of research chosen. Interestingly in this work is that quantitative research findings accomplish qualitative research. Usually it is contrary, but in this research it is necessary to investigate the amount and intensity of e-Health services usage in Lithuania first. Findings in this survey induce me to make further research in Lithuania using qualitative method. As for qualitative method - convenience type of research is chosen. It is the multiple-case study in two European countries. One of them is Danish e-Health network MedCom. This network is called as the most advanced e-Health system in Europe. Therefore it is chosen as the best current sample of e-Health development in Europe and is a base comparing findings with other representative European country. On purpose to make a reliable research the second European country, where e-Health system is not so developed well is chosen. This country is Lithuania, where e-Health started to be implemented and developed five years ago. As the criteria for beneficial e-Health development are creation of Value Chain, Supply Chain Management (SCM) and Customer Relationship Management (CRM) chosen. Properly analysis of e-Health system according those criteria is presented in Chapter 5 where it is accomplished also giving suggestions how e-Health system could be effectively developed in European countries.

The results of study show that there is a lack of previous researches made investigating e-Health development process. There is found only basics and presentations what countries have done developing health care system, but analysis how the experience could be useful for other countries or themselves developing e-Health there was not organized. Therefore properly findings in this study work are reliable and valid for all European countries developing their health care system implementing ICT. Furthermore in this study there is noticed the recession of state authorities developing public health sector in appropriate countries. Thus it makes some difficulties developing e-Health system, but experience in sample country Lithuania show that it is possible to develop health care system effective using business solutions, just it takes much more time than it would be advanced with help of authorities. Therefore results of study induce the public authorities further the development of e-Health and all service sector in country.

Key words: Information society, ICT, Value chain, SCM, CRM, European countries, e-Health, development
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1. INTRODUCTION

1.1 Background to the research

The widespread and fast-developing information technologies, especially wireless communications and the Internet (Wang, Cheng, Cheng, 2006) have allowed the Information society development too. Information society is treated as educated and practicable knowledge collected generation (Business Development Commission, 2006), which use Information and Communication Technology (ICT) gathering information (Webster, 2006). Furthermore Information and Communication Technologies in the report of the European Commission and Enterprise Directorate General (2004) are defined as innovative technologies included networks, computers, other data processing and transmitting equipment, and software. As it is mentioned in Communication on Commission Initiative (2000) “what is emerging is often referred to as the new economy”, thus it could be considered that the development of Information society and ICT impacts development of new business concept – e-Business too, which has tremendous potential for growth, employment and inclusion (Communication on Commission Initiative, 2000). e-Business is defined as any financial or non-financial transaction involving an electronic process using Internet or Internet technologies (O’Boyonge, Chen, 2006). Implementation of e-Business solutions would be beneficial for both, providers and consumers because of possibility to shorten the way of product or services delivery. Normally, for customers it is easier to understand when business solutions are adopting in manufacturing or private services provision business, but it should not discontent when business solutions are active in public sector too. It should be understandable to everyone that all organizations make business and want to get benefits to develop their activities whatever it is public or private, manufacturing or services providing company. There shouldn’t be any doubt, that developing business and trying to give the best production to customers all legal business solutions should be acceptable.

But what about electronic business solutions in public sector and especially in health care sector using Information and Communication Technologies?

To answer this question, it is required to know the current situation of Information Society very well and be keen on the usage of Information and Communication Technologies (ICT), their accessibility and acceptation of people. As European Commission (2006) considers, application of ICT in business processes leads to e-Business. It means, if ICT would be implemented into health care process, so this process should be called e-Health. According to Wang, Cheng, Cheng, (2006) the substantial development of e-Health is enabled by incorporation of fast and cost-efficient Internet and wireless communication techniques. Traditionally, common practices in the Health care industry place tremendous burdens on both patients and health care providers, with heavy loads of paper-based documents and inefficient communications through mail or phone calls. In addition, the medical documents prepared manually are prone to errors and delays, which may lead to serious consequences. The time, energy, and resources wasted in such processes are intolerable and unimaginable in any fast-paced society. For these problems, e-Health provides powerful solutions to share and exchange information over the Internet in a timely, easy, and safe manner (Balas et al., 1997). Developing e-Health it is not enough only to know advantages or disadvantages of this system, it is important to ascertain if e-Health will be acceptable and understandable to the patients, citizens and doctors as well. To this extent, firstly it is necessary to estimate how well the Information society is developed in country or in the whole World and then to start development process of e-Health. From the beginning the
development must be appealed to the creation of valuable e-Health system, which is connected by
effective working relationships and collaboration, by speed and openness sharing information
(O’Brien, 2006). The scientist M. Porter (1998) offered Value Chain model which is
advantageous for each country developing any type of business, also e-Health. Value predicated
services chain includes in-bound logistics, operations, out-bound logistics, marketing and sales
and they are supported by procurement, technology development, human recourse development
and firm infrastructure (The European Commission, Enterprise and Industry Directorate General,
2006), which all must collaborate with each other. To ensure the satisfaction of customers the
whole value chain should be supported by effective Supply Chain Management (SCM) and
Customer Relationship Management (CRM). Supply Chain Management supports and manages
the links between some of company’s main business processes and its suppliers, partners and
customers (O’Brien, 2006). The link between company and customers are relationship which is
managed using CRM business measure. Customer Relationship Management helps company to
improve their customers’ focus and analyze needs of customers creating and using the database
of customer information (O’Brien, 2006). Thus the efficient creation and improvement of e-
Health network is close related to the implementation of other business solutions which could be
managed electronically as well creating integrated e-Health system in country beneficial for the
whole health care sector also citizens and patients, together encouraging the development of
Information Society.

1.2 Research question

According to the rapid development of Information Society in whole Europe the scientific
researches should be made concentrating more on the computer literacy having citizens but not
forgetting illiterate part of society too, because consequent development of electronic services
would help to solve computer illiteracy problems in country and thereby would modernize public
sector including public health care system and make it more efficient. According to declaration of
European Commission (2006) there is a lot of work to do developing health care sectors in many
of European countries. For the effective improvement of health care activities related State
Institutions of each country are responsible and the collaboration between countries is suggestion
of European Commission. Because of internationally spread e-Health development problem, this
is an interesting issue to investigate further. Therefore the aim of this study is:

To investigate European countries, which use Information and Communication Technologies
improving Health care system.

This will be done in order to answer the research question:

How European countries develop e-Health using ICT in their Health care system?

On the purpose to answer the research question this study work will be concentrated on
investigation of two countries: Denmark, where electronic health development is advanced far
away and Lithuania, where implementation of ICT in Health care sector is on the initial stage.

This study argues that e-Health system and interactivity level of its actors are different in all
countries, but there are main services providing channels and ways which are similar to all
countries and they must be improved not only developing Health care system in appropriate
country but developing all country too. For effective development and successful work of e-
Health system in this study work it is purposive set tasks, which will be realized investigating
representative countries.
Research tasks are to investigate:

1. What actors participate and influence development of e-Health?
2. How does electronic services package differ in different European countries?
3. How does the creation and development of value chain impacts development of Health care system?
4. What implication has Supply Chain Management developing e-Health?
5. How Customer Relationship Management helps to develop electronic health system?
6. What useful suggestions could be given for countries developing e-Health system?

Those tasks will give guidelines to the author of how the experience of representative countries, Denmark and Lithuania, developing e-Health system could be beneficial for countries improving or creating their own e-Health network. Gathered and processed data in empirical research will show if it is useful for other countries to appeal to experience of countries advanced in developing their e-Health system at all. Maybe comprehensive of the research will not be adequate to the reality and it will require for more researches. Everything will be known in the further sections of this thesis.

1.3 Justification for the research

Integration of ICT and e-Business management solutions into health and social sector and development of e-Health is advantageous, because health sector in all countries (The European Commission, Enterprise Directorate General, 2003):

- impacts on economical indexes and on the growth of economy;
- has already been for quite some time under considerable cost containment pressure and is expected to come under even more pressure in coming years due to an ageing society with a projected negative impact on the economic basis of our society, on taxes and social security systems;
- is not so developed on adaptation of ICT (Information and Communication Technology) and Internet business solutions, but
- is possible to reach the greatest economy of costs in the services sector integrating e-business solutions.

Having such opportunities health sector should be investigated as soon as possible encouraging the development of e-Health. The last researches about e-Health system were made only notionally or intended for separate countries. Useful information for further research in e-Health could be found in research reports of the European Commission and Enterprise Directorate General investigating Electronic Business in Health and Social Care Service Sector or analyzing ICT and e-Business in Hospital Activities. There were made some researches initiated by the European Commission analyzing different e-Health projects in different countries, but there were found no connection between countries in similar or even in different economical level. Therefore this study work will be concentrated on the general e-Health issue acceptable for each country developing e-Health and making guidelines creating theory of e-Health business. The issues of project initiated by Danish e-Health researchers called “Baltic eHealth” would be very beneficial supporting this study work, but because of this international project is going to be finished at the end of 2007, thus it will be contrary, the results of master research will be beneficial developing “Baltic eHealth” project across Baltic countries, as Lithuania, Estonia,
Denmark and Norway too. The achievement of this thesis will be analysis and comparison of two European countries which are different advanced in both developing health care sector and all economical section. The qualitative issue of study work based on the suggestions how to develop e-Health system creating value chain of activities, and effectively managing valuable system through supply chain and customer relationship will be advantageous for countries developing e-Health, no matter whether the development standing is advanced or just the begin in the country. Thought the research issue is suggestive it will be beneficial for both countries implementing offered suggestions in their practice developing e-Health, and researchers investigating e-Health topic further on purpose to create unified e-Health model adaptable in each country and construct more theory of e-Health also its efficient development.

1.4 Delimitations

This study work will cover the general understanding of health care business which could be developed implementing innovative business solutions as making business process more automatic and electronic so reducing the undesirable work power of doctors and health care administrators completing paper documents. This research will concentrate on the modern electronic Health care development process implementing ICT in health care provision process and creating integrated system of activities – e-Health. On purpose to make research reliable and valid it will focus on the European public health care enterprises belonged to the full responsibility of authority which is common in many of European countries. Because of this delimitation the comparative multiple case studies will focus on Danish situation where health care belongs to the full responsibility of authority and has quite a high welfare. The second comparable European representative of research – Lithuanian e-Health system is in the responsibility of authority but the welfare state is not developed very well and requires for further researches and suggestions how it could be improved implementing modern business management tools – Information and Communication Technologies.

To make research clear and beneficial more for citizens than for services providers, it will be concentrated on the main business model B2C where the competition and interaction between Information Technology providers and health care services providers will be eliminated and focused only on health care providers and customers - patients, citizens. This study work will not cover or analyze the solvency of customers or reimbursement strategies of electronic health care services because it is too different in all countries and the other research could be made on the topic how to make reimbursement system more beneficial for all actors of health care. Therefore in the research of master thesis one marketing “P” – Price will be eliminated and concentrating on three marketing P’s: Product – electronic health care services, Place – portal of e-Health network supported by operative Supply Chain Management and Promotion – concentrating on the effective Customer Relationship Management. Finally concluding the research issue will be suggesting health care providers how to improve e-Health creating valuable services provision system.

1.5 Conclusions

In this section the background to the research was set, where the broad field of study was described leading into focus of the research question and main tasks to answer this question. Introduced research purpose and question enabled author to justify the importance of research and present the benefits of research issue implementing in countries developing e-Health. Then in this section the methodology was described briefly and finally delimitations of research were presented. On these foundations, the research could be navigated further and elaborated wider.
2. RESEARCH ISSUES

2.1 Introduction

After briefly described what is going to be analyzed and investigated in this study work, mentioning the purpose and question of research in this section the findings of previous researches and scientific theories related to research object – e-Health will be presented. Firstly in this part author will discuss about health care institutions and their behavior as economic entity mentioning the problems of employment and financing. Later the advantages of Information and Communication Technology implementation into business and health care delivering process are going to be presented. This presentation will lead author to discussion of adaptation e-Business solutions in the activities of health care institutions, together presenting the fundamentals of value chain creation and management of supply chain and customer relationship providing electronic services. Finally the concept of study work object – e-Health, will be presented using comparative description method and announcing the priorities of e-Health system creation.

2.2 Health care enterprise as economic entity

Along with the high rhythm life and work style development, people’s consciousness of service is increasing, they pay great attention to efficient and convenient consumer service and more and more companies or organizations make an effort of a good service as well (Andrew, 2001). At the same time, customer services have spread to public and professional services including health care and have been central to governmental regulatory and social programmes (Du Gay and Salaman, 1992).

The hospital as a main health care enterprise plays a role in health and social service sector (The European Commission, Enterprise Directorate General, 2004). The comprehensive quality of hospital or clinic not only depends on the medical skill, but the customer service too. In most of countries nowadays, with the perfection and development of private hospitals or clinics, the government hospitals’ non-competition condition is changing, and now consumers may choose their pleasing hospital free, besides base on the medical level and its service quality. Therefore, it has formed a certain competition tendency between hospitals under this social reality.

The health care enterprise already became an economic entity, being precise, some parts of hospitals’ operation already similar with common business; they also need emphasis on consumer demands and market demands, customer whose needs and choices should be catered for (Damian 2001). A better service is imperative under the situation. Therefore, it is necessary to follow and control business actors first.

As it is known, business situation is influenced and controlled by actors which interacts and have relationships with each other. Figure 1 presents a schematic model of the structure and organization of healthcare service provision in a “typical” European country. It indicates a number of levels at which healthcare services can be structured or organized. Nevertheless, it should be unforgettable that the extent to which there are clear and/or rigid boundaries between the identified sectors and levels varies across European Member States (The European Commission, Enterprise Directorate General, 2003).
Primary care services typically act as gatekeepers for referral to secondary care involving more specialist treatment. Primary health care providers are outside hospitals. Usually they are general practitioners, dentists, community pharmacists and community nurses (The European Commission, Enterprise Directorate General, 2003).

Ambulatory care, as it is seeable in Figure 1 involves primary health care, hospital care and home care as well. Ambulatory care is provided on a non-residential basis, including primary care services and hospital out-patient services (The European Commission, Enterprise Directorate General, 2003).

Hospital care, according to the practical knowledge of author as a patient and information in Figure 1, it is in-patient care when usually general practitioners send patient to the hospital for longer and deeper treatment or laboratory testing. Health theorists such care treats as a secondary care too what means that hospital professionals generally do not have the first contact to a patient in the sequence of health care (The European Commission, Enterprise and Industry Directorate General, 2006).

Home care simply should be understandable as health care provision in the patients’ home. Care is provided by nurses and doctors. It could be provided by community nurses or even doctors in distances (The European Commission, Enterprise Directorate General, 2003).

Groups of previous defined health care services attend whole health system and make it work as a normal economic entity. To persist in market health organizations as other services providing companies must joint the staff and maintain their effective motivation system. Though there are some differences between private and public organizations. Public organizations are peculiar because of their dependence on government what regulates health care services reimbursement system and both finance and support depends on governments’ expenditures. The specifics and situation of public health care system in Europe will be analyzed further in this section.
2.2.1 Employment relevance

In the schematic model of health care services (see Figure 1) it is showed what kind of different specialists and professionals are necessary to provide health care services.

*It is interesting, are medic specialists enough in EU countries?*

Answering this question the statistical data of the research, initiated by World Health Organization in 2004 (see Table 1), show that to one physician fall 300 citizens and one general practitioner approximately has one thousand patients. In the last five years the number of employees was growing in all medic specialities. The biggest quantity of graduated physicians in 2004 was in Greece and Italy. In those countries one physician approximately could have two hundred patients while in Poland one physician needed to treat twice more.

Table 1. Medic specialists, per 100.000 citizens, 2004

<table>
<thead>
<tr>
<th>Countries</th>
<th>Physicians</th>
<th>Physicians, medical group of specialties</th>
<th>General practitioners</th>
<th>Dentists</th>
<th>Pharmacists</th>
<th>Nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>345.25</td>
<td>134.65</td>
<td>143.82</td>
<td>50.31</td>
<td>61.13</td>
<td>606.43</td>
</tr>
<tr>
<td>Denmark</td>
<td>357.09</td>
<td>44.79</td>
<td>77.8</td>
<td>83.87</td>
<td>65.99</td>
<td>977.55</td>
</tr>
<tr>
<td>Estonia</td>
<td>320.91</td>
<td>121.92</td>
<td>65.07</td>
<td>85.08</td>
<td>62.63</td>
<td>643.00</td>
</tr>
<tr>
<td>France</td>
<td>337.70</td>
<td>81.17</td>
<td>165.37</td>
<td>67.88</td>
<td>108.12</td>
<td>726.10</td>
</tr>
<tr>
<td>Germany</td>
<td>339.05</td>
<td>141.05</td>
<td>102.35</td>
<td>78.78</td>
<td>57.97</td>
<td>773.32</td>
</tr>
<tr>
<td>Greece</td>
<td>487.54</td>
<td>197.52</td>
<td>...</td>
<td>120.35</td>
<td>...</td>
<td>350.37</td>
</tr>
<tr>
<td>Iceland</td>
<td>360.92</td>
<td>111.76</td>
<td>77.93</td>
<td>98.09</td>
<td>98.09</td>
<td>943.31</td>
</tr>
<tr>
<td>Ireland</td>
<td>275.51</td>
<td>...</td>
<td>51.96</td>
<td>55.32</td>
<td>88.16</td>
<td>1502.91</td>
</tr>
<tr>
<td>Italy</td>
<td>415.28</td>
<td>...</td>
<td>93.87</td>
<td>56.86</td>
<td>91.33</td>
<td>665.14</td>
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<tr>
<td>Latvia</td>
<td>311.22</td>
<td>89.5</td>
<td>53.23</td>
<td>60.1</td>
<td>...</td>
<td>529.57</td>
</tr>
<tr>
<td>Lithuania</td>
<td>389.95</td>
<td>137.88</td>
<td>82.96</td>
<td>66.13</td>
<td>66.95</td>
<td>745.72</td>
</tr>
<tr>
<td>Netherlands</td>
<td>360.37</td>
<td>38.5</td>
<td>50.42</td>
<td>48.83</td>
<td>16.79</td>
<td>1424.06</td>
</tr>
<tr>
<td>Norway</td>
<td>348.29</td>
<td>174.59</td>
<td>71.89</td>
<td>80.51</td>
<td>59.93</td>
<td>1476.49</td>
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<td>Poland</td>
<td>224.26</td>
<td>184.81</td>
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<td>26.4</td>
<td>58.07</td>
<td>464.90</td>
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<td>Portugal</td>
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</tr>
<tr>
<td>Slovakia</td>
<td>313.25</td>
<td>151.26</td>
<td>43.05</td>
<td>45.33</td>
<td>48.97</td>
<td>663.83</td>
</tr>
<tr>
<td>Sweden</td>
<td>324.57</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Switzerland</td>
<td>375.42</td>
<td>131.51</td>
<td>64.02</td>
<td>49.79</td>
<td>60.35</td>
<td>...</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>...</td>
<td>...</td>
<td>67.31</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>EU</td>
<td>320.88</td>
<td>107.14</td>
<td>97.66</td>
<td>60.61</td>
<td>71.94</td>
<td>693.73</td>
</tr>
</tbody>
</table>

Source: WHO, 2007

According to WHO data it would be easy to say that there are enough for physicians, general practitioners, nurses and other specialists to supply the demand in all European countries. But there is a problem, that the numbers of graduated medic specialists do not mean that all specialists will be under their speciality or work in there own country. Nowadays developing countries face big problem of emigration of good healthcare specialists. They are moving to developed countries looking for better work and life conditions. This problem must be solved in coming years; otherwise the development of e-Health system in developing countries will not be beneficial as wanted.
2.2.2 Economic importance

Primary health care, hospital care, home care, ambulatory care, most of these types of citizens’ care services in EU are public and depends on government and its expenditures to develop health care sector and make provision of services better. Interesting that health is a significant item of government spending categorized separately from social protection. It includes expenditure on services provided to individual persons (e.g. medical and pharmaceutical products or equipment intended for consumption or use outside a health facility or institution, outpatient services, hospital services, as well as public health services) and services provided on a collective basis (for example, administration and operation of government agencies involved in applied research and experimental development related to health) (Pulpanova, 2004).

According to statistical facts (see Appendix 1), government expenditures were growing in 28 European Union countries together during five years (2000 - 2004). Analyzing countries separately, the biggest beneficial jump of expenditures was in Belgium – 1.7 % (from 6.0 % to 7.7 %), in Ireland - 1.4 %, in UK – 1.1 %. There is noticeable decrease in some countries too. In Slovakia the expenditure of government jumped from 6.5 % in 2000 to 5.8 % in 2003, in 2004 it should have been reached 5 %. Similar situation was in Lithuania too, then every year the expenditure declined 0.2 % and from 2000 till 2004, quantity of expenditures decreased 0.8 %. As in currency, a total government expenditure on health in the European Union members increased by 105.9 billion euro in 2002 (Pulpanova, 2004).

According to statistical facts showed in Table 1 the conclusion is that in Lithuania chosen as representative country health care sector development requires more attention and support of government. They need to make good plans of profits and expenditures, which would be beneficial not only for doctors and practitioners but for citizens and patients too. Policy of Health care expenditures in Denmark is developed continues suitable for the development of e-health system. Percentage government expenditures for this sector grow every year and shows governments’ interest to make health care provision better for citizens and practitioners.

2.2.3 National structures of health care system

Most of the healthcare expenditure in Europe is by the public sector (The European Commission, Enterprise Directorate General, 2004), but there are and private health care deliverers or even mix of services in private and public sector. In the different Union Members, social insurance, general taxation, private insurance and out-of pocket co-payments by patients are involved in varying mixes. Overall, four main clusters of countries can be defined (see Table 2). Typically, countries have systems that are mainly based either on general taxation or on compulsory social insurance (The European Commission, Enterprise Directorate General, 2004).
Table 2. The main clusters of countries as regards financing models

<table>
<thead>
<tr>
<th>Country</th>
<th>Predominant system of finance</th>
<th>Main supplementary system of finance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finland, Greece, Ireland, Italy, Sweden,</td>
<td>Public: Taxation</td>
<td>Private voluntary insurance, direct payments</td>
</tr>
<tr>
<td>Spain, UK, Norway, Lithuania</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Denmark, Portugal</td>
<td>Public: Taxation</td>
<td>Direct payments</td>
</tr>
<tr>
<td>Austria, Belgium, France, Germany, Luxembourg, Estonia</td>
<td>Public: Compulsory social insurance</td>
<td>Private voluntary insurance, direct payments, public taxation</td>
</tr>
<tr>
<td>Netherlands</td>
<td>Mixed compulsory insurance and private voluntary insurance</td>
<td>Public taxation, direct payments</td>
</tr>
</tbody>
</table>

Source: The European Commission, Enterprise Directorate General, 2003; Nohr, Mártonty, Linstad, Breivik, Kloosterman, 2006

In most Member States, a considerable share of total health care expenditure has to be paid directly by users as a consequence of gaps in insurance coverage for specific products and services. This is particularly true for the southern Member States, where the share of out-of-pocket payments as a proportion of total health expenditure is highest (European Communities, 2003). Private reimbursement problem doesn’t help developing Health care system. It must be solved by Governments of each State increasing the Health Insurance Funds or helping hospitals to reduce costs of health care services. Implementation of modern business solutions, as Information and Telecommunication Technologies would help to solve some services provision problems, as a quality, rapidity, information security and accessibility in turn reduce the costs.

2.3 Business process using Information and Communication Technologies (ICT)

To control the demand and persist in the market the business analysts suggest use information technologies in business process. It doesn’t mater which sector company works in. The health care sector is not an exception. In this sector there are a lot of free opportunities to use modern business technologies and solutions to solve problems developing health care sector. But the question is:

How is the society ready to accept modern business methods and instruments in such an important subject as personal health?

In this section the theories and concepts of information society will be explained comparing recent situation and tendencies developing information society linking it with Information and Communication Technology (ICT) concept and virtual usage of ICT in hospitals and between citizens among European Union members. Finally the description of electronic services will help to understand what could be obtained linking society, ICT and business activities.

2.3.1 Information society position in Europe

In the time of growing economic level all together the business activities are strengthening, quality and quantity of public and private services are raising, new, educated and practicable knowledge collected generation is growing. All those facts are related with information society incoming and development. Because of the formation of information society, as it is handled of Information Society Development Commission (2006), “many countries launched strategic activities and declare political resolutions to form and develop knowledge society. The well known examples of this policy are in the USA, Japan, Ireland”.

9
First time information society concept came up in Japan fifty years ago at the beginning of seventh decade extruding industrial society. Analyzing information society as new age of changes, it is noticeable “The third wave” concept deduced by Toffler A. (see Figure 2).

Figure 2. Toffler A. “The Third Wave” concept

Source: Toffler, 1981

The first wave started before Christ and continued till 18 A.D. century when industry started to take an important position in society’s life. The second wave didn’t take very long and suddenly the third wave penetrated and brought into industry society life modern activities, the communication became very attractive and advantages in business, serial production lost its importance, man became more individualist, the information started to dominate (Rathmell, 1974).

When “the third wave” came, Information Society concept was wide analyzed by Webster, Machlup, Porat, Castells. Theorist Frank Webster (2006) suggested grouping the Information Society concept to make easier to explain it. Webster accented further definitions of Information Society:

1. technological
2. economical
3. professional
4. spatial
5. cultural.

*Technological conception*

Modern technologies are one of the most visible features of new age; therefore those technologies precisely are treated as forerunner of Information Society emerges (Webster, 2006). New technologies’ advantages are meeting everywhere – at home, at work, in business processes, providing services and products, consuming them. Nowadays personal computers are not request
but necessity in daily activities; in business processes more often are implementing self working
technologies. Internet and Information services in Internet are the most attractive in all activities.
Scientist Webster assumes, “that such an amount of new technologies with varied influence, must
lead to the reorganization of social life” (Webster, 2006).

Economical conception

This conception underlines the growth of information activity’s economical value (Webster,
2006). As Webster have quoted scientist Jonscher (2006), “when bigger part of economical
activities takes information activity but not agricultural economy or manufacture, it means that
Information society has been formed”. According to Eurostat statistical data (2006), agriculture
industry gives the smallest part to Gross Domestic Product than other industries in all European
Union. In 2005 there was noticed that agricultural sector growth rate declined 3.6 percent
comparing with other years at the same time. While communication industry growth rate was 2.5
per cent per 2005, as the European Commission has declared in 2006. According to data,
conclusions could be made that formation of Information Society is on progress and have
perspectives to reach one of the biggest part in GDP.

Professional conception

Economical conception treats that information society is formed when it takes bigger piece of
GDP than agriculture or industry sector while professional concept considers, as Webster (2006)
has presented the words of theorist Bell, that “Information Society could be declared when the
professions associated with information are dominant”. In ten year the fastest growing sectors
were business services and communication, where the number of persons employed rose average
by 5 % per annum between 1996 and 2005. In contrast the index of employment for industrial
activities showed a steady decline during the period 1995 to 2005, with annual reductions
averaging 1.2 % per annum over this period (European Commission, 2006).

Spatial conception

This concept defining Information Society appeals to geographical position and distance
(Webster, 2006). Space between supplier and user nowadays is feasible because of Network
where information flows fast and directly to final user wherever the person would be in the
world. Such communication technologies connect whole world societies in one and form
common information society.

Cultural conception

As Webster (2006) claims, this cultural concept of Information Society is “easiest to understand
but bare correct”. Explanation of this concept, according to scientists Baudrillard J., Poster M.,
Webster F., is related to media (TV, Radio, Newspapers) and the information quantity and quality
which society gets from them. People are interested in other people’s life, their behavior and
look. It means that “life is symbolization of knowledge about us and others, exchange or
resistance of knowledge” (Webster, 2006).
All concepts mentioned above are nor definite neither mistaken. Everybody can treat information society as they understand and it is closer to their lifestyle, but the features to define Information Society are:

- Information,
- Information and Communication Technologies and
- Society accepted those means.

Concluding technological, economical, professional or cultural changes in society, change health care system too and challenge it to decisive actions. This factor is partially global and generic, i.e., not dependent on the way health care is organized or financed (European Commission, 2006) it depends more on how citizens accept modern technologies and how much ICT are and going to be involved in public life and business.

### 2.3.2 ICT usage in Europe

The increasing demands on cost-containment and on proven cost-effectiveness will put certain harness on the development of medical technologies but the pace of introducing new technologies is unlikely to slow (European Commission, 2006). But before starting analyze deeper the benefits and disadvantages of Information Technologies, the meaning of this important concept must be defined.

First, it is relevance to define what *Information System (IS)* is. This system describes all components, such as hardware, software and data resources necessary to deliver information in an organization (o’Brien, 2006). All those components leading system to operate are called *Information Technologies (IT)* and if in the system communication networks are involved, than the unit of system components is called *Information and Communication Technology (ICT)*. The application of ICT in business processes leads to e-business, if non-proprietary networks are used (The European Commission, Enterprise Directorate General, 2004).

The researches group from different EU countries observed that the building and renovation of healthcare facilities require new thinking and new flexible solutions that incorporate the revolutionary developments in Information and Communication Technologies into the processes and structures of the facilities (European Commission, 2006).

Recently telematics infrastructural questions have gained in importance at the European level as it is mentioned in the European Business Market Watch report (2004). The most important barriers for the wider diffusion of e-Health applications across Europe are (The European Commission, Enterprise Directorate General, 2004):

1. *Technical infrastructure issues*
   - legacy and task-specific information systems,
   - stand-alone systems for various administrative tasks,
   - mainframe computers rather than client-server platforms;

2. *Security and privacy issues* - missing *medical and clinical standards*. 
At the same time European Commission maintains (2004), that central trend for development of e-Health at the local, regional and increasingly at the national level is the development of Integrated Healthcare Communications Systems (IHCS), providing the much needed healthcare system (inter-)connectivity which will become a key driver for the wider diffusion of e-Health applications – a new challenge for European ICT providers (The European Commission, Enterprise Directorate General, 2004). New challenges should encourage investitures to invest more in potential benefit sector – Health care sector, where in the last years the level of total annual IT investment is estimated at only 1.2% of all expenditures as compared to 2.5% in the USA and up to 10% (for ICT) and more in other information-intensive sectors such as financial services (The European Commission, Enterprise Directorate General, 2003).

Hospitals in most EU Member States are currently already well equipped with access equipment, access to advanced networks and access to the Internet. In other words, the technical basis for developing e-business applications is in most instances in place.

Figure 3 shows how many health care organizations in European Union had internet access in 2003 and how many employees were working that time in companies. Looking at employment-weighted country data, there are considerable variations ranging from 99% for establishments in the Netherlands and the Czech Republic, 97% in Estonia and 96% in Slovenia to levels below 70% for those in France, Poland and Italy. Noteworthily is the fact that for organizations in several of the new Member States values are above the EU-5 (DE, ES, FR, IT, UK) average (European Commission, Enterprise Directorate General 2004).

Figure 3. Health Care organizations having Internet access by country, 2003 year, %

Source: European Commission, Enterprise Directorate General, 2004

Eurobarometer surveys show that from 2001 to 2003 the usage of internet of general practitioners (GP) noticeably grew up. In 2002 an average of 78% of EU medical general practitioners were online, most of them were in Sweden - 98 %, 97 % - United Kingdom (see Figure 4).
The use of networks, including the Internet, to deliver patient care is also growing. On average in the European Union, 48% of medical practitioners use electronic health care records, and 46% use the Internet to transmit patient data to other care providers for the purposes of continuity of care. But a fully interactive use of the Internet to deliver care to patients through the provision, for example, of e-mail consultation (12%) or to enable patients to book appointments online (2%) appears to be only in its early stages (Communication from the commission to the council, the European Parliament, the economic and social committee and the committee of the regions, 2004).

Figures ranging from 2000 to 2002 show the different levels of Internet connection among Europe’s general practitioners, and the high levels of use for continuing education with low levels of use for telemedicine services (see Figure 5) (Communication from the commission to the council, the European Parliament, the economic and social committee and the committee of the regions, 2004).

Figure 5. General Practice’s connection to the Internet reasons and intensity in EU

<table>
<thead>
<tr>
<th>Reason</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPs with internet connection</td>
<td>44 %</td>
<td>77 %</td>
<td>78 %</td>
</tr>
<tr>
<td>• for continuing education</td>
<td>34 %</td>
<td>70 %</td>
<td>72 %</td>
</tr>
<tr>
<td>• to transfer patient medical data</td>
<td>9 %</td>
<td>37 %</td>
<td>46 %</td>
</tr>
<tr>
<td>• to offer telemedicine services</td>
<td>5 %</td>
<td>7 %</td>
<td>12 %</td>
</tr>
</tbody>
</table>

Source: Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the regions, 2004
Usage of ITT and creation of electronic health care systems attracts more consumers. The patients are given more information about their condition and choices, so they can take more responsibility for healthcare decisions. Eurobarometer survey shows that in 2003 23% of Europeans have used Internet for health information. 41% of the European population considered that the Internet is a good source of information on health (Communication from the commission to the council, the European Parliament, the economic and social committee and the committee of the regions, 2004). It is expected that Information Technologies will be used extensively for advice to, and follow-up of patients and that this will reduce queuing times (European Commission, 2006).

Concluding the study work, the statistical facts show that there are still a lot of gaps and work to fill in them developing electronic health system and adopting innovative business management solutions in it. Collaboration between different countries sharing the experience and organizing deep researches in implementation of business solutions in health care sector, also developing information society in all countries could make health care sector one of the leaders among all services sectors.

2.3.3 Electronic services development in European Countries

Contemporary people are getting fussier. In the first places they require for fast and qualitative services leaving the price in the place below. Modern customers usually are looking for complexity services, when they can get more coherent services in one place at the same time. This requirement suits for both natural and juridical persons as well for both public and private services’ providers. Regarding to the request of coherent services provision in one place Information Society Development Commission (2006) noticed further main characteristics of public services:

- quality of services;
- easy and rapid usage;
- public accessibility (Information Society Development Commission, 2006).

Services provided by using ICT could be called as electronic services (e-Services). For private e-Services provision, quality and accessibility responsible are private business administrators. Meaningly, business process providing e-Services could be called as e-Commerce. As European Commission agrees, e-Commerce refers to external transaction in goods or services between companies and consumers, supported by ICT (The European Commission, Enterprise Directorate General, 2004). Naturally, that for public e-Services provision responsible is public companies or government. Here comes the concept of e-Government. European Commission declare the aim of e-Government, which is to deliver better, more efficient public services and improve the relationship between citizens and their governments as well as reducing costs for both businesses and governments and encouraging administrations to be more user- centered and inclusive. To meet this aim, increasingly public bodies are creating websites for enterprises and citizens (European Communities, 2005). But having website and providing services on-line, doesn’t mean that this business will be very beneficial. The simple but main rule of business - to define and to pull in the customers - takes a significant role in e-Services provision. This declaration could sound jejune, but the idea is that consumers of e-Services can not be the same all consumers as they demand of the services providing in ordinary way. e-Services consumers must have minimal
computer literacy and access to Information and Communication Technologies. Nowadays it doesn’t look a big problem. So there is a potential of electronic services development.

As statistical data show (see Figure 6), citizens use Internet most for checking their mail in it, what amounts 78% of all Internet users. On the fifth place of priorities to use Internet the reason is Health, 40%. It means that citizens willingly look for health information and use e-health services in Internet. Most of individual persons use Internet to interact with public authorities only for look and obtain information and it takes 22% part of all Internet users in EU (see Figure 7).

Figure 6. Citizens’ connection to the Internet reasons and intensity in EU

![Graph showing various reasons for using the Internet and their percentages]

Source: European Communities, 2003

Figure 7. Individuals and enterprises use of Internet for interaction with public authorities in EU, 2004, %

![Graph showing the percentage of individuals and enterprises using the Internet for different purposes]

Source: European Communities, 2005
Concluding this chapter and answering the given question: how is the society ready to accept modern business methods and instruments in such an important subject as personal health?, could be made such notes:

Firstly, the Information society is not developed enough in all European Union countries. But there are some of them, which are very advanced in using ICT between private and business actors so those countries must be an example and guide other countries to rapid and beneficial development of Information society.

Secondly, it is interesting that almost all enterprises have Internet access and use Internet advantages, including e-Services, more than private persons. This fact means that the society must be prompted to use ICT more in their daily life. But here the help of Government is required, which should organize public lectures of computer literacy and enable people to have easy Internet access. In this time the European Commission applause such actions and budget this development from European Union Funds.

So the answer for previous question for this analysis is that bigger part of society already knows what ICT is and what it is helpful for, but because of lack of information more of them are not interested in the interactive services usage. It would be true to say that society is afraid to use online services for fear to get not qualitative and/or incomplete services. Because of this the further researches and publicized persuasive arguments of ICT advantages are required.

2.4 The link of e-Business and Health care sector

Is it possible to implement Information and Communication Technologies (ICT) in the process of health care provision?

This question will be answered analyzing what is electronic business and what kind of solutions impacts better and faster development of health care system.

The term "e-Business" is used in the broad sense, relating both to external and to company internal processes. There are included external communication and transaction functions, but also ICT supported flows of information within the company, for example, between departments and subsidiaries (The European Commission, Enterprise Directorate General, 2004).

As distinct from the broader concept of e-Business there is e-Commerce, which refers to external transactions in goods and services between companies (B2B) or between companies and consumers (B2C) and may therefore be seen as a subgroup or component of e-Business activities (The European Commission, Enterprise Directorate General, 2004). Olatokun, Ajiferuke (2006) mention two more models of e-Business. They are C2B (consumer to business) and C2C, transacting business only between customers.

The foundation of B2B e-Commerce, according to Haag et al. (2002), is electronic data interchange (EDI). EDI is the direct computer-to-computer transfer of transactions information contained in standard business documents such as invoices and purchase orders, in a standard format. EDI replaces paper documents with digital records exchanged between trading partners’ computers (Olatokun, Ajiferuke, 2006).
B2C involves e-Commerce sites that sell products and services, or provide information services directly to consumers. B2C (or retail) e-Commerce has spawned many new businesses that have no physical stores but can deliver a wide variety of goods and services on request (Olatokun, Ajiferuke, 2006).

As scientists from Nigeria Olatokun and Ajiferuke (2006) declare, C2B is e-Commerce in which the Internet makes it possible for many consumers who want to buy some or similar products to band together in order to obtain volume discounts from a business.

C2C involves consumers dealing with each other, either through an action site or directly in one of the peer to peer networking applications (Olatokun, Ajiferuke, 2006).

According to Deloitte and Touche (2003) recent study, with the growing of internet, information technology provide creditability to many areas including e-Health technology which is emerging as a new industrial, alongside pharmaceuticals, medical devices sector and on-line service, even to become the third largest industry in the European health sector. European businesses have every opportunity to become leading global players in this new industrial. It provides a convenient on-line service for consumer, at the same time, customer interest in on-line health information and e-Health service is growing as well (The European Commission, Enterprise Directorate General, 2004).

According to the sector report of European e-Business Market Watch 2003, a health care organization is not only comprised by its management, administration, professionals and staff, and means of healthcare delivery, but also by a functioning network of "business" partners that include its suppliers and customers. Thus, there are some relationships between e-Health carrier such as hospital or clinic and information technology company and patient or citizen which are indicated as business to consumer (B2C) and business to business (B2B) (Eysenbach, 2001). There is a model to show and explain detailed as following (see Figure 8):

![Figure 8. The relation between each actor](image)

Source: own edition according to Eysenbach, 2001
Part A in Exhibit 8 plays business role which includes information technology companies and some supply partners, B plays business and consumer roles which include many health care enterprises, C plays consumer role where end users - patients or citizens act. A supply the software or other components of e-Health system to customer B that form a relation as B2C, B supply the service to C also forming another relation as B2C. And B2B take place between each health care enterprise, such as there is cooperation when sometime they can share the patients’ personal information or treatment information, and like what we mentioned before, there is competition among them as well.

But there are always some disagreements and hindrances using basic e-business model such as B2B e-commerce in health care sector. To some extent, B2B e-commerce used in other sectors are applicable, but the fragmented structure of the sector is a major hindrance to the wider diffusion of such models. In addition, the public-private mix, third-party payments by insurance funds as the rule, or the asymmetric information available to the various players (patients; physicians; insurance funds which have to pay for what is deemed “appropriate” care) render it a rather specific field of application (The European Commission, Enterprise Directorate General, 2004).

Analyzed theories prompt an answer to the previous question about the conformity of ICT and Health care. It is clear that ICT helps to develop not only private business but public too, not only production business but provision of services too. e-Business are not obscurity anymore. It is necessary just to face it and use its advantages in company activities.

2.4.1 Value chain via e-Business and health care solutions

Living in information and information technologies century, to develop and secure the quality of services the health care institutions should use advantages of e-Business. But the solution to implement e-Business into health care system would get profits only after explored and unified interests and wishes of patients, doctors, nurses, hospitals and investors.

Developing above mentioned B2C model in health care enterprises the most important target is customers. To reach them and satisfy the demand in the business actors, services suppliers should collaborate together and work in partnership adding value across the entire value chain. The meaning of the value chain is that success is dependent on the effectiveness of the working relationship between the members of the supply chain, the speed and openness of information sharing and the degree of collaboration between suppliers and customers, with the objective of adding value and removing transaction costs (Doole, Lowe, 2004). Further the value chain could be resulted in a larger set of processes – the value system (see Figure 9). e-Commerce, i.e. electronic transactions, occurs within this value system (The European Commission, Enterprise and Industry Directorate General, 2006). According to Richardson’s (1992) primary activities consists of in-bound logistics (receiving request or data); operations (activities which transform inputs into final service offers); out-bound logistics (storage of data or giving answer to request, it is the final service); marketing and sales (the attracting and serving of clients); and service (after-sales service).
Support activities

Firm infrastructure
Human Resources Management
Technology development
Procurement

Inbound Logistics  Operations  Outbound Logistics  Marketing and sales  Service

Primary activities

Source: Adapted from ICT and e-Business in Hospital Activities. ICT adoption and e-business activity in 2006

Support activities act as back-up to primary activities and each other. They include procurement, technology development, human recourse development and firm infrastructure (Richardson, Richardson, 1992). Value chain is important because of its internal and external linkages which impacts organizational success, according to business activity researches Richarsons.

2.4.2 Management of Supply Chain in e-Business

Key dimensions of value chain framework (notably inbound and outbound logistics, operations, and the value system) are reflected in the Supply Chain Management (SCM) concept (The European Commission, Enterprise and Industry Directorate General, 2006). Technology enabled supply chain management helps firms to grow through exploiting market development opportunities, reducing investment but it is vital to maximize added value by integrating the activities (O’Brien, 2006). According to O’Brien (2006), Supply Chain Management is a cross-functional interenterprise system that uses Information Technology to help support and manage the links between some of a company’s key business processes and those of its suppliers, customers, and business partners. The goal of SCM is to create a fast, efficient, and low-cost network of business relationships, or supply chain, to get a company’s products from concept to market (O’Brien, 2006).

Creation and development of the value system and SCM is marketing solutions to organize the work better and faster, save costs of activities, but there is need to make a solution how to attract and retain customers. Customer Relationship Management (CRM) strategy is the best for it.

2.4.3 Customer Relationship Management

Companies are turning to CRM to improve their customers focus. CRM uses information technology to create a cross-functional enterprise system that integrates and automates many of the customer-serving processes in sales, marketing, and customer services that interact with a company’s customers (O’Brien, 2006). To deliver a CRM solution the key component is the database of customer information. Techniques and systems are used to manage and extract data to
identify trends and analyze customer characteristics that enable the targeting to be carried out (Doole, Lowe, 2004). O’Brien (2006) marks four types of CRM which are used in many companies today (see Table 3).

Table 3. Business value according to different types of CRM

<table>
<thead>
<tr>
<th>Types of CRM</th>
<th>Business value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational CRM</td>
<td>• Supports customer interaction with greater convenience through a variety of channels, including phone, fax, e-mail, chat, and mobile devices</td>
</tr>
<tr>
<td></td>
<td>• Synchronizes customer interactions consistently across all channels</td>
</tr>
<tr>
<td></td>
<td>• Makes company easier to do business with</td>
</tr>
<tr>
<td>Analytical CRM</td>
<td>• Extract in depth customer history, preferences, and profitability information from your data warehouse and other databases</td>
</tr>
<tr>
<td></td>
<td>• Allows to analyze, predict, and derive customer value and behavior and forecast demand</td>
</tr>
<tr>
<td></td>
<td>• Lets company approach customers with relevant information and offers that are tailored to their needs</td>
</tr>
<tr>
<td>Collaborative CRM</td>
<td>• Enables easy collaboration with customers, suppliers, and partners</td>
</tr>
<tr>
<td></td>
<td>• Improves efficiency and integration throughout the supply chain</td>
</tr>
<tr>
<td></td>
<td>• Allows greater responsiveness to customer needs through sourcing of products and services outside of enterprise</td>
</tr>
<tr>
<td>Portal-based CRM</td>
<td>• Provides all users with the tools and information that fit their individual roles and preferences</td>
</tr>
<tr>
<td></td>
<td>• Empowers all employees to respond to customer demands more quickly and become truly customer-focused</td>
</tr>
<tr>
<td></td>
<td>• Provides the capability to instantly access, link, and use all internal and external customer information</td>
</tr>
</tbody>
</table>


In Table 3 outlined CRM categories may also be viewed as stages or trends in how many companies implement CRM applications, and the figure also outlines some of the capabilities of CRM software products. Most businesses start out with operational CRM systems such as sales force automation and customer service centers. Then analytical CRM applications are implemented using several analytical marketing tools, such as data mining, to extract vital data about customers and prospects for targeted marketing campaigns. Increasingly, businesses are moving to collaborative CRM systems, to involve business partners as well as customers in collaborative customer services. This includes systems for customer self-services and feedback, as well as partner relationship management systems (O’Brien, 2006).

Concluding the information in this section, a union of markets and integration of e-Business solutions such as supply chain management and customer relationship management in health care system would let properly and qualitatively organize the process of services provision; the services would become much more streamlined and will cover much wider fields than today. Of course, that would increase the competition between services providers. But if they improve themselves and are ready to do more than they are able to do now they will survive. As it is known from business theory, the competition simply stimulates market runners to improve themselves and their services for customers too.
2.4.4 Internet as the core of the development of Health care B2C model

Almost forty years ago internet was developed into unstructured computer network linking users around the world (Doole, Lowe, 2004). Nowadays the role of the Internet is very important for business users. According to Doole and Lowe (2004) for e-Business the role of the Internet is to provide global marketplace which is open to everyone and particularly:

- a method of collecting and exchanging marketing and business information;
- an alternative route to market to traditional distribution channels;
- a means of building customer relationships;
- a device for the digital delivery of certain information services;
- a networked system for managing the supply chain; and
- a virtual marketplace, trading floor and auction house (Doole, Lowe, 2004).

To provide services and information on-line it is necessary to create special websites, which would be accessible to the target group. Developing health care enterprises there is a need to create web-pages where customer (citizens, patients) could see all information about enterprise, doctors working in, their working time table and etc.

Commission of the European Communities (2002) decided to estimate quality criteria for special health related websites. According to the report of the Commission the criteria should be used as a basis in the development of user guides, voluntary codes of conduct, trust marks, accreditation systems, or any other initiative adopted by relevant parties, at European, national, regional or organizational level. By using a common set of criteria as a starting point, such initiatives can develop in a focused manner across the European Union (Communication from the commission to the council, the European Parliament, the economic and social committee and the committee of the regions, 2002). European Commission agrees with differences of law in each European country too, so it is required those criteria (see Appendix 2) apply in addition to relevant Community law.

The Commission of the European Communities (2002) designed those criteria to be applicable to the development and maintenance of health related site irrespective of the type of information or audience to whom the information is targeted. However, one essential quality criterion is that a health-related website should state clearly what is its target audience and that care should be taken to ensure that both the style and nature of the information, and its presentation, are appropriate for the chosen audience (Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions, 2002). This European Commission statement is convenient answering the question of Section 2.4: Is it possible to implement Information and Communication Technologies (ICT) in the process of health care provision?

Yes, it is possible to use Information Technologies delivering Health care services and reach the proportion of delivering quality and satisfaction even bigger than providing services in natural way. The fair theorists and researches have analyzed the situation how ICT implementation will influence health care delivery system. They identified some advantages and disadvantages of ICT usage but there were no negative answer denoted. Therefore, it is certain, that ICT can be implemented into health care system but it is not admitted to forget that to succeed the collaboration between health care centers, government and customers must be well rounded and unaffected.

When it is deduced the compatibility of ICT and health care system, further in the section 2.5 the concept of electronic health will be analyzed and the e-Health system work process concerned.
2.5 Theory of e-Health

In the previous sections there were presented features of Health care institutions management, e-Business solutions were discussed relating to the health care business. Finally in this section the consolidated concept of e-Business and health care management relation – e-Health will be described. As this concept is quite new, therefore, the description of e-Health will be appealed to practical experience more.

In many reports of European Commission, in strategies of European Countries, everywhere is stated the lack of theories about e-Health. It is because the concepts of “Information and Telecommunication Technology”, “Information Society” are the newest revolutionary approaches for the last tens years. As it is known (see section 2.4), e-Health is close related with modern business – e-Business. It means that e-Health concept is come up after e-Business started to be analyzed deeper. This should explain why e-Health concept is quite new and there are not a lot of proofed theories explaining how e-Health business should work. The need of more and wider defined e-Health concepts requires for further researches. The research and conclusions of it will be explained and analyzed in further chapters 4 and 5.

In this section the main ideas and definitions of e-Health will be studied and defined the priorities of e-Health creation, explaining why and to whom it is useful to develop Health care system involving Information and Telecommunication Technologies.

2.5.1 Priorities of e-Health creation

Information Communication and Technologies make a business global. Not an exception is the government administration together with public organizations, where Health security system plays an important role. To manage healthcare system in global world many ICT services are required which application would be effective collaborating strategically with other countries organizing practical seminars or making researches in groups of people from different countries. The advantageous R&D organization and modern Information Technologies implementation in health care system would reduce expenditures of health care providers and government as well, waiting time would be shorter. All those advantages would increase the quality of services.

The creation of e-Health interests developing countries, where health system requires being developed and renewed. For example, Lithuania is rapidly developing country for ten years, but the healthcare system of this country started to be developed only a couple years ago when the situation alerted to pay more attention on health system. In 2005 (Ministry of Health of Republic of Lithuania, 2004) the Strategy of Electronic Health was formed for 5 years in advance and the Ministry of Health of the Republic of Lithuania started first movements to modernize health care system.

According to Lithuanian e-Health Strategy, the Commission of the European Communities and Information Society and Media Directorate-General the priorities of e-Health system creation could be settled and used by other countries where analyzing system is not developed well. It is important to mention that the priorities must be formed according to different situations in each country, but as a guide the list of priorities should follow next actions:

1. Development of Information Technologies in the primary, secondary and acute health care gains: The creation of various databases and system of integral registers would be effective assuring active and versatile collaboration between all levels of health care organizations (Ministry of Health of Republic of Lithuania, 2004);
2. **Commitment and involvement of all stakeholders:** All phases of eHealth development, implementation and deployment have to be supported by citizens/patients, health providers, industry, authorities, and third party payers (Stroetmann, Jones, Dobrev, Stroetmann, 2006);

3. **Development of Information Technologies managing prevention of diseases, public health:** Creation of information portals, libraries, committed to community and specialist of health care system, the increase of register integrity would let citizens, students, specialist, administrators to find relevant information about health and administration of health system. Such aim would assume the reduction of public morbidity and the administration of health system and its recourses would be more effective (Ministry of Health of Republic of Lithuania, 2004);

4. **Regular assessment of costs, incentives and benefits for all stakeholders:** Considering purely financial return on investment at an institutional level, or potential benefits for only one of the stakeholders, may lead to suboptimal decisions. Particular attention should be paid to include all users, some of whom are often neglected in such assessments (Stroetmann, Jones, Dobrev, Stroetmann, 2006);

5. **Strong health policy and clinical leadership that guides a flexible and regularly reviewed eHealth strategy:** While the strategy should be directed by a long term vision of a citizen-centered health delivery system, it must address concrete needs of actors in the system. The strategy should include achievable, shorter term goals that create an e-Health investment dynamic (Stroetmann, Jones, Dobrev, Stroetmann, 2006) and as European Commission recommends, “a big-bang approach with ambitious goals to be achieved over a short period of time” would not lead health system to be beneficial;

6. **Organizational changes in clinical and working practices:** This is indispensable in order to optimize the use of ICT-enabled solutions and realize the benefits. Such changes should be facilitated by greater legal certainty in using e-Health solutions.

7. **Strong clinical leadership, good organizational change management, multi-disciplinary teams with a well-grounded experience in ICT and clear incentives:** The combination of skills of the people involved will make the difference between success and failure, not the specific e-Health solution (Stroetmann, Jones, Dobrev, Stroetmann, 2006). The Commission of the European Communities, Information Society and Media Directorate-General maintain, that creating and developing health care system it is essential to develop people skills through continuous education and training;

8. **Long term perspective, endurance and patience:** Health is an important indicative of countries living conditions. Therefore, health system must be developing not in rush, but taking time and patience planning strategic actions. In the report of the European Commission, Information Society and Media Directorate-General (2006) it is approved that development of health system “takes a considerable amount of time (about 5 years) to mature and develop its potential fully”. 

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ICT implementation in health care processes is leaded to patient, according to his/her needs, to the development of attendance quality and especially to the quality of treatment. Implant the e-Health system, Lithuanian Ministry of Health and Commission of European Health expect that it will be beneficial for both patients and specialists. In the plan of e-Health development in developing country Lithuania is sorted into groups of the benefit receivers as follow below:

The benefit for the patient (Ministry of Health of Republic of Lithuania, 2003):

1. Saving time;
2. Successful treatment;
3. Attention to patient.

The benefit for the health care specialists. Dimension of treatment quality improvement (Ministry of Health of Republic of Lithuania, 2003):

1. Qualitative and timely diagnosis:
   - Repeatable and unnecessary examination would be avoided;
   - The dynamic of patients condition would be ensured;
   - Patient constantly would be informed about illness progress or regress;
   - There would be possibility to diagnose the disease earlier.
2. Enlarged possibility to get methodical help.
3. Presentation of data for clinical researches and scientific activities.

The benefit for the health care specialists. Dimension of administration quality improvement (Ministry of Health of Republic of Lithuania, 2003):

1. Disappears the problem of the paper patient card storage. It would be changed in electronic patient cards;
2. Disappears the problem of the data transmission, conveyance;
3. Electronic prescription would efficient the prescribing process and solve cost saving problems;
4. Electronic registration release work of staff, improve medics’ time planning, reduce registration time and possibility of mistakes;
5. The problems of statistical data processing and transfer would be solved by timely gathering data in the system.

According to above mentioned e-Health creation priorities and benefits implementing it, concluding, e-Health system would inure to citizens and patients giving an opportunity to choose services provider according to his/her real activity results, with expedition to get essential information about illness. Development of ICT and implementation of new methods and standards would encourage the reorganization of all health care system, increase qualification of medical staff and quicken the modernization of system and effectiveness of providing services.
2.5.2 Comparative description of e-Health conceptions

There are getting more and more people talking about e-health these days, but few people have come up with a clear definition of this comparatively new term. Barely in use before 1999, has this term now seemed to serve as a general "buzzword," used to characterize not only "Internet medicine", but also virtually everything related to computers and medicine (Eysenbach, 2001). As the editor of Journal of Medical Internet Research maintains, the term e-Health firstly was used “by industry leaders and marketing people rather than academics. They created and used this term in line with other 'e-words' such as e-commerce, e-business, e-solutions in an attempt to convey the promises, principles, excitement around electronic commerce to the health arena”. Accordingly, the question arises:

Does e-Health mean the set of ICT applied to health care delivery?

In the report of electronic health strategy in Lithuania for 2005 – 2010, e-Health is strictly associated with the Internet, focusing on the growing importance of this medium in health transactions. In the strategy e-Health is defined as “modern information and communication technology application to satisfy requirements of citizens, patients, and specialists of health care, health care providers, administrators and politics”. But the president of Marketing Technology & Metrics Incorporation, David J. Sternberg (2004) declares implementation of modern technologies is intended “to help people deliver healthcare services - not replace them”. Hence, does it mean that e-Health is not only a set of technologies and management, collaboration and direct services delivery persists in an important place?

Description by Eysenbach (2001) could answer this question. He describes e-Health as “an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology”. Scientist Kwankam (2004) agree with Eysenbach’s opinion and declare that “e-Health is an all-encompassing term for the combined use in the health sector of electronic Information and Communication Technology (ICT) for clinical, educational, research and administrative purposes, both at the local site and at a distance. It lies at the intersection of medical informatics, public health and business” (Kwankam, 2004).

In the context of eEurope e-Health is understandable as adaptation of different information technologies, communication functions and services, which in one or other way impact persons and patients health in three main fields:

- When health care is effected by specialists of health care;
- With health and patient related information;
- E-commerce with health care products (medicaments) (Ministry of Health of Republic of Lithuania, 2003).
Eysenbach (2001) introduce an interesting but correct and reasoned idea that "the "e" in e-Health does not only stand for "electronic," but implies a number of other "e's," which together perhaps best characterize what e-Health is all about (or what it should be). The scientist presents following 10 “e” beginning words related to e-Health (Eysenbach, 2001):

1. **Efficiency** - one of the promises of e-health is to increase efficiency in health care, thereby decreasing costs. One possible way of decreasing costs would be by avoiding duplicative or unnecessary diagnostic or therapeutic interventions, through enhanced communication possibilities between health care establishments, and through patient involvement.

2. **Enhancing quality** of care - increasing efficiency involves not only reducing costs, but at the same time improving quality. E-health may enhance the quality of health care for example by allowing comparisons between different providers, involving consumers as additional power for quality assurance, and directing patient streams to the best quality providers.

3. **Evidence based** - e-Health interventions should be evidence-based in a sense that their effectiveness and efficiency should not be assumed but proven by rigorous scientific evaluation. As Eysenbach say, “much work still has to be done in this area”.

4. **Empowerment** of consumers and patients - by making the knowledge bases of medicine and personal electronic records accessible to consumers over the Internet, e-health opens new avenues for patient-centered medicine, and enables evidence-based patient choice.

5. **Encouragement** of a new relationship between the patient and health professional, towards a true partnership, where decisions are made in a shared manner.

6. **Education** of physicians through online sources (continuing medical education) and consumers (health education, tailored preventive information for consumers).

7. **Enabling** information exchange and communication in a standardized way between health care establishments. Here could be used clinical applications as tele-consultations, transmission of electronic medical records, clinical decision support system, watch of life signals and homecare systems (Ministry of Health of Republic of Lithuania, 2004).

8. **Extending** the scope of health care beyond its conventional boundaries. This is meant in both a geographical sense as well as in a conceptual sense. E-Health enables consumers to easily obtain health services online from global providers. These services can range from simple advice to more complex interventions or products.

9. **Ethics** - e-Health involves new forms of patient-physician interaction and poses new challenges and threats to ethical issues such as online professional practice, informed consent, privacy and equity issues.

10. **Equity** - to make health care more equitable is one of the promises of e-Health, but at the same time there is a considerable threat that e-Health may deepen the gap between the "haves" and "have-nots". People, who do not have the money, skills, and access to computers and networks, cannot use computers effectively. As a result, these patient populations (which would actually benefit the most from health information) are those who are the least likely to benefit from advances in information technology, unless political measures ensure equitable access for all. The digital divide currently runs between rural vs. urban populations, rich vs. poor, young vs. old, male vs. female people, and between neglected/rare vs. common diseases (Eysenbach, 2001).
By the means of previous definitions and features of e-Health starting with “e” or not, the essential measures to organize e-health could be deduced as following:

- Information technologies and telecommunications;
- The knowledge of informatics;
- Public health;
- The providers of health care;
- The consumers of health care.

Previous five fundamental components of e-health give the sense to this system. Without them e-Health would lose its essence. To ensure the existence of all components and the continues work of e-Health system European Commission (2003) and Ministry of Health of Republic of Lithuania (2003) suggest countries to collaborate with other countries and share the experience. The good example could be Danish health care system where the projects MedCom1 and MedCom2 were organized and substantially improved the work conditions and quality of General Practitioners (GP): more than 90% of Danish GP have and use computers at work, what daily saves one hour of their work time. The quality of services enhances because of access to electronic health history and to the information about timetables of specialists, about medicines and so doctor can be precise and decree faster. In Denmark approximately 2 million messages per month are delivered in electronic way and it amounts 70% of all health data transmission in the primary health care level (Ministry of Health of Republic of Lithuania, 2004). As a successful example could be e-Health strategy practicable in Great Britain. The essence of this strategy – to increase efficiency of e-Health system investing in electronic patient records, where the main information about patient is stored and electronic health history, where the information about medical institutions records is kept (Ministry of Health of Republic of Lithuania, 2003). The success of Great Britain e-Health strategy was determined by keeping main principals:

- Information must be concentrated to patient;
- Systems must be integrated; administrative information must be output of clinical information;
- Information must be accessible, confidential and safe (Ministry of Health of Republic of Lithuania, 2003).

Swedish SJUNET network is advantageous because of increasing effectiveness delivering e-Health, telemedicine services, organizing transaction of information and collaborating between health care institutions. This network incorporates around 80 state hospitals, 800 primary health care centers, 900 pharmacies and some private health care institutions (Ministry of Health of Republic of Lithuania, 2003).
In consequence, collaboration and share of both information and practical experience between European Countries advanced in e-Health developing, such as Denmark, Germany, United Kingdom, Spain, Sweden, and countries where e-Health system is just on the initial stage would forward unify European market. As European Commission (2004) refer, this will not concern product innovation in the manufacturing sense, but rather obtain a specific meaning for further integration of the health and care services chain.

Such integration will follow along two major dimensions:

- a geographic dimension from the local to the regional and global;
- a service chain dimension, both internal to an organization (such as following a clinical path), and external in terms of continuity of care (The European Commission, Enterprise Directorate General, 2004).

Concluding, a union of markets and integration of e-business solutions in health care system will let properly and qualitatively organize the process of services supply; the services will become much more streamlined and will cover much wider fields than they are today. Certainly, that will increase the competition between services providers. But if they improve themselves and will be ready to do more than they are able to do now, then health care providers will survive. Further the competition stimulate market runners to improve themselves and pursue the “one-stop” service approach what is the biggest aim of e-Health system.

2.6 Conclusion

In this chapter fundamentals of e-Health were presented. The discussion started setting fundamentals of Health care institutions business in general accomplishing this idea by business management using Information Technologies and so approach the e-Health business. Concluding secondary data supported information presented in this chapter three main components of e-Health could be accentuated: e-Business - the core of e-Health, Information and Communication Technology – the engine of e-Health, the Information society – the customers of e-Health. Those three mentioned components create value chain of electronic services provision supporting it by effective management of supply chain and customer relationship leading e-Health system to work beneficial.
3. METHODOLOGY OF RESEARCH

3.1 Introduction

After presenting scientific definitions of objects related to research and some findings in previous researches in this chapter the methodology, used to collect and process the data which will be useful realizing the tasks of research and answering the research question, will be described. This chapter will be focused on the guidelines how research of e-Health in two representative European countries will be made. To investigate those two countries the method, type and instruments of research will be defined in methodology chapter also the population and sampling method used in the research will be explained.

This part of study will be appealed to modern and already leading theories. The propositions of internationally conferment scientists as Gummesson (1988), Bovee, Thill (1992), Yin (1994) and Aaker, Kumar and Day (1997), also Jacobsen (1993) and Tidikis (2003) will guide to make an efficient research. Thus a deductive approach will be pursued that will lead author to think and come up with new ideas about research object.

3.2 Justification for the methodology

The purpose of the research is to investigate European countries, which use Information and Communication Technologies improving Health care system. Because the quantity of scientific and proved theories about e-Health is scared, therefore to make the research was decided to compare two European countries. One of those countries should be advanced in developing e-Health system and have useful experience to share with others developers. As representative country with such features Denmark was chosen for the research. The second country should be European country just started to implement e-Health model and develop this system. As country with such situation Lithuania was chosen. The purpose of this country investigation was to know what problems could be met at the beginning of development e-Health system nowadays and what deficiency countries met for effective and fully integration of Information and Communication Technology in health care sector. According to this information, comparison with advanced e-Health system development process and its advantages and disadvantages, author was led to give beneficial suggestions how to improve development of e-Health.

To make a research author chose special type and methods according to the situation of research object. The chosen type of research depends on what was expected to get out of the project (Bovee, Thill, 1992). As the methods of research qualitative and quantitative researches are. Usually qualitative research is supported by quantitative to describe the research object more precisely (Aaker, et. al., 1997, Bovee, Thill, 1992). Contrary in this thesis, the quantitative research led to qualitative research investigating the representative country Lithuania. To support Lithuanian research with quantitative method author decided when the lack of secondary data about the demand of e-Health services was met. Information about acceptance and usage of electronic health care services in Denmark was found on secondary data; therefore to investigate the demand, on which the development of e-Health system is based, there were no need. Thus it was decided firstly to hypothesize investigating Lithuanian e-Health situation.
The method which should be chosen for further and final investigation will be influenced by the answer of hypothesis which will be committed or denied according to the results of organized survey.

**Hypothesis:** *Most of Lithuanian people are acquainted with electronic health services very well*

Because hypothesis of this study is committed to the breadth population – The Republic of Lithuania, therefore the *quantitative research* has been made first. This was concerned by scientist Tidikis (2003), when it is expected to get some answers from a wide population the quantitative research is very useful for investigator. If the hypothesis would be sustained, then other quantitative research would be made investigating what population expects from research object – e-Health. If the hypothesis would be denied, then the qualitative research would be organized investigating the situation of research object deeper in Lithuania and comparing gathered data with data collected qualitatively investigating Danish e-Health system which is considered as the example of e-Health development.

Qualitative method of research provides insights into the problem and in developing approach by generating relevant research questions and hypothesis, models and characteristics which influence the research design (Doole, Lowe, 2004). Such a method would be useful analyzing situation what it is in Lithuania or in other European countries developing e-Health system. Due to the qualitative research purpose to investigate the situation deeper and better than it is presented on secondary data, one of the qualitative research types – *exploratory research* – would be chosen. Exploratory research is useful defining problems in more details, generating service concepts and problem solutions (Aaker, Kumar and Day, 1997). As e-Health concept is relatively new, there is limited amount of researches concerning to this topic. Especially it is relevant in Lithuania, where the appropriate health care services are just at the initial stage of development. Using qualitative research author has found that it would be the best mean to analyze the real situation. *Individual interview* accomplished by other studied case results of Danish e-Health system are proper instrument of qualitative research to reach the aim.

### 3.3 Research procedures

In the previous subsections author introduced the framework of how and why one or other research method is going to be used. In this part the process of all research will be described including sources of information, types of data collection and their analysis.

Research is going to be made sequencing the plan of procedures after setting the purpose and objective of research:

1. Information setting;
2. Literature using;
3. Case study;
4. Data collecting;
5. Data processing;
6. Data analysis;

The research has been finished concluding all the information, what was processed of data gathered during the whole research process.
3.3.1 Information setting

The search of information started in Swedish and Lithuanian scientific libraries and online database. As many people as possible from different countries were questioned informal to get first ideas about the situation of e-Health in all countries. Those findings guided to the problem on which the research should be made and directed to the way realizing the purpose of studies – to investigate European countries with different e-Health development levels answering the research question: How European countries develop e-Health using ICT in their Health care system? To increase knowledge about e-Health system and its actors, how they interact with each other and which parts of system require further researches, secondary data were collected.

Secondary data are data that were collected by persons or agencies for purposes other than solving the problem at hand (Aaker, Kumar and Day, 1997). This data were located from external sources – published data sources and Internet. The major published sources are the various government publications, periodicals and journals, publicly available reports from private groups as foundations, publishers, unions and companies (Aaker, Kumar and Day, 1997). As for computer retrievable secondary databases, more on-line databases were used looking for information. According to Aaker, Kumar and Day (1997) on-line databases can be accessed in real time directly from the procedures of the database or through the vendor. Searches of information in on-line databases significantly reduced the time of author required for the search and helped to concentrate more on the research not on the bringing data. For the search of articles and secondary statistical data the author had an access to databases as EBSCO, LIBRIS, FACTIVA, EUROSTAT and STAT. As for external secondary data sources used in study work, the business publications, Government and European Commission studies must be mentioned.

To support secondary data the primary data have been collected too. Primary data are collected especially to address a specific research objective (Aaker, Kumar and Day, 1997). Collecting primary data in this study work qualitative and quantitative research methods where employed making a survey and case studies using individual in-depth interview.

3.3.2 Literature using

To support argumentations strongly plenty of relevant theories and some original models as a powerful foundation in the study were used. The part of theory became the foundation for further analysis and researches in e-Health. As foundation of theoretical framework became secondary data. Collecting secondary data the information was found which helped pinpoint the problem, refine hypothesis and specify the data wanted to be collected (Bovee, Thill, 1992). Theoretical framework was composed as guidelines for the further deeper research in electronic health care system. The theories and predicates of leading scientist as Porter (1998) - Value Chain Model; Doole, Lowe (2004), O’Brien (2006) – Supply Chain Management and Customer Relationship Management concepts; Eysenbach (2001) - e-Commerce models (B2B, B2C); Toffler (1981), Rathmell (1974) - The Third Wave concept; Webster (2006) - The concept of Information Society. Analysis of those concepts became the foundation for qualitative and quantitative researches.

Due to the nature of chosen topic – e-Health, which has not been investigated many times by many researchers, thus the fundamental ideas were based upon the reports and directorates of Government institutions from different countries and European Union directorates as well.
3.3.3 Survey

Survey is a research technique in which data are systematically collected directly from the people being studied by using questionnaire (Bovee, Thill, 1992). In theory references there are mentioned only some methods of how survey should be made. Usually there are abstracted methods as mail survey, telephone survey and personal survey, but living in information age the new and advantages method of survey should be used. This method could be survey on Internet which was used in this study work too. As Aaker, Kumar and Day (1997) maintain, collection of primary information over the Internet is still in its incubation stage therefore such method is used with caution. In this study work at the beginning of research in representative country Lithuania the hypothesis were raised, which should settle the chosen method of further research.

Hypothesis: Most of Lithuanian people are acquaint with electronic health services very well.

On purpose to justify or deny the hypothesis there was given only one question for people. To get as much precise data as possible corresponded to breadth population, the survey was made using on-line method through interactive forms which are filled out on the screen (Aaker, Kumar and Day, 1997). Such on-line survey method was chosen because it allowed author to reach the target segment more effectively (Aaker, Kumar and Day, 1997). The research question was about the usage of electronic services. Thus on purpose to know how many people know and use electronic health services was very advantageous first to ask people who have an access and ability to use Internet. If the hypothesis that most of Lithuanian people are acquaint with electronic health services very well would be justified, it would mean that further research should be made to clarify wishes of current and potential e-Health customers. In case the hypothesis was denied, therefore the further research was made to clarify what is wrong with current e-Health system and guided to make suggestions how it could be improved.

The question of survey was published on the biggest Lithuanian news portal www.delfi.lt (see appendix 3). Approximately 25% of all Lithuanian people are unique visitors of this website (Gemius Baltic, 2007). On this website the information is intended to various audiences of visitors. As it is announced on the website www.delfi.lt (2007 03 25) the age of visitors approximately is 35 years and the employment of visitors vary from students, cultivators, businessmen till unemployed. Therefore to make a survey on the biggest, most attendance and various visitors attracting Lithuanian news website was a good choice of author to make an effective survey for public opinion about electronic health services.

The publication of question was initiated by author contacting with administrator of www.delfi.lt administrator. The contact was found on the same website, where the question was published. At the beginning there were met some problems, because, according to the rules settled by the administration of website, the announcement of day question can not be bought or promised by everyone’s query, additionally, the question must be related to the news of day. But finally the problem was gone and administrator agreed to publish question offered by the author. The administrator became more interested in the offer of day question when the topic of question was clarified. The administrator suddenly asked to send the question and possible answers via e-mail. Next day author got a confirmation letter from an administrator that the question will be announced coming night. The question was published on the website on the night of Friday (2007 04 20) and it was available till the midnight of Saturday (2007 04 21). Thus the question was open and accessible to everyone 24 hours. During the survey the activity reached 8039 respondents. On weekend before, announced question about political activity, the quantity of
respondents was less than it was of question announced by author. This could mean that the question and topic about electronic health services were more interesting and attractive not only for administrator of website but for the people too.

Concluding, the on-line survey, including negotiation and publication period, took only two and a half day. The result of this survey – investigated more than 8000 respondents from all country with different age and employment. Such a result would not be achieved during the same time using ordinary method of survey.

3.3.4 Multiple-Case study

Since the hypothesis of research is denied, the case study is chosen to make a deeper research of new concept in representative European country Lithuania comparing it with issue of Danish e-Health system investigation. Because relevant study is a new and developing scientific area, it seemed to obtain an exploratory view by new concept, and the purpose of this study was to come up with some suggestions on the improvement of the existing e-Health system which could be employed later in the countries where health care sector is not well developed yet. Thus a deductive approach was pursued what leaded author to think and come up with new ideas. A case study was chosen to provide research with the opportunity to challenge or confront models, theories (Gummesson, 1988) and to enhance understanding of different international patterns (Eisenhardt, 1989). According to reference of Aaker, Kumar and Day (1997) the data for a case study of Lithuania were obtained from interview with head person of representative e-Health services providing company in Lithuania and combining them with secondary data gathered from the other case study of Danish e-Health systems.

Yin (1994) declares that a multiple-case study is preferred in many scenarios since the analytic conclusions from more than one case study will be more powerful than from a single case study. Therefore, willing to give beneficial conclusions two-case study was chosen. Of course, as Yin (1994) maintained, there were dangerous to loose focus on the real purpose of the study by using cases. But especially not to loose the focus, in this study work there were two different e-Health situations chosen which could really support each other in developing process.

As for a cases study first the Danish electronic health care system MedCom was chosen. This system already works more than ten years and the beneficial issues of development of this system arise every five years, therefore MedCom system could be treated as an example for countries developing e-Health system. MedCom was analyzed in all its activities according to how they were developed during the life period. Analysis was made regarding three dimensions:

- Value chain management
- Supply chain management
- Customer relationship management.

Those three features will be as a tool comparing activities of electronic health services provider in Lithuania too.

Findings in Danish case study guided to make an effective analysis of unique Lithuanian e-Health services provider Vilnius University Hospital Santariškių Klinikos. To Lithuanian case analysis the individual in-depth interview was made with Romualdas Jonas Kizlaitis - Head Manager of Informatics and Development department in Vilnius University Hospital Santariškių Klinikos. Deep interview gave rich information on how the main support systems of e-Health business – value chain, supply chain and customer relationship management activities could be changed and improved and lead to beneficial suggestions on whole e-Health systems improvement.
3.3.4.1 Sampling method

When the aim of study was defined and some secondary information was collected there came a demand of research respondents. On purpose to make a research which issue is related to breadth population – Information Society of representative European country, there were important to choose good, purposive respondents for a case study. Author was thinking about many e-Health system examples in different European and even American countries. But later the population of possible countries was limited within European Union countries, because this continent is more convenient for the author and in case, more relative information could be found faster and effective. As a base of comparative case study there were ideas to analyze German, Swedish, UK, and Danish or Spanish e-Health system because of the high development level of e-Health services comparing with other European countries. But finally, to choose the country the main features were defined. They were:

- **The variety of services**
- **Lifetime of system.**

In most of countries only a few electronic services are provided, and if e-Health system is known in this country, so just because of one or two well developed services. Danish e-Health system is very wide and supplies many types of services, the most than other countries, thus this was the first confirmation why Danish system should be chosen. Analyzing systems according to their working time, system in Denmark took first place again, because Denmark was the first European Union country where e-Health started to be developed. Thus Danish e-Health system MedCom became as practical, well developed sample of research.

To choose other sample for making deeper research was easier, because it was chosen the European Union country – Lithuania, where author lives. Thus in this case the convenience sample method was chosen. According to Bovee and Thill (1992) the convenience sample could be chosen because the members of this sample are convenient or readily available. Lithuanian country is advantageous for making researches too because of its not so developed health care system as it is in other European countries. As a respondent in this country the initiator of e-Health system creation and still one developer of this system were chosen. This system doesn’t have special name as it is in Denmark, but author calls it as e-Health system in [Vilnius University Hospital Santariškių Klinikos](#).

Consequently, as for a case study there were chosen two of the relatively best samples, one is considered as the advantageous in whole Europe, another one is the best in developing European Union country convenient for the author.

3.3.4.2 Respondents selection

On purpose to make deeper research in Lithuanian e-Health system, for an interview were chosen two closest persons to this system. First respondent was – administrator of system. Administrator Romualdas Jonas Kizlaitis is Head of Informatics and Development department in analyzed clinics too. The information got from Mr. Kizlaitis was useful analyzing e-Health processes from the beginning, finding out the steps and tactic of system’s creation and plans for further development. Concluding, the sustainability point of view was examined. In order to perceive customers relations point of view, Mr. Kizlaitis suggested author to contact with e-Health project manager Miss Ieva Lukošaitytė working in his department too.
3.3.4.3 Interview

In the case study there was made individual in-depth interview. Such interview is conducted face to face with the respondent, in which the subject matter of the interview is explored in details (Aaker, Kumar and Day, 1997). Respondents of this research, Mr. Kizlaitis and Miss Lukošaitytė during the interview about electronic health services could respond as freely as they wanted. This type of interview is called nondirective, when respondent is given maximum freedom to respond, within the bounds of topics of interest to the interviewer (Aaker, Kumar and Day, 1997). This free respond gave to the author beneficial and more information than was expected.

Nondirective interview was chosen because the research topic is quite new and there were not found any proper directions how e-Health system should be employed and developed in any of countries. Therefore to set a structured questionnaire and make an interview with reference to the questionnaire would be a little bit difficult. On purpose to get as much information as possible about topic, not exceeding the boundaries, author has found the nondirective interview as the best solution for the research. Nondirective form of interview does not only provide the interviewer with insights into context or a certain matter, but the informant could also suggest sources of supporting or contradicting evidence (Yin, 2003). Although the structured questionnaire wasn’t set, the plan of interview was made by author, which was as a boundary of interview (see appendix 4).

Not taking much time of respondents, the total interview with both informants took one and a half hour, around forty five minutes with everyone. Because of Head Managers of department ability and experience to show clear and fast practically how e-Health system works, quantity of information gathered during interview was bigger than it was collected interviewing project manager. As Kvale (1996) suggests, the prewritten interview guide should be given before meeting for respondents which could prepare themselves before interview and make it go faster and beneficial during the meeting. On purpose of author to be this interview as open as possible and to add additional subjects for discussion during the interview, the list of questions was not given to the respondents before meeting. They were only given some guidelines what the discussion is going to be about when the meeting was arranging on the phone.

3.3.5 Data processing and analysis

The processing and analysis of qualitative and quantitative data are different because of the format of data (Tidikis, 2003). Data collected in quantitative research, making a survey on Internet, were easier to process than qualitative data. Properly, author didn’t need to process them at all, just to make an analysis of data. Data were processed by Webpage administrator. Every time, after somebody’s given vote, the processed data appeared in proper chart straight in number of voters and percentage part of total amount of voters that day. Such a survey gives answers of breadth population adequate to the reality and the survey process goes very fast. It was very useful for author not having much time to make a proper research with estimated information at the end. Because quantitative data were collected from one question there was no possibility to correlate the data with other variable. But according to the answer, it was much more important to start qualitative research and to explore the research object – e-Health system.
Qualitative data started to be processed during the interview, when significant information were highlighted or underlined. Soon after interview author wrote a short summary of all gathered information, in case not to forget everything till data will start to be analyzed. When the analysis process was initiated the summary was read again and empirical data were categorized according to the concepts analyzed in the theory part.

Secondary data gathered in the study of Danish e-Health case and primary data, gathered from the interview about Lithuanian e-Health system firstly were analyzed separately according to theoretical framework and discerning the main features which should be kept as a lesson for other e-Health developers. Later both situations were compared with each other regarding the learning lessons but following the same plan of analysis – follow theory frame. Finally the conclusions were made summarizing strengths and weaknesses of the e-Health system in representative country Lithuania and in a sample country – Denmark. The main idea of research conclusions was to give suggestions how e-Health system could be improved to be advantageous for countries developing e-Health system.

3.3.6 Evaluation of research

The two measurements reliability and validity are used in a qualitative research to critically measure that the end result of the research is valid and trustable (Jacobsen, 1993). Due to this, according to Jacobsen (1993), the authors should always strive after a high reliability and validity and try to minimize problems accruing with these measurements.

3.3.6.1 Reliability

Reliability means that the data gathered is reliable and that nothing in the specific research method has affected the result of the study (Jacobsen, 1993). According to Bovee and Thill (1992) reliability requires repeated studies to produce the same result every time when the environment conditions are identical. There could be found some difficulties achieving high results of qualitative results. There is possibility that the results will be not representative and ambiguous (Aaker, Kumar and Day, 1997).

To ensure reliability of data, for the research in Lithuania author chose the initiator not only as a company which started to develop e-Health services, but the interviewed person too, who was the first one started to create and realize projects of e-Health development. The practical experience and initiative of respondent shows that gathered information should be reliable and adequate to the real situation of electronic health care services in the clinic of research and in whole Lithuania, remembering that in this country there is only one public clinic providing and developing electronic health care services. This means that the results of analysis of e-Health in representative clinics in Lithuania, Vilnius University Hospital Santariškių Klinikos, could be representative of wide population but it doesn’t mean that it is generalized. In general, reliability is important because research must be both objective and accurate to provide useful information for decisions (Bovee, Thill, 1992). But, according Bovee and Thill (1992), it is not enough just to be able to replicate the results; the research must also have validity.
3.3.6.2 Validity

Validity is the ability of research to measure specifically what researchers need to know (Bovee, Thill, 1992). It means that research should be valid and relevant to the circumstances. There exist two different types of validity: the internal validity and external validity. The internal validity measure implies whether the author has got hold of what they were striving for with the study and external validity measure if the findings of the study can be transmitted to other contexts (Jacobsen, 1993). According to Jacobsen (1993) the qualitative research has a high internal validity and it does not correspond for the external validity; qualitative and case study approaches do not strive after a high external validity.

The author found that the research is attained a high internal validity, which was soon perceived during the interview. The interview went as it was planed and all main questions were answered which were constructed according to analysis results of secondary data. Further on author noticed that all main factors were measured, what means that at the end of interview author got data which was planned to be gathered.

During interview author noticed some inadequacy of important features of research object, which were presumed before interview analyzing secondary data. Having noticed disagreements author suddenly clarified the problem. Important features weren’t presumed very well, because the topic of research is relatively new in the representative country Lithuania and the development of research object rapidly goes further improving the e-Health system. Therefore information gathered from secondary data didn’t range the newest changes in e-Health system. Due to respondents’ goodwill and interests to support research in innovative topic, they gave the newest information about the situation of research object, which is not announced jet anywhere but the changes are already accomplished. This means that internal validity of research is even higher than it was expecting and the reliability is adequate to the reality.

3.4 Conclusions

In this chapter there were presented the procedures to organize research effectively. To make an investigation the qualitative and quantitative research methods were chosen. It is interesting in this study that quantitative research has been made before qualitative on purpose firstly to investigate the demand and acquaintance of e-Health customers and according to findings of qualitative research using survey measure, the method of further research has been chosen. The settled and defined plan of research methodology leads author to realize it practically. The findings of research will be presented in the further section.
4. EMPIRICAL DATA

4.1 Introduction

The review of previews researches and scientific concepts, related to e-Business – the fundamental of e-Health, Information and Communication Technology – the engine of e-Health, the Information society – the customers of e-Health and the core of all previous and further researches – the concept of e-Health, guided author to make a new research applicable to the European countries planning or already started to develop Health care sector implementing Information and Communication Technology. In this chapter the findings of author’s initiated research on e-Health situations in Denmark and Lithuania will be presented and prepared for the further analysis and conclusion. Firstly, in this chapter the findings of survey which is the main driver of chosen research method for further investigation will be given. Later, according to the data of survey, the information of multiple-case study will be presented.

4.2 Survey findings

The survey of e-Health service usage was made on purpose to investigate how much Lithuanian people are informed and encouraged to use electronic health services. During 24 hours of surveying there were reached 8039 audience of respondents. Considering to Lithuanian statistic data (2006) this is 0,27 per cent of all population in Lithuania and 0,67 part of all households able to access to Internet.

The findings of survey were very interesting and encourage the author to make a deeper research on e-Health situation in Lithuania. On the question: Have you ever tried to book an appointment to doctor via Internet? (see appendix 5 ) 7 % of respondents answered that they have tried to book an appointment to his/her doctor, but 3 % of them were not succeeded and 4 % of respondents every time or sometimes use e-Booking service.

36 % of respondents knew about the service booking an appointment to the doctor electronically, but have never used it. This answer could be explained that the clinic where respondents doctor work, doesn’t provide e-Booking service, or respondent doesn’t trust on this service effectiveness, or simply the respondent doesn’t go to doctor. 57 % answered that they even didn’t know about such a possibility. This rate is the most important investigating e-Health system and providing services for customers. Most of respondents denied the hypothesis of this survey that Lithuanian people are acquainted with electronic health services very well. According to that all respondents have an access to Internet and have an ability to use it (because the survey was made on-line) the fact that 93 % of respondent doesn’t use electronic health services is very striking. Especially attracting fact is that more than half of surveyed citizens don’t know about providing e-Booking service in clinics. According to gathered facts of survey the further researches must be made investigating deeper the situation of e-Health in Lithuania and offer some suggestions on how analyzing system should be improved according to Danish experience developing e-Health network.

4.3 Multiple-Case study

The facts and conclusions of survey guide author to make a qualitative research investigating current e-Health system development process in Lithuania and accomplish with qualitative findings in case study of Danish e-Health system and find areas where this system could be improved. More attention will be paid on actors interacting in e-Health system and the creation of valued electronic health services providing chain, effectively managing supply chain and customer relationship.
4.3.1 Introduction of Danish e-Health system MedCom

MedCom is a cooperative venture to use health care data and information network for enabling secure electronic communications between authorities, organizations and private firms linked to the Danish health care. The history of MedCom - the Danish Healthcare Data Network (DHDN) - goes back to the late 1980s, when interest in electronic communication among healthcare providers grew (Stroetmann, Jones, Dobrev, Stroetmann, 2006). This fact is very interesting in regard that Information society started to be developing 20 years before MedCom project started (Toffler, 1981)(see subsection 2.3.1). It means that Denmark develops its health care system in modern way more than 20 years and the practical outfit is already full of worth suggestions for developing countries, which just started to create electronic health care systems. Because of this, MedCom project is treated as a good example for other countries.

In essentials, this national Danish network allows fast information flow in form of reliable data exchange among the respective software systems of the participating healthcare providers (Stroetmann, Jones, Dobrev, Stroetmann, 2006). Since 1994 the role of MedCom system has been significantly expanded and the network now contributes to the development, testing, dissemination and quality assurance of all electronic communication across the Danish healthcare sector (The European Commission, Enterprise Directorate General, 2004).

4.3.1.1 Process of MedCom’s development

The first big and vital project regard to electronic health care services Denmark started in 1994 and so far has had five main phases (Stroetmann, Jones, Dobrev, Stroetmann, 2006):

- MedCom I — pioneer spirit and professionalism — 1995 – 1996
- MedCom II — implementation and consolidation — 1997 – 1999
- MedCom III — quality services and diffusion — 2000 – 2001
- MedCom IV — adopt Internet and web based technologies — 2002 – 2005
- MedCom V — realization of “Good Web Service”— 2006 - 2007

MedCom I

The background for the MedCom project was local and regional projects, which to a large extent were launched by enthusiastic initiators within the healthcare sector. In recognition of the need for securing communication across individual projects, MedCom was established (Petersen, Bernstein, Bruun-Rasmussen, 2003). At the beginning one of the first efforts for new system became the establishment of national communication standards on the basis of international CEN standards (Petersen, Bernstein, Bruun-Rasmussen, 2003). Those standards in the publicity of Danish Centre for Health Telematics (2003) are indicated as standards MEDREQ for requisition, MEDRPT for reporting laboratory results, MEDREF for referrals, MEDDIS for discharge letters and MEDRUC for reimbursement claims.

MedCom II

After the initial stage MedCom aimed at massive dissemination of the health network. As a part of the dissemination MedCom worked consistently with making the extent of the communication visible by using the so-called EDI-top (Electronic Data Interchange). The EDI-top showed the
number of messages communicated for each county and message type. This was done both as a part of the information and as a motivating factor for the regional health networks. Another part of the effort was clear and precise information about which software suppliers had been certified for which communication forms. Parallel with the dissemination of the health network, focus was directed at the need for organizational development in the clinic. Without this element it would be difficult or impossible to harvest the advantages of the new technology (Petersen, Bernstein, Bruun-Rasmussen, 2003).

**MedCom III**

After five years of intensive activity the advantages and disadvantages of created system could be noticed. At this time Danish health care system met a challenge too. Developers indicated that the actual standards were not precise enough. But the co-operation between health professionals and developers, the problem was solved improving standards. More on this stage according to publicity of Danish Centre for Health Telematics (2003), new pilot projects were established for communication between hospital departments and laboratories. Web technology pilots were carried through, for example in the form of e-mail consultation and web access to patient data in laboratory and radiology systems.

**MedCom IV**

In the last years of developing modern health care system, MedCom opened up for many-to-many communication across certified networks. In relation to the internet, an effort has been put into developing a technical platform and a common structure of information of a future national internet health portal (Petersen, Bernstein, Bruun-Rasmussen, 2003). Other ambitious projects were the Local-Authority projects, the purposes of which were to achieve large-scale use of MedCom’s standards for communication between hospitals and local-authority home care (The European Commission, Enterprise Directorate General, 2004).

4.3.1.2 **Current situation of Danish MedCom system**

Present situation of Danish health care system MedCom development should be explained according to its beneficial activities started in last years and the aims for future projects. As for a foreseeable future purposes on the fifth stage development MedCom aims to ensure the quality of services on Web. The idea is to provide patients and health professionals with access to information regarding all prescribed medicine. This is already done by connecting to the Danish Medicines Agency’s Prescription Server, which contains a list of the patient’s prescribed medication from both hospitals and general practitioners (Wanscher, Voss, 2006). Plans for current year will not be over in Denmark. As Danish Centre for Health Telematics (2006) declare MedCom is going to be developed making electronically registered patient data available across country boundaries what will provide a web-based access function and will give Danish citizens access to own patient data over the eHealth Portal by the virtue of the Health Data Network. The standards are not forgotten too. The control and improvement of them are set as focal aim.

The MedCom standards are based on consensus among healthcare professionals on content and application (The European Commission, Enterprise Directorate General, 2004) thus ensuring security, storage and accessability of information for its consumers. Today the information flow in 9 areas e-Health (The European Commission, Enterprise Directorate General, 2004):
1. eBooking. Information flow from patients, citizens to the doctor.
2. ePrescriptions. Information flow from primary care doctors (GPs and doctors on call);
3. eReimbursement. Information flow to public insurance from GPs, doctors on call, specialists, pharmacies and dentists;
4. eDischarge letters and referrals. Information flow between hospitals and specialists, physiotherapists and GPs;
5. eLab requests and results. Information is interchanged between GPs and specialists and laboratories (in both state and private hospitals);
6. ePathology and microbiology requests and results. Information flow between GPs and specialists and laboratories;
7. eRadiology requests and results between GPs and specialists and hospitals;
8. eCorrespondence. Free text letters go between parties; and

The interchange of information via messages using Information and Telecommunication Technologies runs inside the MedCom e-Health network. All actors and their relations are showed in the Appendix 6. This e-Health model was created especially for Danish health care services provision, but according to this model and primary data got from interview, the suggestions on how the interactivity of e-Health actors could be expanded and improved will be given at the end of this study work.

The Health portal [www.sundhed.dk](http://www.sundhed.dk) in conjunction with MedCom was awarded in the category for “e-health administrative support tools and services for citizens” by the European Commission in 2004. The present plan for this portal is to unify all public health organizations, including the Ministry of Health, Danish Medical Association, and professional health and patient organizations (The European Commission, Enterprise Directorate General, 2004). On the main Danish health website functions already available [for all users](http://www.sundhed.dk) are:

- Overview of the structure of the health service
- Site map with contact information for the entire health service
- Hospital patient information (examination, treatment, post-treatment)
- E-booking for own GP, prescription renewal, email consultation, change of GP etc.
- Information about health, illnesses and prevention
- Information about choice of hospital and other patient rights
- Handbook of medicine and interactive database
- Information about general preparation for contact with the health service
- Waiting-list information and information about quality and performance
- E-commerce for prescription-only drugs
- Self-generated information from all regional health authorities, hospitals, departments etc.
- Practice declarations to support choice of GP
- Access to current status concerning public reimbursement in personal medical expenses.
Functions available for **healthcare professionals** are:

- Access to data stored in electronic patient records
- Access to laboratory test results
- Access to editing own practice declaration (GPs)
- Personalization (own profile and customized information)
- Visit data and access to confidential phone numbers – e.g. hospital departments
- Profile areas: practice information
- Regional clinical guides, consensus reports and reference programmes
- National clinical guides
- Access to job vacancy board for the healthcare sector.

Danish health system MedCom didn’t limit only with national projects. Couple years after the beginning of first MedCom activity’s stage, the international projects started to be launched. The background was a Danish desire to enter into close teamwork with related communication projects abroad to gather inspiration and to be inspired, in short, to reach a synergy effect in the correlation between these projects across borders (Petersen, Bernstein, Bruun-Rasmussen, 2003). For now MedCom have already realized 11 international projects and three more are on the progress (see Appendix 7).

Present international projects *Baltic eHealth, eHealth Trends, @HEALTH* have one common aspect – to share information and experience between countries due to improving health services delivery to citizens. The purpose of project *eHealth Trends* is is to investigate European health consumers’ use of, their attitudes to and desires with regards to Information and Communication Technologies for health purposes (Petersen, Bernstein, Bruun-Rasmussen, 2003). To accomplish this project survey on e-Health consumer trends was organized among European countries. Data gathered from this survey are useful for developing *Baltic eHealth* project. As Danish Centre for Health Telematics in its own report specify, above mentioned project is intended to counteract the tendency for rural migration planning to provide for more equal treatment opportunities in the Baltic Sea region. As for investigation of project three networks, existing in Denmark, Norway and Sweden, and two regional networks in Estonia and Lithuania were linked. But the ideas and ambitions of MedCom developers do not limit on European countries. The project *@HEALTH* was laid to involve two regions – Europe and Latin America. The purpose of this project is to enable European and Latin American researchers, industries, organizations and other relevant players operating in the field of e-Health to access and exchange knowledge, skills, technologies and facilities (Petersen, Bernstein, Bruun-Rasmussen, 2003).

Concluding, enthusiastic penetration of international collaboration and teamwork brought MedCom to the leading position in developing electronic health care network beneficial not only in Denmark but in all Europe. In Denmark this system works fully. In 2006 the Danish Health Data Network was used in daily operation by all 63 hospitals, 331 pharmacies and more than 4000 general practitioners and 100 local authorities together with all the IT suppliers in the healthcare sector (Stroetmann, Jones, Dobrev, Stroetmann., 2006). European Communities (2006) declare the plan to exceed € 75 millions of economic benefits of MedCom system by 2008. These data impress and give a pause to other European Countries what benefits the health care system could bring for them too.
4.3.2 Review of Lithuanian e-Health situation

Lithuania is called as a tiger of Baltic States because of its fast economical development. Such a quick development is encouraged by effective long-term strategies. But the question is, are all business sectors developed enough for now? What situation is in IT and health care sector in Lithuania?

The development of Information and Communication Technologies attained attention of Government only a couple years ago in 2002, then this aim was set in the long-term strategy of Lithuanian State development and in the strategy of Lithuanian economy development till 2015. Thus the situation of adoption of Information and Communication Technologies into business is quite poor but has a potential to its rapid and effective development. Big influence on development has activities by companies themselves. Some medical and technical institutions have already formed core-base where exploratory e-Health networks are creating and the international collaboration is initiated. Besides, there is a huge potential of specialists, creators, developers and interested personal and no inconvenient heritage of infrastructure, which would keep the implementation of new technologies down (Lithuanian e-Health strategy, 2004).


1. Improve access for citizens to the comprehensible and qualitative information about healthy life style and possible risk for health.
2. Rapidly provide qualitative health care services for patients and improve access to the comprehensible and qualitative information about diseases and treatment.
3. Improve competence of medical personnel and their quick access to the reliable and universal information about patient, to effective decision making means; and develop system of information interchange with other companies.
4. Improve possibilities for doctors and administrators to get reliable information for management and planning of activities.

At the beginning of 2006, Minister of Health of Republic of Lithuania, Žilvinas Padaiga, declared one key purpose of e-Health project – which, in the words of Minister is - to realize international standards adequate national electronic health system, which could ensure effective input, usage, transmition and administration of information about patient’s treating process and results by health care organizations.

Currently in Lithuania the e-Health system is on the progress of creation and attainment of purposes, what, according to specialists, will become very important achievement in whole Health care sector in Lithuania. According to e-Health strategy created by Ministry of Health (2004) at the beginning e-Health project is going to be realized by health care organizations established in three biggest Lithuanian cities: Vilnius, Kaunas and Klaipėda. For this day there is only one public health care institution which is willingly involved in the process of electronic health care services provision system. It is hospital depending on the biggest university authority in Lithuania. This hospital is Vilnius University Hospital Santariškių Klinikos. Researches and
managers of this hospital were initiators of e-Health system creation in Lithuania. Presently, with support of Government, European Union and technical companies they realize the first steps of electronic health services provision in Lithuania together doing this via network of mentioned hospital. Worldwide IT solutions company Hewlett-Packard is authorized to install and support all technical part developing e-Health project. In the website of VUH SK (2006) is declared that whole Lithuanian e-Health project, which is worth 9 million Litas (~ 2.5 million Euro) is funded by loan from World Bank.

Not wasting money, the project started to be developed soon after the first loan was taken. The e-Health project is planning to be implemented in four stages. For now the implementation process in on the second stages. First one has already passed when the main integrated module has been implemented, which allows to change available information in all country. On the second stage the access to the system via Internet was given to the main health care institutions and their personnel. Due to this, currently, it is possible to book patients but there is a space left for planned services activation as transmission for consultancy and diagnostic. On the third stage the system is going to be developed regionally and all information about examinations will be involved. The database of Lithuanian citizens’ health conditions will be encouraged too. Later e-Health system will be accomplished by special integrated solutions, which will let to use all possibilities of system (Šebekienė, 2005).

Arguably, regarding to practical experience in other European Countries, realization of e-Health strategy in Lithuania will be beneficial for citizens and patients giving them opportunity to choose services provider by specialist’s activity results, operatively to get necessary information or service. The development of Information Technologies, new methods and creation of effective standards will encourage the changeover of all Lithuanian health care system. Due to e-Health activities the qualification of medicine personnel will grow and the rapid modernization of system and effective services will be encouraged.

On purpose to make a research of e-Health in Lithuania and offer suggestions how e-Health could be improved implementing it in countries developing electronic health services, the analysis of the most advanced institution implementing e-Health solutions in developing country Lithuania - Vilnius University Hospital Santariškių Klinikos and comparison of cumulated information with one of the best e-Health example in Europe – Danish health care data system MedCom would let to achieve the aim.

4.3.2.1 Background of Vilnius University Hospital Santariškių Klinikos activities

Vilnius University Hospital Santariškių Klinikos (VUH SK) is one of the major academic diagnostic and treatment centres, the tertiary multi-profile personal health care services providing institution in the Republic of Lithuania, as it is presented in VUH SK formal website www.santa.lt (2007). Hospital was established in 1980s (when MedCom started first activities (author’s notice)). The founders were Vilnius University and the Ministry of Health of the Republic of Lithuania. On their special website (2007) VUH SK presents themselves as “a non-profit institution financed by the Territorial Sickness Fund and the Ministry of Health of the Republic of Lithuania”.

The main goal settled by company’s managers is to ensure and execute high-specialized diagnostic and treatment services, educational and scientific work. The Hospital seeks to implement the latest modern medicine technologies, to participate in international projects promoting healthy lifestyle, prevention of diseases, and accessibility of health care services, as it is declared on website www.santa.lt (2007) presenting the activities of company.
Mr. Kizlaitis during the interview has accomplished the secondary information founded on the web sources and concluding gathered information it is defined that VUH SK has a fully licensed medical staff of 727 medical doctors and other highly qualified professionals. Over 1102 nurses-practitioners work in the hospital. More than thirty habilitated doctors and 170 doctors with scientific degree provide medical assistance in various areas of medical care. Approximately 43 000 in-patients are treated in the hospital annually. About 22 000 surgical operations of different complexity are performed in surgical departments. The Out-patient Department of the Hospital provides consultative services for nearly 400 000 Lithuanian citizens yearly referring for miscellaneous health disorders.

4.3.2.2 E-Health system in VUH SK

To support effective treatment and release provision of heath services VUH SK was first in country started to implement the newest information technologies in clinics: digital visual radiology (DVR), Electronic Patient Record (EPR), Internet Patient Card (IPC) as developer of e-Health system in Lithuania, Mr. Kizlaitis has declared. EPR system in clinics has been working already for five years and it is related with IPC. According to Mr. Kizlaitis, in the EPR system there are records of laboratory and instrumental results, protocols of operations, epicrises and other electronic clinical documents and images about patient stored.

As Mr. Kizlaitis maintained during our interview, IPC system let patients and their doctors read patient records at home or in GP room far away from VUH SK base. This system already works but the project is still not finished. Mr. Kizlaitis declared that there is planned to compliment IPC system with m-Identification (mobile identifications) solutions and on purpose to this there is put an effort to change all clinical documents electronically so they could be included in EPR system. In future Lithuanian researches in VUH SK hospital plan to create special tools, which would let patients to fill their electronic patient record by themselves. Thus patients could enter data about body temperature, blood pressure, usable medicines, claims about health, even pictures and other electronic files could be stored by patients. Accomplishing Mr. Kizlaitis words with information founded on the VUH SK website (2007), EPR system is going to be as national system, where patients could see information gathered not only in VUH SK but also in other institutions across country.

In the late 2006 there was triangular agreement written, which allowed developing Patient Registration System (PRS) also calling as e-Booking. By now PRS system involved other registration systems from different health care institutions. The initiator of this Project was Vilnius University Hospital Santariškių Klinikos which took 19 partners more to join PRS system. It is planned that all Lithuanian patients will feel advantages of this system. Furthermore PRS Project is one of the priorities developing national e-Health system. This Project is 100 per cent financed by structural fund of European Union. In present this system is active only in couple of hospitals in Lithuanian capital. But all Project is planned to be finished till the autumn of 2007 as it is published on the formal website of VUH SK (2007).

It is proved that academic Vilnius University Hospital Santariškių Klinikos is modern hospital with developing electronic health services. As they were described above, three electronic services are provided in hospital which is 20 years in the market. According to that VUH SK is quite new and that electronic services started to be developed five years ago, so three modern services for hospital in developing country, could be said it is quite a good achievement.
5. COMPARATIVE ANALYSIS OF E-HEALTH NETWORKS

5.1 Introduction

Descriptions of Danish MedCom and Lithuanian e-Health systems’ activities gave beneficial information understanding how e-Health system works in reality, what services are provided, what actors participate in this system, how actors and services are related with each other and how they are integrated in one common system adding the value across the system so creating valued e-Health system. Further in this chapter the comparative analysis of reliable e-Health systems will be analyzed what will lead author to take in account all participating actors and created electronic services which effective provision is supported by efficient supply chain and customer relationship management.

5.2 Analysis of e-Health network actors

MedCom (see Appendix 6) and VUH SK electronic health care networks involve all actors participating in the electronic health care delivering process. The main accent of e-Health system is the Portal, through which all data, information, messages and services are flowing. Simply, Portal is a special webpage which access is allowed to everyone. In a case of Denmark the Portal calls www.sundhed.dk. Administrators of this Portal collaborate with MedCom (The Danish Health Data Network) and are joined to one system – e-Health system. In a case of Lithuania there is Portal calling www.santa.lt. This is the website of electronic health care network created clinics – Vilnius University Hospital Santariskių Klinikos (VUH SK). As in Lithuania e-Health network is not developed regional yet, remembering that it involves only one health care delivery institution with its specialized health care centers in the same city, therefore the developer of electronic health care services are administrator of Portal too. As Mr. Kizlaitis said, “to administrate portal and deliver electronic health care services by the same institution is even better than collaborate with specialized Web administrating company, because so the development process goes faster and requires less expenditures”. Developer can quickly change unexpected matters or improve the system. If the portal would be administrated by other company as it is in Denmark, than the rapidity, comprehensibility and precision could be lost. But according to the different breadth of networks in Denmark, which is adopted regional and local network in Lithuania, it is understandable that Denmark has chosen the collaboration with specialized Web support services providing company. As Mr. Kizlaitis suggests, referencing with his experience, at the begging of local network’s development it is more beneficial to administrate Portal by the same institution. Administrating Portal by the same company it is possible to control the demand of services and make the delivery process more effective.

The visitors/customers of www.sundhed.dk portal are customers of MedCom too, and jointly they are actors of e-Health. As customers of electronic health services in Denmark case are hospitals, patients and general practitioners (GP’s). They are the part of e-Health system too. The customers of Lithuanian portal www.santa.lt, according to Mr. Kizlaitis, are citizens and patients of appropriate clinics and sometimes, in request of patients, in other clinics working general practitioners become customers too. Except to VUH SK belonging hospital, other hospitals don’t use electronic services provided by VUH SK. So the customers of Lithuanian electronic health services are patients and doctors which act in e-Health system. In Danish e-Health system totally there are 12 groups of actors, 11 of them are directly involved by MedCom network plus customers from outside (see Table 4).
Due to those 11 MedCom actors, customers of whole network can get electronic health services. In Lithuanian network through one Portal [www.santa.lt](http://www.santa.lt) act only medical specialists in hospital, laboratories and doctors with different specialties working for VUH SK and also customers. Other medical specialists, not related with VUH SK are not connected to e-Health network yet. In Lithuania there are some specialized medical websites, presenting useful information about health care, diseases and drugs in general. Some examples of those websites are [www.medicina.lt](http://www.medicina.lt), [www.medicine.lt](http://www.medicine.lt), [www.sveikata.lt](http://www.sveikata.lt), [www.sveikas.lt](http://www.sveikas.lt). The links to these websites and others more, as Government Institutions, central authorities are published in the analyzing website [www.santa.lt](http://www.santa.lt) on the reference “Related links”. For the effective e-Health system all those links should be integrated in one website and publish the information connectively. When Mr. Kizlaitis was asked about this idea during the interview, he declared that maybe in the distant future more health care related actors will be integrated in one system, but now there are other big plans developing electronic services.

Summary of actors in both cases and in traditional health care system, according references is comparatively presented in the table below (see Table 4).

Table 4. Actors of e-Health network

<table>
<thead>
<tr>
<th>ACTORS OF TRADITIONAL HEALTH CARE SYSTEM</th>
<th>ACTORS OF INTEGRATED DANISH E-HEALTH NETWORK</th>
<th>ACTORS OF INTEGRATED LITHUANIAN E-HEALTH NETWORK</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Laboratories</td>
<td>2. Laboratories (independent)</td>
<td>2. Laboratories (belonging to VUH SK authority)</td>
</tr>
<tr>
<td>3. General practitioners</td>
<td>3. General Practitioners</td>
<td>3. Doctors in different specialities (working for VUH SK)</td>
</tr>
<tr>
<td>4. Hospitals</td>
<td>4. Regional authorities (Hospitals)</td>
<td>4. Hospitals (belonging to VUH SK authority)</td>
</tr>
<tr>
<td>5. Pharmacists</td>
<td>5. Pharmacies</td>
<td></td>
</tr>
<tr>
<td>6. Dentists</td>
<td>6. Dentists</td>
<td></td>
</tr>
<tr>
<td>7. Other paramedical and socio-medical</td>
<td>7. Physiotherapists</td>
<td></td>
</tr>
<tr>
<td>8. Nurses, carers</td>
<td>8. Psychologists</td>
<td></td>
</tr>
<tr>
<td>10. Ambulatory care providers</td>
<td>11. VANS (Value Added Network Services)</td>
<td></td>
</tr>
<tr>
<td>11. Home care providers</td>
<td>12. Local authorities (Municipalities)</td>
<td></td>
</tr>
<tr>
<td>12. Home care providers</td>
<td>13. Central authorities</td>
<td></td>
</tr>
</tbody>
</table>

Source: own edition according to findings in multiple-case studies and issue of references (see Figure 1, section 2.2.)

At the first glance Danish e-Health system looks well improved involving a lot of different actors. But considering to the traditional system of health care providers author misses:

- Emergency centers
- Ambulatory care providers
- Home care providers
- Nurses and carers
Thinking as a customer author misses some more actors which should be involved in the full and efficient e-Health system:

- **Rehabilitation centers, sanatoriums** where people are treated physically and psychologically as well, using all kinds of methods which consolable, relax and help to recover (medicated massages, swimming pools, quiet atmosphere, consistent care and other). Doctors and nurses in such centers could also have online contact with hospitals when it would be necessary.

- **Scientific medical information providers**, for instance medical libraries. They could be useful to deepen knowledge of doctors. For example doctors could book online some scientific literature and get beneficial information improving patient’s treatment.

- **Medical education and research centers**, for instant State Universities. The communication could process between universities and doctors for some information from practice in order to write more particular article or assignment. Also students could even ask for some information, for example video record of some operations. Research centers would be useful for doctors to get the newest information any time any where only accessing to the network.

The involvement of mentioned actors into MedCom system is not embraced in the short-term plans of MedCom developers, but it is not surprising, because it is only 20 years how the first electronic services started to be delivered and the present Health Data Network with 12 groups of actors is still on the improving and developing stage of standards and services. The Information Society furthers the development of e-Health system too which is on the developing stage by its own. According to product life cycle theory when the current situation will be close to ripeness the new services and actors could be adopted into system and bring new value of network. Suggesting new actors of e-Health author wants to thrust e-Health network developers from all countries forward to involve not only practically proved utility actors by advanced developers but also new, for customers important health care and information services providers.

### 5.3 Comparative analysis of e-Health services

Collaboration of health related actors is the main request developing e-Health network. One hospital by itself will not create an effective network with efficient services satisfying the demand. In this section will be analyzed the quantity and variety of services comparing developed e-Health system in Denmark and just started to be developed e-Health network in Lithuania. All e-Health services will be analyzed according to their provision through special Internet Portals. Portal, according to O’Buyonge and Chen (2006), is an electronic environment that provides a secure, single point of interaction with diverse information, business processes, and people, personalized to a user’s needs and responsibilities.

For now Portal’s [www.sundhed.dk](http://www.sundhed.dk) customers can search for medical information, to see the work hours of patient’s doctor, to book an appointment to doctor, to find information about interesting drugs and their usage, about reimbursement of services and etc. All possible services in MedCom network for patients and medical specialists are mentioned in the previous subsection 4.1.2. Most of those services are provision of personal clinical patient data, which are reachable only privately for patient or his/her doctors. But there are some, so called, open data which are accessible to everyone through the Portal. Those data are stored in the databases of regional and
central authorities. Open data are related with public health. They could be statistical data about the public health in the region or in all country also the data about activities in public health improvement. Central authorities could provide data about reimbursement of services in country, about taxes rules of services delivery and other data useful for all people and health companies. The most integrated Lithuanian e-Health network in VUH SK for citizens and patients offers only privately accessing services: e-Booking, Internet Patient Card, Electronic Disease History and the only one service – information about doctor, does not require any registration. The comparative presentation of e-Health services groups provided in the studying countries is placed below (see Table 5).

Table 5. Comparative analysis of e-Health services in groups

<table>
<thead>
<tr>
<th></th>
<th>eBooking</th>
<th>ePrescriptions</th>
<th>eReimbursement</th>
<th>eDischarge</th>
<th>eLab</th>
<th>ePathology</th>
<th>eRadiology</th>
<th>eCorrespondence</th>
<th>eMunicipality</th>
<th>Electronic Patient Record</th>
<th>Internet patient card</th>
</tr>
</thead>
<tbody>
<tr>
<td>DANISH E-HEALTH NETWORK</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X (available for doctors)</td>
<td></td>
</tr>
<tr>
<td>LITHUANIAN E-HEALTH NETWORK</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X (available for doctors and patients)</td>
<td>X</td>
</tr>
</tbody>
</table>

Source: own edition according to findings in multiple-case study

In the table above there are presented groups of e-Health services which are provided in Denmark and Lithuania. As it is seeable, in Lithuania there are a lot of opportunities to develop e-Health system. Tough Denmark has what to learn from Lithuania too. There is one possible service, which is not provided in Denmark yet. This service is Internet Patient card. Lithuanian e-Health developers integrated Electronic Patient Record (EPR), into the interactivity system and let patients to see their treatment history with all laboratory results, pictures and etc. by themselves after registration in system. This service is already provided for couple of years in Lithuania. In Denmark it is only in the plan.

Analyzing the services which are provided on the formal websites of e-Health providers, author has found some interesting functions, which the beginners of e-Health development could share with the leader in Europe calling e-Health services administrator MedCom in Denmark. The analysis of services for citizens and patients provided on the specialized Websites www.sundhed.dk and www.santa.lt are concluded in the table 6 below.
Table 6. Website functions available for citizens/patients

<table>
<thead>
<tr>
<th>Function</th>
<th><a href="http://www.sundhed.dk">www.sundhed.dk</a></th>
<th><a href="http://www.santa.lt">www.santa.lt</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Overview of the structure of the health service</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Site map with contact information for the entire health service</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Hospital patient information (examination, treatment, post-treatment)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>E-booking for own GP, prescription renewal, email consultation, change of GP etc.</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Information about health, illnesses and prevention</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Information about choice of hospital and other patient rights</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Handbook of medicine and interactive database</td>
<td>Yes (of Internet Patient Card)</td>
<td></td>
</tr>
<tr>
<td>Information about general preparation for contact with the health service</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Waiting-list information and information about quality and performance</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>E-commerce for prescription-only drugs</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Self-generated information from all regional health authorities, hospitals, departments etc.</td>
<td>Yes (from departments)</td>
<td></td>
</tr>
<tr>
<td>Practice declarations to support choice of GP</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Access to current status concerning public reimbursement in personal medical expenses</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td></td>
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<td>No</td>
<td></td>
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<tr>
<td></td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

Source: own edition according to findings in multiple-case study

In the table above there is presented many useful information how e-Health system could be improved regarding to experience of Denmark. But each country has its own advantages and disadvantages developing system. It depends a lot on the researches and developers of e-Health system not only on the environment or current circumstances in Health care sector which could be encouraged by political or economical factors. Analyzing secondary data related to development of Danish e-Health network author found that developers of this network pay a lot of attention exploring and investigating the demand of electronic services usage. They are doing this organizing researches or creating new demand controlling systems as EDI (Electronic Data Interchange), but analyzing Lithuanian e-Health network researches gave a simple but effective idea how to satisfy the demand. The means is on-line queries and outgivings of customers. On the website there is a link where customers can say their thoughts, ideas and suggestions or to ask what is important to them. Such on-line service is beneficial for both researches and customers developing valuable e-Health system and encouraging the collaboration between services providers and consumers.
5.4 Analysis of value chain

As it was introduced in the theoretical part (see subsection 2.4.1), value chain is created according to B2C model on the collaboration and working relationship between the services providers and customers. Speed and openness sharing the information are the main value indicators. Value chain creation in MedCom started organizing team-work and co-operation from the beginning of project. The enthusiastic, ambitious and hard-working team was organized which firstly standardized the activity and process creating effective health care network. At the beginning MedCom have created standards special for requisition, for reporting laboratory results, for referrals, for discharge letters and for reimbursement claims but after a while it was noticed that those standards are not very precise. For this reason health professionals and developers issued the document, called: “The good EDI letters”, where they wrote all recommendations according to technology and health system. In that document is written the validation of standards, suggestions for software suppliers (Health communication in development, 2003). Such standardization means and intelligent developers led MedCom to concentrate more on effective systems development and finally to remove transaction costs.

The importance and utility of standardization was denied by Lithuanian e-Health system developer Mr. Kizlažitis, which maintained, that “standardization takes too much time and stops the development process when in your mind there are many of ideas which are rapidly changed by others”. Those changes arise practically implementing new services and improving old ones. If the standards were approved for each new services or program, then, according to Mr. Kizlažitis, the satisfaction of customers and offer of new services would be changed by the standards creation and their registration. Creating value chain for the innovative services provision in developing system is much important to harvest the trust and collaborate with team workers or even to make a competitive environment for suppliers, than take a time standardizing activity. Mr. Kizlažitis is sure, that rapid development of e-Health in Lithuania is encouraged by the freedom in work, listening, understanding and evaluating the wishes and possibilities of each services provider and readjusting the innovative technologies according to each services provider abilities.

To create a valuable system it is not enough only to motivate employees to work with new technologies, but firstly to get those useful technologies. In Denmark there was found that Government and other State authorities help willingly in the health care sector’s development process. In Lithuania the situation is contrary. The e-Health system developers needed to find the support by themselves in private business sector when State authorities weren’t very interested in developing health care sector. If not a support of private business companies, the implementation and development of e-Health system in Lithuania would be stopped for a long time.

First lesson from Danish MedCom case study

Close teamwork between authorities and health care providing companies are required. The crucial indicator creating effective and valuable health care system is support from all-important players – authorities, system providers, health professional groups and associations, hospital owners (Petersen, Bernstein, Bruun-Rasmussen, 2003). Mentioned players of health care system are not the last essential participators. It is important not to forget engineers which support all electronic part of e-Health system. Especially demand of IT engineers is significant in countries,
where the Information Society is on the developing stage and there are none or very less practice experience delivering electronic health care services.

International researches and collaboration are the best measurement developing electronic services. The practice of other countries or sharing your own practice with other similar network creators gives incredible benefits.

First lesson from Lithuanian e-Health system study

Creating valued e-Health system in the public sector at the beginning it is important to find reliable and steady support sources which would be useful implementing innovative technologies into the health care sector. However the new technologies without pleasure to use them will not be utility. The example of human resource management could be Lithuanian case, where employees were not pushing but motivating to use new technologies. If doctor doesn’t want to use ICT in his work, so better don’t push him, otherwise there will be more problems and will take more time correcting mistakes and even standardization of each step will be not productive. According to Lithuanian practical example, after a while doctors will ask by themselves to implement ICT in their daily work.

5.5 Analysis of Supply Chain Management

Maximizing added value by integrating activities and collaborating together the Management of Supply Chain are improving too. MedCom system standout its often changed by communication technologies. At the beginning they were using EDIFACT (international Electronic Data Interchange (EDI) standard) communication. However, after they realized that it would be better to use communication by web sites. To use web based communication allows securing information, developing infrastructure, administrating users. So developers decided to change EDIFACT standards to XML (extensible markup language), using VPN (virtual private network) technology. The supply chain network was established by connecting existing intranets. The vision was to open up for many-to-many communication across certified networks. In relation to the internet, an effort has been put into developing a technical platform and a common structure of information of a future national internet health portal (Petersen, Bernstein, Bruun-Rasmussen, 2003). Technology enabled Supply Chain Management helped MedCom to reduce investment and create new electronic services. The National Basic EHR (Electronic Health Record) model was created which was considered as strategic matter for the entire health sector in Denmark and now this service plays a significant role in health care sector in whole countries.

Considering that supply chain is created not only by effective collaboration between services providers (suppliers) and customers, but by technology suppliers for e-Health developers too. In the practice of Lithuania, willing to create a beneficial e-Health system there was a need of help of communication technologies providers. As Mr. Kizlañitis remembered during Interview, at the beginning prepared plan for support of innovative health care services development was given by one Lithuanian communication services provider BITĖ, but the plan didn’t interest this company and it was rejected. After that it was given to another company OMNITEL. This company found the plan very attractive and supported e-Health developer with necessary modern connection equipments and programs. Soon after that, the competitor BITĖ offered the support to developers of e-Health by itself. Such a competition between communication services providers was very beneficial for e-Health system developers and encouraged new e-services provision to Lithuanian
citizens. Now one of Communication Company supports Electronic Patient History system, providing local Internet connection equipments. Another company supports Internet Patient Card system, providing costless mobile connection services. At the beggning of electronic services provision development the basic Information and Communication Technologies are required. As Lithuanian practice shows there is no need to buy Web support services from specialized company. At the beggning the employed IT specialists could encourage the development very well. Such a solution would save the costs and would make the control of supply chain easier.

Second lesson from Danish MedCom case study

The suggestion for countries developing health care system is to analyze and take advice of professionals and countries with practical experience as Denmark is at the beginning, regarding to IT implementation into system in order not to waste money for installing different programs as happened to MedCom. Thus developers should resolve about IT and services supply system before installation. Creating ensured and effective supply chain by establishing closed, secure networks, there is possibility to solve security problems themselves by the programmed modern Information Technologies without health professional players. This would be the big advantage and benefit managing electronic services delivering system.

Second lesson from Lithuanian e-Health system study

At the first stage of e-Health development there is no need to collaborate with Web supporting companies. While the e-Health network is just local the employment of ICT specialist would be the best solution. Saved costs managing support chain management could be used improving customer relationship.

5.6 Analysis of Customer Relationship Management

In order to distribute the e-Health system as quickly as possible, also as widely as possible, developers of MedCom started to develop closer relationships with customers. The first used beneficial decision was to show people how many medical messages are sent, using IT, during the month or year. They used EDI (Electronic Data Interchange) program. Via this program MedCom was able to show how many messages and which kind of messages were sent. This was done both as a part of the information and as a motivating factor for the regional health networks. Another part of the effort was clear and precise information about which software suppliers had been certified for which communication forms (Petersen, Bernstein, Bruun-Rasmussen, 2003). The information of how many, how often and in which place data were changed helped MedCom to control the demand in each health care center and according to findings to make a beneficial decision for organizational developing in clinic. MedCom developers understood that without controlling data and messages flow it is difficult or impossible to harvest the advantages of the new technology.

To investigate health consumers’ demand, their access, usage and desire of Information and Communication Technologies MedCom developers decided to make a research not only in Denmark but in order to get wider and respective information researchers realized an International eHealth Trends project. This was a good decision in plan to develop Supply Chain internationally so giving a beneficial opportunity for Danish citizens to get useful information not only from domestic health specialists but from abroad too.
Supporting customers’ relationships MedCom offered new services for them. For current year MedCom aims to make electronically registered patient (ERP) data not only in one place for one health care centers specialist but it will be available across country boundaries. Such project lets patients to access to their own patient data and see the history of decease or the process of treating. They will be able to see laboratory results also the information special for their healthy life. Due to new services MedCom expects to attract more customers and ensure security of their health.

Analysis shows that MedCom is tended to both type of CRM, analytical and operational. Analytical method MedCom uses when the needs and whishes of customers are analyzed using special programs of demand control. The administrators of network are even organizing surveys to the breadth population just to encourage as much as possible the ICT usage of customers. The motivation of customers to use electronic services is purposed on the time and expenditures savings of services providers. Operational CRM in Denmark is used interacting with customers usually through e-mail and interactive forms on portal when enable the connection with customers consistently.

Electronic health care providers in Lithuania are concentrated more on operational and portal-based customer relationship management. At the initial stage of e-Health system development to support customer interaction through communication channels as mobile connection, Internet, e-mail is very effective solution. Firstly Lithuanian e-Health developers started to convert all paper documents in electronic form, which later become accessible to the customers when the Internet Patient Card was created. Through the internet and special portal of clinics the e-booking services started to be delivered. It was very important for developers to create electronical booking system very easy and attractive to customers, because it was the innovation in Lithuanian health care provision history. The first e-booking services in Lithuania started to be provided on the Webpage [www.santa.lt](http://www.santa.lt). The Webpage was created attractively and very solid, not giving to much unnecessary information with easy driving structure (see Appendix 8). The Website fully conform the Quality Criteria for Health Related Websites, defined by the European Parliament, the Economic and Social Committee and the Committee of the regions (2002). The transparency, privacy and data protection processing personal patient’s data are ensured. There is created security system against incorrect information. The unregistered patients on e-booking system can not make an appointment to doctor. This secures the patient for possible booking mistakes and ensures the effective booking for administrators. The information is updating consequently, especially when the on-line registration or patient card systems are improved, there are always corrected the guidelines for usage so improving the accessibility of Website. Electronic services are providing in clear and understandable way explaining each next step or making a different color link to the next operation. (see Appendix 9). The registration to electronic system is very simple. It is only necessary to write the number of mobile phone and click on the link of password receiving. After few seconds the short message (SMS) will come on the phone with new password necessary for registration. The phone number is straight saved to the system and after filling the registration form it is kept on the new registered information card. When the appointment is booked, day before visit to the doctor patient is reminded with SMS, automatically sent from system, about the coming visit to doctor with information when, where and to which doctor patient should go next day. If there are some changes from doctor’s side, according to Miss Lukošaitytė, interviewed person, the patient is informed sending SMS or calling by the initiative of doctor. Such services are the part of value chain, when the main
service is supplemented with other useful services. According to this case, the conclusions could be made that e-Health services in Lithuania are developing in a good way taking full care and responsibility of customers. The problem is that VUH SK electronic health care services providers do not pay more attention on attracting more customers. During the interview Miss Lukošaitytė maintained, that at the beginning of e-Health development, the administrators are more concentrated on the effective working system. Later when the system will be fully ready, more attention will be paid on encouragement of electronic services usage.

Third lesson from Danish MedCom case study

Developers should take care of e-Health distribution. The MedCom idea of visible number of sent messages is really great for more than one reason. Through the website system providers can estimate the demand and obligations very well and if they didn’t live up with demand the relative and effective decision could be made. Such kind of information is also useful to attract the investors and other important persons, who can influence the developing of this system.

The concept of innovations must be not forgettable ever. Analysis and thoughts about how it is possible to moderate the e-Health system must be generated constantly. Company persisting to improve their services shows how important customers to the company are. Creating new messages is one of the examples of innovation.

Third lesson from Lithuanian e-Health system study

If e-Health administrators decide not to make an active e-Health services promotion, there is a good solution to follow portal-based Customer relationship management and ensure the pursuance of Website quality criteria (see Appendix 2). Such solution will not encourage the rapid usage of electronic services by customers, but after a while the trustiness of customers will be deserved and the demand will grow. To increase the demand of electronic services is not only the matter of services providing company it is the problem of all society and Government, which should pay more attention on how to develop Information Society and encourage the usage of public electronic services as e-Health services. Without support, as it was gathered during Interview from respondents Mr. Kizlaitis and Miss Lukošaitytė, the customer relationship management and the increase of demand are related with Government. If State Institutions are not very interested or not so advanced on knowledge how to modernize the public health care sector, the clinics initiators instead of paying all attention on e-Health system’s development, must take their time for preparing the documents, plans and persuade the State institutions about the necessity to encourage the society to usage of ICT in their life and so make the health care process go faster, more effective and more beneficial. This is a great lesson for countries developing e-Health system. Customers are the part of value chain and if the society – the matter of whole State institutions; current and potential customers of public health care electronic services – will not be acquainted or able to use electronic services, other actors of e-Health value chain as services providers, ICT suppliers will not be so valuable without the demand, competition and inducement to provide services orientated to customers. The collaboration of services providers, suppliers, customers and state authorities, is a requirement managing customer relationship. The examples are the situation in Lithuania with low collaboration level and the Denmark with high increased collaboration level.
5.7 Suggestions on e-Health improvement

The examples of investigated representative countries show that the development of e-Health system is a big challenge for all countries and processing development it is required for initiative researchers and health care employees, for rapidity to meet and adapt new technologies, for wisdom to create a value chain and for courage to investigate and manage the relationship of customers. According to research findings, author could maintain that the biggest challenges for countries developing e-Health system are knowledge and capability to manage the change in practices and rules integrating IT and reforming frequent healthcare system. For effective management of e-Health system it doesn’t matter is it in the developed or developing countries in this section the main ideas and suggestions according findings of two investigated countries will be given.

As it was mentioned in previous sections, e-Health system is developing creating a valuable chain of services provision, which is supported by effective managements of supply chain and relationship with customers. Experiences of Danish and Lithuanian e-Health developers lead author to conclude the findings of investigation and give guidelines improving the development process.

The value chain could be improved according to further suggestions:

- Before developing present e-Health system, it is advantages to investigate the environment according both micro and macro factors.
- Analysis of foreign practice and control of previous steps developing e-Health system must be initiated creating and improving value chain.
- Close collaboration between health care providers and local or national authorities.
- e-Health developers collaboration with private business actors in health care sector.
- e-Health creators and developers must have a good relations and mutual aims with Information and Communication Technology providers using efficient opportunities of B2B organization.
- Win a material support from authorities or private business companies encouraging an effective development of e-Health system.
- On purpose to deliver beneficial electronic health care services, firstly the management system should be improved.
- All employees and developers of e-Health system must have one common aim - to build up and support a market for e-Business solutions and implementation of ICT in the healthcare sector.
- Increase the usage of ICT in health care provision process motivating and helping employees.
Enable education of physicians through online sources (Eysenbach, 2001).

There is no need to standardize the activity of development strictly when it is implementing in one health care institution. Leave freedom as much as possible making e-Health system valuable at the beginning.

When the e-Health network involves more health care establishments, it is important to enable information exchange and communication in a standardized way (Eysenbach, 2001).

Bearing those general suggestions proper to each country and employing common model of valued e-Health services provision chain the development of e-Health would be more advantageous. According to the findings of investigation, Porter (1998) value chain framework and strategic management approach analyzed by Richardson and Richardson (1992) author have systemized all data and constructed value chain model for e-Booking service common for both researched countries (see Appendix 10). As it is showed in presented value chain providing electronic booking an appointment to doctor services, the development of technologies during all e-Booking process gives grate benefits constantly improving this system and increase advantages managing human resources. Automated booking system reduces the working force of employees and the rest of power could be used in other activities in health care center or improving provision of other health care services. All e-Booking process is electronical automated; therefore there is possibility to reach efficiency in whole service supported activities and create a valuable chain. According to the example of valued e-Booking, similar chains could be created for other electronic health care services or common one for whole e-Health system. Of course, the benefits would be reached all actors of system collaborating firstly between each other at the same level and than integrating all in one utility unit. Therefore further the suggestions on how Supply Chain Management (SCM) and Customers Relationship Management could be improved will be given.

Guideline for effective Supply Chain Management supported by findings in research is:

- Analyze and take advices of practical experience from other countries choosing ICT suppliers.
- To choose respectable ICT suppliers.
- At the beginning of e-Health development process there wouldn’t be too difficult administrate the system by the creators. There is not necessary to hire a company to administrate it. Thus the expenditures could be saved for other development processes.
- Ensure the security of gathering, saving and proceeding data.
- Create an easy navigated e-Health system for employees related to electronic health services provision.
- Integrate activities in one beneficial system.
- Ensure effective control of e-Health system timely denying possible mistakes or damages.
- Create and confirm a list of people responsible for supply chain management.
- Extend the scope of health care delivery beyond its conventional boundaries (Eysenbach, 2001).
Creation of e-Health value chain, effective management of supply chain both those features without practical application and employment to customers would be only the important concepts of developing system. Therefore further the suggestions on how to attract, maintain customers and manage the relations with customers will be presented.

According to research issues, *customer relationships* could be managed following main suggestions:

- Collaboration between services providers, suppliers, customers and authorities.
- Important to collaborate with authorities encouraging Information Society development.
- To define well the segment of customers.
- To create a beneficial database of customer information.
- To ensure effective management of information database.
- To employ efficient techniques to manage data about customers.
- To hire qualified employee to control the system of customer information.
- Use advantage type of customer relationship management.
- It is possible and even more effective to mate more different types managing customers’ relations.
- Developing e-Health it is useful to manage customers through portal.
- Rapidly react to the changes of demand.
- Managing relationship with customers it is important not only to take information from customers but to give to them too.
- Constantly improve and create innovative services.
- Enhance quality of care involving consumers as additional power for quality assurance (Eysenbach, 2001).
- Encourage relationship between the patient and health professional, towards a true partnership, where decisions are made in a shared manner (Eysenbach, 2001).

All advises given above could be consider as guidelines and be useful making a strategic plan developing e-Health system in country. The fact is, that the list of advises will never be over and must be continued regarding to experience. Experience not only by one creator but by many others collaborating together. To create the value chain of activity, the collaboration should be between actors in micro and macro environments. As micro environment author means employees of e-Health system support, suppliers and customers. Macro environment would be expanded involving the collaboration of state authorities and even international actors of others e-Health systems.
5.8 Conclusions

In the chapter of e-Health network analysis there were compared two networks in countries with different level of e-Health development. The main objects of e-Health analysis were the actors of network, the electronic health services, creation of value chain, managements of supply chain and customer relationship. Concluding the findings of analysis, finally the suggestions on e-Health system improvement according to value chain, supply chain management and customer relationship management were given. In the comparative analysis there were found that creation and improvement of value chain is the big challenge for developers and requires attending many of system actors and control relations between them. Therefore European countries developing e-Health system firstly should pay attention on the management and improvement of value chain, which involves and services providers, suppliers, and customers too supporting them by implementation of innovative technologies and effective management.

According to that comparative analysis was made of two e-Health systems, there could arise the feeling of inadequate findings to real situation in other countries. But the value of analysis findings increases because of those two e-Health representatives were in totally different development stage both in health care sector and in all economy. Therefore the findings of analysis are reliable and valid and could be used as practical improved advices developing e-Health system in distinct European countries.
6. CONCLUSIONS AND IMPLICATIONS

6.1 Introduction

The aim of this study has been to investigate European countries, which use Information and Communication Technologies improving Health care system.

In chapter 1 the fundamentals of research were presented describing the research question, which was formulated as: “how European countries develop e-Health using ICT in their Health care system?”, giving fundamentals of the research and presenting delimitations briefly. In chapter 2, specific areas of previous research were examined referencing to the secondary statistical facts and reports of researchers investigated topic related to this study object – e-Health. Analysis of references issue gave the background for the further research. Chapter 3 was committed to present guidelines of research methodology involving the type of research, sources of data, sampling features, instrument of data collection and analysis. Chapter 4 was intended to present empirical data, gathered from survey and case studies of sampled countries Denmark and Lithuania. In this part the situation of e-Health in chosen countries has been described and guided to the thorough analysis, which has been made in chapter fifth. In the chapter 5 the comparative analysis of e-Health situations according three criteria: management of value chain, supply chain management and customer relationships management in appropriate countries was made. In this chapter the aim of research was reached giving suggestions and lessons to the e-Health developers according to experience of countries with different advancement level of e-Health development. In this final chapter 6 author will briefly conclude important findings in the research and discuss possible areas and questions for further researches.

6.2 Conclusions about research question

Current theories and practical experience can help us to understand the situation of e-Health. As it was found in many declarations of European Community, especially in the Sector Report No. 10 (2006), e-Health is declared as a new concept, which is very attractive and have big prospers in modernizing health care services and all the health and social sector. As the main feature and tool for the development of health care sector was found implementation of Information and Communication Technologies (ICT) in the health care business. In this study work was discussed that wide usage of ICT in business change business type in to electronic business, what means, connection of Information and Communication Technologies with health care activities would be involved in one system – e-Health. This concept was the main object in this thesis and it was analyzed on purpose to answer set research question how this system could be developed implementing business solutions. As it was found in most e-Health related references, the development of e-Health is close connected with ICT development too, because it is enhanced through the Internet and related technologies (Eysenbach, 2001). But the findings in case study had shown that developing only ICT in health care sector it is fully not enough. For the efficient development of e-Health, the effective management of business process is required. Especially the findings of Lithuanian e-Health system presented that the encouragement of employees and customers using ICT in their daily and work life have the main influence developing e-Health. If employees will not willingly help to provide health services via ICT and customers will not have possibility to access and use Internet than electronic health services would loose their value. Thus the findings of Danish e-Health system advanced in development of health care system and in
initial stage of development stating Lithuanian e-Health system presents the inconsistent or it should be called better as a complementation of theory developing e-Health systems in countries.

The important remark analyzing e-Health concept in references and comparing with real situations in representative countries was noticed that in references are concentrating more on the explanation of e-Health concept and how it is useful changing traditional health care system into electronic health system. There are mentioned how the implementation and development of e-Health system will “enhance”, “enable”, “extend”, “educate”, “encourage”, “empower”, et al. (Eysenbach, 2001, strategy of Ministry of Health of Republic of Lithuania, 2003) but there are a huge lack of advice or suggestions for developers what to do and how to reach benefits; developers must all parts of e-Health system create by themselves, sometimes looking back at the experience of other countries or even invoking intuition (Kizlaitis, 2007). As Mr. Kizlaitis, developer of e-Health system in Lithuania (2007) declared the traditional theories of business usually are not useful; they loose their value making business acting in information age. The halfway proving of this notice is met analyzing the creation of electronic services value chain. Comparing Porter’s (1998) drawn value chain model and offered a framework of improved value chain model, according to findings in multiple case study, delivering electronic health services presented in appendix 10, there are seen the same parts of chain both in primary and in secondary activities. But if the attention would be paid on the human resource management, there would be noticed that delivering valuable electronic services, there is no need to manage employees in each step of chain. For company it is beneficial because of saving expenditures for extra work force used delivering traditional, not electronic services, furthermore the work power of employees could be saved too and used for paying attention to other business activities. This is a contribution to the management of electronic health care business also to the theory of e-Health, furthermore to the theory of e-Business.

In the literature key dimensions of value chain framework are reflected in the Supply Chain Management (SCM) concept (The European Commission, Enterprise and Industry Directorate General, 2006). According to O’Brien (2006), technology enabled supply chain management helps firms to grow up and develop market, but it is vital to maximize added value by integrating the activities. Findings in Danish e-Health system activities are inconsistent with the literature. In Danish e-Health system, called one of the best systems developed in Europe, working for 20 years activities are connected in one network but not integrated. All services there have their own administrator and are separate subsystems of e-Health system. Here came the question how developers of Danish e-Health system were able to reach such good results in e-Health services development not integrating activities? Research findings of this system returned that each subsystem’s activities were standardized and this led to the beneficial business. In the literature there were not found any confirmation about standardized activities and their efficient, but developer of Lithuanian e-Health system Mr. Kizlaitis was very secure declaring that the success of business is not a standardized activity, but the integration of activities. Those findings in the analysis of Lithuanian e-Health system are consistent with literature and confirm the importance of integration and suggest for other countries developers pay a lot of attention integrating their activities offering faster, more accessible and more acceptable services for customers.

Integrating and automating customer serving processes the Customer Relationship Management (CRM) using Information Technology enables company to focus on customers (O’Brien, 2006) and provide the most attractive services for them. In both cases Danish and Lithuanian e-Health
systems CRM at the beginning were not used especially to attract more customers. Developers of both systems concentrated more on the development of activities but not attracting more customers. Only in Denmark after many years spent in e-Health business the customers were started to attract presenting special information and services for them together involving customers into the development of services provision process. Lithuanian e-Health developers convinced that they don’t use special means to attract more customers. The lack of them is quite a big problem for developers; according to findings of survey, more than ninety per cent (93 %) of respondents didn’t use e-Health services. In this case, the problem was the deficit of financial resource. But Lithuanian developers found the way how maybe not to attract but to retain the customers via Internet pursuing authority set Website quality criteria. More or less this could be called usage of CRM type - portal-based. In the literature of CRM there were not found any reference to the Information Society, which is the target group of e-Health services customers. Findings in case studies showed that development of Information Society impacts the most on the usage of electronic health services. Therefore during the research process there were found out that e-Health developers without possibility to attract customers by themselves require help of authority, to encourage the society use public health care services via innovative Information and Communication Technologies. Thus the concept of Information Society development is a contribution to the theory and to the effective development process in other countries involving activities of authorities.

Concluding briefly what is the issue of made research the explicit list is presented below:

- Findings in multiple-case study compliment e-Health theory that developing e-Health system implementation and development only of ICT in health care sector it is not enough. For the efficient development of e-Health, the effective management of business process is required.

- Value chain of electronic services is different from traditional not electronic services valuable provision. The main seeable different is less human resources required delivering electronic services.

- e-Health development through effective management of supply chain principles varies in cases. Findings in research of Lithuanian e-Health system contributes with declarations in references but findings in Danish case study doesn’t contributes with findings in Lithuanian e-Health situation and there were not found any strong confirmation in references about Danish principles managing supply chain. References and findings in Lithuanian case study declare that for the effective supply chain management the integration of activities is beneficial for e-Health development. In Denmark, integration of activities is changed to the standardization of each activity separately. This lead Danish e-health developers to the problem of often required monitoring of standards.

- Types and principles of Customer Relationship Management (CRM) are different in both studied cases but there were found that they are not going out of boundaries mentioned in references. The main communality between both cases and theory is request for the development of information society, which impacts the usage of e-Health services.

- Channels and principles developing e-Health system through effective Customer Relationship Management can be different in all countries, as the findings in multiple-case study have shown. Comparing findings in cases with theory advantages types of
Customer Relationship Management could be operational, portal-based management and analytical Customer Relationship Management. For countries being at the initial stage of e-Health development and creating effective network of e-Health the operational management of customer relationship would be advantageous connecting with them directly through mobile devices, internet or simply stationary phones. Improving the e-Health system adoption of portal-based type of management would be useful on purpose to react quick on the customers needs, demand and to control them. Advancing in e-Health development the portal-based management type could be improved accomplishing with analytical type of CRM, when the database of customers are created and already gives beneficial information sharpen the management of customer relation up.

6.3 Implications for theory

The previous studies done on the e-Health have focused on different points. Most of them analyze the implementation of ICT in health care sector or what electronic health services are provided in different countries. This study have presented new point of e-Health where author wanted to say that it is enough only to analyze current situations. It is time to help countries to create and develop e-Health system giving proper suggestions on what the attention should be paid more for rapid and effective development. Analysis of research issue have shown that there are made good investigations where useful information about organization and management of health care institutions could be found, the concept of e-Health is defined and explained understandable, but there was missed theory of e-Health business. Therefore findings in the multiple-case study and analysis of data in master study are beneficial developing e-Health theory incorporating ordinary business solutions as value chain creation conforming it to electronic business and especially to the e-Health business. Thus the findings of this study imply not only e-Health theory, but e-business too. Other analyzed business solutions: Supply Chain Management, Customer Relationship Management are broadly analyzed in previous researches, but in this study work investigated data can imply e-Health theory too offering suggestions what important actions must be done for effective management of e-Health system.

6.4 Implications for public state authorities

Because this study work was made limiting it with public organizations in health care sector depending on government and other state authorities, thus the needs and possible implications raised for state authorities policies improvement. The findings in multiple-case study often met a question why government doesn’t intervene in the e-Health development process as it is necessary to reach effectiveness and benefits. Therefore findings in this research should encourage the development of procedures of state authorities related to health care sector and especially to e-Health. According to the research findings the main fields for state authorities developing e-Health could be as listed below:

- Organize active moves encouraging development of Information Society (this is one of the most important criteria, according to Lithuanian practice);
- Organize dispenses of government expenditures to health care sector according more to the needs of efficient e-Health development (as Lithuanian e-Health developer Mr. Kizlaitis declared: “without state financial support the development of e-Health would...
take to long”. Even well developed Information Society wouldn’t help much without resources to satisfy the demand);

- Help for e-Health developers to prepare plans for support from international funds;
- Collaborate together with e-Health developers legalizing e-Health activities and principles. It means that law shouldn’t stop the development of e-Health).

6.5 Implication for further research

e-Health care is a wide topic related to many entities and this study was made widely limiting it. There was concentrating on the European countries and on the involvement of public health care institutions also analyzing e-Health development on three factors: value chain creation, Supply Chain Management and Customer Relationship Management. The analysis also was limited over the business model B2C not involving business actions on B2B, C2B or C2C. Furthermore in this study work was investigated only two cases. All those limits encourage the further researches on e-Health development which should involve more important fields of e-Health. Firstly future researches could be made accomplishing results of this study incorporating more European samples of study. For instance, analyzing more countries advanced in developing e-Health, like UK, Germany, Spain, Sweden and comparing the results with research findings investigating countries just started to develop e-Health system, for example, Latvia, Estonia, Poland, Czech Republic and more others. Secondly the further research could focus on involvement of both public and private health care entities creating valuable e-Health network and analyzing more possible business channels, like services provision interacting business companies together (B2B) or customers with customers (C2C) who encourage the development of e-Health system sharing health information between each other chatting in specialized forums. Thirdly, the e-Health could be improved analyzing and creating models implementing more business solutions. In this study work there was focusing on three marketing “P’s”: creating valuable services, supplying those services effective managing supply chain and promoting customers to encourage the usage of services managing relationship of customers. Here is left fourth marketing “P” – price, which influence was delayed in this study work analyzing the e-Health development possibilities. Therefore the further researches should include reimbursement principles of e-Health too, which would be advantages creating fully ready, efficient model of e-Health development in country or creating international e-Health model. Moreover the international researches involving countries out of Europe boundaries would create a beneficial world wide e-Health network. Thus there are still left many fields for the investigation of e-Health. But it is important to start and have beneficial guidelines how the object could be developed further. The first proper steps of e-Health development were made in this study work, which will guide other researches to improve e-Health and reach the greatest economy saving costs in service sector as it is purposing of European Commission and Enterprise Directorate General (2003).
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# HEALTH CARE EXPENDITURE, % OF GDP

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## QUALITY CRITERIA FOR HEALTH RELATED WEBSITES

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<tr>
<td>information put up on the site, including dates at which credentials</td>
</tr>
<tr>
<td>were received.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Privacy and data protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Privacy and data protection policy and system for the processing of</td>
</tr>
<tr>
<td>personal data, including processing invisible to users, to be clearly</td>
</tr>
<tr>
<td>defined in accordance with community Data Protection legislation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Updating of information</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Clear and regular updating of the site, with date of update clearly</td>
</tr>
<tr>
<td>displayed for each page and/or item as relevant. Regular checking of</td>
</tr>
<tr>
<td>relevance of information.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accountability</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Accountability - user feedback, and appropriate oversight responsibility</td>
</tr>
<tr>
<td>(such as a named quality compliance officer for each site).</td>
</tr>
<tr>
<td>• Responsible partnering - all efforts should be made to ensure that</td>
</tr>
<tr>
<td>partnering or linking to other websites is undertaken only with</td>
</tr>
<tr>
<td>trustworthy individuals and organizations who themselves comply with</td>
</tr>
<tr>
<td>relevant codes of good practice.</td>
</tr>
<tr>
<td>• Editorial policy - clear statement describing what procedure was used</td>
</tr>
<tr>
<td>for selection of content.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accessibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Accessibility - attention to guidelines on physical accessibility as</td>
</tr>
<tr>
<td>well as general findability, searchability, readability, usability,</td>
</tr>
<tr>
<td>etc.</td>
</tr>
</tbody>
</table>

Source: Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the regions, 2002
APPENDIX 3

SURVEY QUESTION ON LITHUANIAN NEWS PORTAL www.delfi.lt
(Circled in red)
INTERVIEW GUIDE

About the system work process (Value chain, SCM,)

1. The beginning of systems creation.
2. Was the plan prepared for the creation of system? Who was responsible for this?
3. Did the developers take in consideration the practice of other countries, clinics?
4. Where the standards created?
5. Who administrates the system and supplies all necessary equipments?
6. Does the system work according to the plan?
7. What electronic services are provided to employees?
8. What was the reaction of employees implementing ICT in their daily work?
9. Were the employees motivated to use ICT; how were they motivating?

About customers (CRM)

1. How developers think about the e-Health system intended to patients in their clinics?
2. Do the developers think that services are fully adequate to the patients’ wishes?
3. Are the customers motivated to use electronic services? How are they promoting the usage of electronic services?
4. Is the service supported after the main services provision? (ex. reminder about appointment, information about changes, etc.)
### RESULTS OF ON-LINE SURVEY ON [www.delfi.lt](http://www.delfi.lt)

**Survey findings translation in English**

**Question:** Have you ever tried to book an appointment to doctor via Internet?

<table>
<thead>
<tr>
<th>Answers</th>
<th>%</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, always</td>
<td>2</td>
<td>186</td>
</tr>
<tr>
<td>Yes, sometimes</td>
<td>2</td>
<td>148</td>
</tr>
<tr>
<td>Have tried, but not successful</td>
<td>3</td>
<td>211</td>
</tr>
<tr>
<td>No, I have never tried</td>
<td>36</td>
<td>2889</td>
</tr>
<tr>
<td>I didn’t know about such a possibility</td>
<td>57</td>
<td>4605</td>
</tr>
<tr>
<td><strong>Totally:</strong></td>
<td><strong>8039</strong></td>
<td></td>
</tr>
</tbody>
</table>
THE DANISH HEALTH DATA NETWORK

![Diagram of the Danish Health Data Network](image)

Source: Wanscher, Voss, 2006
TIME PLAN OF NATIONAL AND INTERNATIONAL MEDCOM PROJECTS

Source: Wanscher, Voss, 2006
WEBPAGE www.santa.lt

Lithuanian version

English version
PROCEDURE OF E-BOOKING

1. Press on the e-Booking (customer is automatically transferred to the new portal [viva.santa.lt](http://viva.santa.lt))

2. Clicking on the first link – search by speciality (the list of different specialities of doctors appear)
3. Clicking on the chosen speciality (the list of all doctors of chosen speciality appear)

4. Marking the chosen doctor and clicking the link „Appointment time“ (the list of available times appear)
APPENDIX 9 (sequel)

5. Clicking on the chosen time (system requires to be authorized to finish booking process)

Please authorize yourself before going further

Don’t have password. Would like to be registered in the system
### VALUE CHAIN MODEL FOR E-BOOKING SERVICES

#### SUPPORT ACTIVITIES

<table>
<thead>
<tr>
<th>Technology development</th>
<th>Implementing and improving new programs to increase efficiency and revenue for services providers</th>
<th>Development of information submission and acceptance; exploration procedures</th>
<th>Integrated registration system in whole e-Health system</th>
<th>Creation of new services enlarging the supplement information after registration</th>
<th>Greater capability to provide precise services; supplement main services, ex. automatically send SMS reminder about coming visit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human Resource Management</td>
<td>Skilled and innovative workforce able to undertake and control the input-output operations</td>
<td>Qualified managers able to investigate data of demand and customers</td>
<td>Efficient researches and development on demand</td>
<td>Standards offering qualitative services</td>
<td></td>
</tr>
<tr>
<td>Management systems</td>
<td>Organization and control of access to system</td>
<td>Well defined role of registration system’s administrator. Quality system</td>
<td>Good time planning and scheduling system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td>New licenses awarded by the government</td>
<td>Technology for exploration, effective input-output of information</td>
<td>Cooperation with ICT support companies</td>
<td>Knowledge of market and establishment of regular customers</td>
<td>High priority on safety</td>
</tr>
</tbody>
</table>

#### PRIMARY ACTIVITIES

- Patient’s access to the portal
- Information submission and acceptance
- Registration
- The evolvent of registration facts; Acknowledgement for using system
- Extra service after registration

Source: Own edition according to guidance of findings in Danish and Lithuanian e-Health systems, M. Porter (1998) value chain framework and Strategic management approach by Richardson & Richardson (1992).