Sustainability Initiatives in the Healthcare Sector
Challenges and Opportunities for Businesses and Support Agencies

Master Thesis by:

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Abstract

The paper presents and empirically explores sustainability initiatives in the healthcare sector. Through comprehensive literature review and semi-structured interviews it analyzes what are the consequences (economical, environmental, social) of current healthcare practices. Second, it captures what kind of eco-innovations are predominantly implemented in diverse healthcare institutions. Moreover, study explores what are the motives of diverse individuals or organizations whose activities are related to healthcare, as well as the opportunities and limitations which they face in the implementation process of certain types of sustainable innovations. In addition, the research explores the novelty of incorporating sustainability in the healthcare sector in countries that rather adopt eco-innovations from the external environment than invent them. The study provides a summary of different stakeholders (international organizations, government institutions, NGOs, companies and others) and analyzes which stakeholders do and can foster the implementation of environmental innovation and in which ways. This is very important not only for a better understanding of the subject, but it signalizes the course of actions which different market actors should take in the future.

Keywords: sustainability, healthcare, diffusion of innovation, eco-innovation, international organizations, United Nations, Serbia
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I Introduction

“When the winds of change blow, some people build walls and others build windmills.”

Chinese proverb

1.1. Problem Statement

1.1.1. Sustainability and healthcare

In June 1992, the United Nations Conference on Environment and Development (known as the Earth Summit), was held in Rio de Janeiro and the concept of sustainable development was adopted. This concept of sustainable development that we mostly use today is defined by three pillars: economic development, social development and environmental protection. What we tend to be less familiar with is how the "triple bottom-line" of sustainability framework is being applied to the healthcare sector, or most important, what are the ways of meeting the healthcare needs of today's population, as well as the future generations.

More than twenty years after the Earth Summit, a number of proposals and projects have been made for the advancement of "sustainable development goals" and the green economy is seen as a vehicle of sustainable development (United Nations General Assembly, 2012). Green economy is defined as: "an economy that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities" (ILO et al., 2013). This indicated that there is a need for a change in our current practices, including the healthcare.

Sustainability measures designed to reduce water, energy, waste and costs have a direct financial return on investment (Johnson & Johnson Services, 2012), but healthcare will need to be delivered in ways that are no longer only financially sustainable, but environmentally sustainable as well (Naylor and Appleby, 2012). In 2011, globally, the total health expenditure was 10.1% of GDP (The World Bank, 2013), but there was a group of countries, including the United States of America and west of European Union countries, with even higher levels of expenditures up till 19.6% of GDP (Figure 1.1).
Considering the amount of money spent on healthcare, apparently any activity on this scale, inescapably has consequences for the environment and society (Naylor and Appleby, 2012). As a result, there is a necessity to plan comprehensively any activity related to healthcare.

In the last two decades, as sustainability is becoming increasingly apparent and adopted throughout various companies, government institutions and international organizations, healthcare organizations and manufacturers embraced social, environmental and financial sustainability throughout industry (Johnson & Johnson Services, 2012), underpinning all dimensions of the green economy (UNEP, 2013). These initiatives followed the principles of sustainable development and incorporated them in the very core of their businesses and operations and related them [principles] to healthcare in terms of safety, environmental protection and product and production responsibility (Bayer, 2012; Johnson & Johnson Services, 2012). Moreover, national initiatives (Centre for Sustainable Healthcare, 2013) engaged with healthcare professionals and the wider community, raised the awareness about an important connection between the environment and health and why sustainable practices need to be implemented both at home and work.
1.1.2. Healthcare goes green

Our current lifestyles and economies are based on a large range of services and goods for whose provision key role play manufactured chemicals. With a threat of some current business practices that are based on using toxic chemicals in offering their goods and services, we have cases of its devastating hazards on our health and our ecosystems (EEA, 2013). Contamination caused by toxic chemical can cause anything from harm to the environment and animal life (Price and Readman, 2013), to rare cancers (Soffritti et al., 2013) and lethal or severely debilitating mental and physical diseases (Yorifuji et al., 2013). The newest results at our hands show that toxic chemicals are contributing to the epidemic of diseases around the world and disruptions in the climate are contributing to a whole pack of health issues that affect everyone on the planet. In the context of this environmental crisis, healthcare needs to transform itself to be a force for a greater healing on the planet (Health Care Without Harm, 2013). Healthcare was always concerned with healing the patients, but now it needs to be concerned with healing the entire community and the environment that sustain us all.

When we talk about costs, we usually think about the costs of our actions. How much will it cost us to explore a new field of technology, how much does it cost to invest in a new production facility, how much more it would cost our company to change its business practices, for instance, to be sustainable. If that is not necessary, why should we spend more? What is left out of this picture is something that mostly public institutions and international organizations need to draw peoples’ attention to, and it is an understanding of how much some business practices that cost them (companies and institutions) less today, will cost the society unimaginable more in the future. If I would tell you that costs of some actions are paid in millions of lives, new cases of diseases and dysfunction, damaged environment and species, and lastly there are even severe economic penalties (on which we first think when it comes to costs), would you prevent those actions? Would you direct their paths in different ways? Are you personally aware of costs of our inaction?
With the technological advancement we have at our disposal and consciousness about the negative affect of solely toxic chemicals for example, we need to start implementing ecologically sound and healthy alternatives to the practices that pollute the environment and contribute to diseases (Health Care Without Harm, 2013). Ongoing discussions in the recent years revealed that there are many forms of green, eco-friendly economies that vary depending on the context of different countries. To facilitate the green economy, a broad range of policy instruments needs to be applied, market-based approach taken, all in combination with appropriate regulatory mechanisms and investments that will stimulate research and innovation (Sha, 2012). As a vital part of an economy, healthcare sector must also be included in the process of reducing the impact it has on the environment. There is a number of suggested ways to achieve this including the reduction of carbon footprint (Subaiya et al., 2011), improving energy efficiency in hospitals (Naylor and Appleby, 2012) or even a drastic view of reducing the scale of clinical activities, with an aim of reducing the overall quantity of toxic materials and general waste (Pierce and Jameton, 2004).

Considering all the efforts of international organizations and some particularly innovative national healthcare systems (e.g. National Health Service in United Kingdom; The Healthier Hospitals Initiative in United States) in making the healthcare sector more sustainable and "green", it is interesting to research what is the situation in the healthcare sector in countries with less resources at their hands to innovate or even adopt the latest eco-innovations. For that reason, it is noteworthy to interview C-level healthcare executives to understand how they see the latest innovation trends in the healthcare; how much they are able to adopt eco-innovations and being the gatekeepers in the organizations they work, how do they influence the innovation process. Since the health research can potentially affect the environment and the society, including our future generations, seeking answers to previously mentioned issues will have a wide patient and public relevance (NIHR, 2010).

Hospital executives are struggling with a number of issues (technological, financial, institutional), but the most important one may be how to introduce a sustainable healthcare. Given the complex facilities and range of activities that are involved in
delivering healthcare, incorporating sustainability into clinic or hospital operations can be exceptionally demanding (Boone, 2012). However, senior leadership can play a critical role in encouraging staff to engage with environmental sustainability (Dangelico and Pujari, 2010; Heslin and Ochoa, 2008; McConnell, 2009) and crucial for achieving success in reaching lasting environmental sustainability in the healthcare organizations with their commitment and support (HHI, 2013). To develop the healthcare sustainably, in this time of global social challenges it is necessary to use scientific expertise and innovative capability (Bayer, 2012). As guardians of the nation’s health, hospitals are in the best position to lead the other parts of the economy to healthier operations, with corresponding health benefits (Health Care Without Harm, 2013). While it is important to follow the latest trends in any industry and study the development processes of the most advanced countries in the world, it is also important to see how these trends are being followed by many other countries that we can consider as "followers." In this context, countries defined as "followers" are considered as countries that are not at the front-line of extensive investments in the innovation processes that will make the healthcare sector "greener." How much and in which ways exactly do healthcare executives from the "follower" countries understand and implement diverse innovations to "green" the healthcare sector are important questions to discuss and study.
1.2. Research Questions

The basis of this study is finding an answer to the following research questions:

1. In the context of a country that rather adopts than invent eco-innovations in the healthcare, what kind of eco-innovations are implemented?
2. What are the barriers and drivers which different stakeholders face in the implementation process?
3. Who are the stakeholders that should foster the implementation process of eco-innovations?

Answers to all three research questions are explored with both qualitative and quantitative data obtained from comprehensive literature review, as well as from case studies and semi-structured interviews. The contribution of the thesis to the existing work of literature is that it analyzes not only what are the consequences of current healthcare practices; but through different case studies it shows what kind of eco-innovations are predominantly implemented in diverse healthcare institutions, with varying outcomes. The study captures motives from diverse individuals or organizations whose activities are related to healthcare, as well as their opportunities and risks which they face in the implementation process of certain sustainability initiatives. In addition, the research explores the novelty of incorporating sustainability in the healthcare sector in countries that rather adopt eco-innovations from the external environment than invent them. Moreover, through a summary of different stakeholders (international organizations, government institutions, NGOs, companies and others), the study analyzes who of them do and can foster the implementation of eco-innovations and in which ways. This is very important not only for a better understanding of the phenomena, but it signalizes the course of actions which different market actors should take in the future. Second, one of the most important contributions of this thesis to the existing literature, is the connection drawn between international organizations and national public institutions. Lastly, this study shows the significance of eco-innovations, even incremental ones, in tackling pressing global issues.
1.3. Summary of the thesis structure

To ease the process of reading this paper, a summary of the thesis structure is provided, along with a short description of the content of each chapter.

Chapter I: Introduction
The introduction describes a broader context of the thesis, allowing reader to understand the background of the subject and showing how and why sustainability is being increasingly incorporated in the healthcare in diverse ways.

Chapter II: Literature Review
This chapter offers a reader a better understanding of the research focus through critically presenting diverse literature views on the studied phenomenon.

Chapter III: Methodology
This chapter presents the methodology of the study, explaining more in detail why a certain research philosophy, approach or a design is chosen by the author as the most appropriate in answering the research questions.

Chapter IV: Analysis
This chapter offers a detailed analysis of the research findings. Findings are drawn from interviews with C-level executives from institutions and organizations related to healthcare. Examples of implemented sustainability initiatives in the healthcare and the most important stakeholders in this implementation process are described.

Chapter V: Discussion
Considering the qualitative and quantitative data obtained in this study, this chapter discusses what is the applicability of these findings in the real-world practice.

Chapter VI: Conclusion
This chapter concludes the study with offering answers to each research question. It offers key recommendations for diverse stakeholders how to act in a more sustainable way in the future and to foster the implementation process of eco-innovations in the healthcare sector. Suggestions for further research are also offered.
II Literature Review

2.1. Research Gap

Looking at the existing work of literature that primarily converges in the field of innovations in the healthcare sector, I tried to understand how much exactly is the term eco-innovations present in the healthcare and whether these innovations are important to healthcare executives. Moreover, healthcare executives considered in this study are regarded as the frontrunners and gatekeepers of change in their organization. Since they take certain steps in their decision making processes which notably influence the future of any matter considered, it is noteworthy to recognize in which ways they make these decisions. Identifying the model of the decision making processes in the healthcare, offers an opportunity to researchers, policy makers, businesses and support agencies to understand how to foster innovations in the healthcare, with an aim of making it more "green."

Innovations in the healthcare are widely covered area, but still with research gaps to fill in. Innovation is seen as an important part of change towards a better functioning system or an organization and this is also reflected in numerous healthcare related research papers. Not only that innovations were sought as necessary in diverse parts of healthcare system, but also researchers investigated a number of different ways of successfully implementing innovations in the healthcare organizations. Particularly, May (2013) researched the implementation of healthcare innovations in practice, but his model focused on the Normalization Process Theory. Bullinger et al. (2012), considered that open health platforms might bring to light the unexpected, good innovations and they researched how these innovations might be implemented successfully. Thakur et al. (2012) researched, similarly to my study, how are healthcare innovations seen through the eyes of top-level executives. However, in their research, C-level executives were asked about their understanding of the term innovation in the healthcare with a focus on the sole role of IT innovations, rather than environmental innovations.

Since IT innovations adoption and diffusion are predominantly researched when talking about the innovations in the healthcare (Zhang and Liang, 2012; Ward, 2013), I decided to
focus on capturing the role of eco-innovations in the healthcare sector, with an aim of understanding how important it is actually to implement environmental innovations in the practice, either in products (e.g. medicines) or equipment that physicians use. Tarrass et al. (2010), for example, researched how innovations in care technologies and medical equipment can have a significant impact, but they based their study particularly on water conservation in renal dialysis as a design for generating carbon and cost savings.

Lastly, Rosenberg-Yunger et al. (2008), did research in the direction of how sustainability is implemented in the healthcare through innovations. However, they tried to grasp the situation with primary focus on biotechnology and from an outside perspective, looking at the healthcare and the government. Moreover, they based their research on the Canadian system, along with many other scientists that researched mostly the most advanced healthcare systems, rather than the adopter ones. The vast majority of the literature is concerned with exploring the situation of the healthcare innovations in the countries that can be considered as pioneers or very advanced in their innovative activities. Therefore, I decided to explore the situation in the healthcare sector in Serbia, as it might give a fresh, practical insight to the existing work of literature. Moreover, it will show how much do executives from "follower" countries pursue the newest trends in the healthcare and if they consider that turning their operations towards a more environmentally friendly way is beneficial, how do they conduct this process.

2.2. Issues that concern the healthcare sector

Environmental destruction caused by the climate change concerns not only the development, but public health as well. There are many issues of concern that have effects on health including the climate change, inefficient waste management, toxic materials (mercury, PVC, cleaners, pesticides), toxic chemicals, pharmaceuticals, unhealthy food systems, etc. Concerning solely the effects on health by the climate change, they will be felt by most of populations in the following decades and lives and wellbeing of billions of people will be put on an increased risk (Costello et al., 2009). Moreover, the health sector itself contributes immensely to the Greenhouse Gas (GHG) emissions, which have not been quantified yet on a global scale. However, estimates for the Europe’s health care sector show that with around 15,000 hospitals, European
healthcare sector contributes to GHG emissions with approximately 250 million tons of CO\textsubscript{2} per annum (LCB-Healthcare, 2011). This figure is similar to emissions of international aviation and maritime transport activities of EU 27 Member States. In addition, data from the National Health Service (NHS) England show that NHS contributes by 25% to the overall public sector GHG emissions (SDC, 2008). Over 59% of these emissions are due to the procurement of products and services, of which the largest component was the procurement of pharmaceuticals. These empirical data raised the issue of procurement and its potentially important role in greening the healthcare sector. Evidently, contributions of the health sector are not negligible.

Looking at the actors which deal with harmful substances, we can see that healthcare and other large institutions have a particular ethical responsibility to use of chemicals which pose less risks to human health, and this seems to address the problem, with also sending a positive signal to other leading industries (Greiner et al., 2006). What is more, there are positive example of companies (Dell, H&M, Ikea, Collins & Aikman), committed to use safer chemicals, which show how innovation can be not only feasible, but most important, a profitable solution that other companies can follow. Seeing these examples, some might think that other companies will get active as well in switching from the use of toxic chemicals in their practices to the green chemicals. However, this should be taken with a hold since companies tend to have number of reasons why they do not implement sustainability in their businesses (Laughland and Bansal, 2011). Some of the reasons are said to be: the difficulty of discriminating between the most important opportunities and threats on the horizon; too many metrics that claim to measure sustainability; consumers do not consistently factor sustainability into their purchase decisions or there is no common set of rules for sourcing sustainably.

2.3.1. Externalities and healthcare

Externality is defined in the economic literature as a consequence of an economic activity experienced by the unrelated third parties (Buchanan and Stubblebine, 1962; Investopedia, 2013). An externality can be either negative or positive. For example, if a factory pollutes the environment, it affects the health of the population that lives in the factory’s surroundings. This is a negative externality. In cases when a factory employs
well-educated employees, they can raise the productivity of that factory. This is a positive externality. Externalities are also present and related to health and healthcare sector. Diverse business and public actors through their activities impose negative effects on the environment and population’s health. These actors include also diverse stakeholders related to healthcare sector, and this is why healthcare sector needs to adapt its activities to sustainability principles, while downsizing the negative externalities it causes on the environment and people’s health.

International organizations are addressing these rising concerns about the non-sustainable practices of both business and public sector and offer credible information that might be used for fostering more environmental-conscious innovations. However, what these innovations may be? There has been criticism on those researching and developing technological innovations that they often fail to acquire relevant existing knowledge from other disciplines, as well as that governments tend to use methods from the past to monitor the potential hazards of future technologies, rather than implementing more advanced, flexible and relevant approaches (EEA, 2013).

Looking at the history, there is a number of inventions and business practices that were expected to yield great benefits for the companies and the overall society, but that were exploited with a negative influence in diverse fields that was either neglected or not recognized at first. For example, it was believed that the invention of pesticides will eradicate hunger, but we now we face pesticide poisoning (WHO, 2001), animal and human sterility (Bingham and Monforton, 2013), as well as pollution problems of considerable size (FAO and WHO, 2007). Chlorofluorocarbon (CFC) used for the refrigeration was considered to be an invention of the century, but as a result of its immense use and according to the Montreal Protocol, this substance is considered to be one of the most important that contributed to ozone depletion in the upper atmosphere (UNEP, 2012). Could toxic practices, inefficient waste management or other non-sustainable practice lead to another environmental, economical or social crisis? What is more important, what are the practices (environmental innovations) that healthcare stakeholders can change or already changed with an aim of greening the healthcare and making it more sustainable?
As a researcher, I found it quite interesting to explore this phenomenon, since it is correlated with important aspects of peoples’ lives, such as environment, society and economy. Moreover, it is noteworthy to explore how global issues, toxicity, pollution, diseases cause by non-sustainable activities that have manifold consequences, can be perceived as a significant issue (in monetary and non-monetary terms) from a companies’ and policy makers’ perspective. Moreover, study explores how we address these issues with innovation.

2.3. Sustainable approach to healthcare

On June 5, 2007, UN Secretary General Ban Ki-moon took the first step in leading the UN towards greater sustainability by openly calling all UN agencies, funds and programs to “go green”. This was a signal to everyone that there are both social and environmental challenges that need to be faced in the twenty-first century. In a growing number of publications and projects started by international organizations (ECA, 2013; IISD, 2013; UN, 2013), sustainability agenda is highlighted. Since sustainability agenda is becoming increasingly apparent, researched and sought to be implemented globally by international organizations, the researched phenomenon becomes even more important, and the questions proposed in this study, of a strategic importance not only for the public institutions, but also for the society.

What is the current situation of implementing sustainable approaches to healthcare? Naylor and Appleby (2012) examined the connection between environmental and financial performance in the healthcare, and found that a common case is that policy framework tends to create barriers which discourage organizations from taking more sustainable approaches in their practice. Moreover, healthcare organizations need to take a dual approach towards environmental sustainability, including both direct and indirect actions (Table 2.1). Since this study’s focus in on a healthcare system of a country that rather adopts eco-innovations than inventing by itself, it is noteworthy to explore which kind of innovations, behaviors and policies are adopted. Eco-innovations have a certain peculiarity that they are determined by not only market pull or technology push, but also with a government pull (Rennings, 2000). This will be discussed more in detail in the Section 2.4.1.
From that point of view, eco-innovation cannot exist without the government, on the other hand it can also be it’s stumbling block. Some of the most contributing government efforts to environmental clinical practice may be the ones listed in the System governance and polices in the Figure 2.1. Their presence would ease the decision-making and implementation process of eco-innovations in the healthcare. Boone (2012) believes that an executive that advocates for sustainability, expressing sustainability initiative in the mission and vision of the institution and performance management system proved to be key organizational elements that can effectively support the sustainability initiatives. Can this be applied to the public sector healthcare executives dependent on the government regulations?

<table>
<thead>
<tr>
<th>Innovation</th>
<th>Behaviors, attitudes and cultures</th>
<th>System governance and policies</th>
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<tr>
<td><strong>Direct</strong></td>
<td>- Less resource-intensive buildings and equipment</td>
<td>- Developing metrics for sustainability</td>
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<td>- Low carbon care pathways</td>
<td>- Identifying levers at national level (e.g., financial incentives, regulation, targets)</td>
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<td>- Reducing ‘care miles’ through tele-care, care closer to home, etc.</td>
<td>- Improving data systems for environmental accounting</td>
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<td>- ‘Green’ drug manufacturing</td>
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<td>- Improved waste management</td>
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<td>- System preparedness for environmental change</td>
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<td><strong>In services</strong>:</td>
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<td></td>
<td>- Engaging professionals and developing leadership for sustainability</td>
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<td>- Sustainable procurement and commissioning practices</td>
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<td><strong>In society</strong>:</td>
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<tr>
<td></td>
<td>- Engaging public and patients in sustainable service delivery</td>
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<td></td>
<td>- Building community resilience to health impacts of environmental change</td>
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<td><strong>Indirect</strong></td>
<td>- Prevention, shifting care upstream</td>
<td>- Understanding incentives or drivers for prevention, care closer to home, integrated care</td>
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<td>- Efficient, effective care</td>
<td>- A policy framework that permits a long-term focus in organizations</td>
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<td>- Well coordinated, integrated care</td>
<td>- Enabling hospital reconfiguration</td>
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<td></td>
<td>- Effective medicines management</td>
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<tr>
<td></td>
<td>- Patient empowerment, self-care, enablement</td>
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<td><strong>In services</strong>:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- ‘Learning organizations’ that encourage experimentation</td>
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</tr>
<tr>
<td></td>
<td>- Devolving managerial powers to clinical teams</td>
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<td>- Clinical behaviors (e.g. addressing variations)</td>
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<td><strong>In society</strong>:</td>
<td></td>
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<tr>
<td></td>
<td>- Promoting healthy behaviors</td>
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</tbody>
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Table 2.1 - Changes needed to deliver more sustainable health and social care
Source: Naylor and Appleby, 2012
In case if the government measures are not present in the context of some countries, healthcare executives might face difficulties of implementing eco-innovations in their organization besides the fact they are aware of them. If this proves to be correct, healthcare executives interviewed in this study will, without government policies and long-term strategies, bear many difficulties in their decision-making processes for implementing eco-innovations. After all, as Damanpour and Evan (1984) argue, if organizations want to implement innovations all stakeholders must support and contribute to this process (participatory management is needed).

Atun et al. (2007) also examined different influences on innovation process and came to the same conclusion as we discussed previously in the Table 2.1. What they realized is that the stakeholders’ perception of the innovation, consensus among participants, interactions of the innovation and importantly the context, all influence innovation process. The context can be either internal or external. Internal such as the top management, organizational structure or culture, decision-making process, and external such as market trends, safety compliance or government regulations. Therefore, it is very important to understand what exactly may influence the innovation process in the health sector in Serbia, to truly understand the process as it is.

One of the aspects of environmental approach to healthcare may be to implement eco-standards in the physical environment (clinics or hospitals). Among commercial building types, the average hospital uses more total energy than any other type, and this is also why service industry like healthcare must begin aggressively to embrace sustainability (Boone, 2012). It is interesting to see the practice in United States, where the focus on greener facilities has led the U.S. Green Building Council to develop specifications for Leadership in Energy and Environmental Design (LEED) certification specifically for the healthcare institutions, as well as initiatives that provide resources for those that are changing industry practices, such as Practice Greenhealth’s “Greening the Operating Room” initiative (Johnson and Johnson, 2012). Evidence from healthcare industry show that these initiatives of changing practices are a requirement for implementing innovations (Van Schaik et al., 2002).
2.4 Innovation and it´s importance in the healthcare

2.4.1. Eco-Innovation

It is noteworthy to consider how the existent literature explains the term *green innovation*, or known as *eco-innovation*. With a better understanding of this phenomenon, it will be easier later to understand how new environmentally friendly ideas and technology are spread among, in case we are interested, members of a global healthcare system and it´s local subsystems.

Green innovations are seen as: "more intelligent product design, greater resource efficiency, lower inputs of natural resources, lower emissions, and less waste and pollution" (Sha, 2012). Not only that this type of innovations is increasingly regarded as an intelligent innovation, but is reflected in the government strategies as a key to sustainable and improved product development (Parliament UK, 2005).

When was exactly *eco-innovation* introduced as a term and by whom? It was introduced by interdisciplinary project “Innovation Impacts of Environmental Policy Instruments,” which defined it quite broadly (Klemmer et al., 1999). According to authors of this project, an innovation could take on a name *environmental innovation* if it contributed to a reduction of environmental burdens or to ecologically specified sustainability targets. This principle was applied to all innovations considered as measures (ideas, behavior, products and processes) developed and introduced both by firms and nonprofit organizations.

Rennings (2000) distinguishes four different types of eco-innovations:

1. **Technological** eco-innovation - e.g. environmental technologies,
2. **Organizational** eco-innovation - e.g. management instruments (eco-audits),
3. **Social** eco-innovation - e.g. changes of lifestyles and consumer behavior and
4. **Institutional** eco-innovation.

Why is it important also to distinguish different types of eco-innovation? It is particularly important since many companies still tend to think that they are innovative just because they are making progress focusing strongly on their technological progress. Since the use of natural resources primarily does not refers to a technological questions, this may lead to
a “technology bias.” Norgaard (1984) identifies and examines unsustainable development and concludes that it is of outmost importance that: “incentives and regulations must evolve with technologies.” Freeman (1992) also acknowledges this by stating: “Organizational and social innovations would always have to accompany any technical innovations and some would have to come first.” It will be also important to research what is the connection between the current regulations in the healthcare sector and whether technological eco-innovations are regarded as the only type of eco-innovations that can be adopted in this sector.

Numerous benefits from environmentally friendly innovations have been emphasized in the recent years. Concerning the government policies that deal with this type of innovation, they often recognize benefits in the cost reduction, increase in competitiveness and in the long-term perspective, creation of new markets for environmentally friendly processes and products that would have corresponding employment effects (Rennings, 2000). Moreover, there is one essential peculiarity of eco-innovations and that is known as the double externality problem. Rennings (2000), explains this peculiarity with the positive spillovers that eco-innovations cause in both the innovation and diffusion phase. Why positive spillovers occur in the diffusion phase? They occur due to a smaller amount of external costs in comparison to the goods and services offered on the market. This problem may lower firms’ incentives to invest in eco-innovations. Moreover, this explains why government policies have to help innovators in the market introduction and diffusion phase. This can be expected to give positive results by government offer to cut the costs of innovations by financially supporting them, or by improving the performance of eco-innovations, respectively. We can easily conclude here what is the second peculiarity of the double externality problem. That is the importance of a regulatory framework. Besides the commonly known technology push (innovations driven by the technological development) and market pull (innovations driven by the demand factors), the extra third determinant of eco-innovations is a regulatory push/pull effect (Figure 2.1). The influence of the regulatory framework is presented in this third determinant. Empirical evidences support this and show that environmental policy have a powerful impact on eco-innovations (Green et al., 1994; Kemp, 1997).
Due to the effectiveness and significant positive impact eco-innovations have on the environment, they show many benefits, but must also be based on sound design to reach their full potential (Fitzgerald et al., 2007). May this become a barrier in the adoption and implementation process of this type of innovations? This question is addressed from diverse aspects. Some researches link the occurrence of barriers with the size of the organizations, indicating that small and medium-size organizations may face more difficulties in implementing successfully eco-innovations (Baumann et al., 2002). Others connect this problem with the tools used when adopting and implementing eco-innovations and even questioning which of them, if any, have real effect on environmentally friendly product development (Luttropp and Lagerstedt, 2006). Quite interestingly, Knight and Jenkins (2009) through their research of adoption and application of eco-design techniques, came to the conclusion that checklists and guidelines are top ranked choices of applying eco-design theoretical settings in the organizations. The reason for using the most simple tools for adopting eco-innovations is explained by the difficulty of non-immediate applicability, as well as necessary process-specific customization before use,
which again brings us to another barrier in the implementation of eco-innovations. Moreover, it seems that the lack of one-size-fits-all technique also contributes to the lack of widespread adoption of eco-innovations. I found it very interesting to address this issue by examining the healthcare sector and understanding whether this might be this sector’s barrier as well.

2.4.2. Diffusion of Innovation in Organizations (DOI Theory)

In economic sense, the diffusion of innovation refers to the phase when the innovation is used and adopted over time (Rennings, 2000). The theory of diffusion has been used since the 1960s to study a number of different innovations ranging from organizational innovations to agricultural tools (Venkatesh et al., 2003; Rogers, 1983; Tornatzsky and Klein, 1982). Everett Rogers, a professor of sociology and communication scholar, a world-known scholar, highly contributed to the communication literature by popularizing the Diffusion of Innovation Theory. In his book Diffusion of Innovation, first edition published in 1962, he presented a theoretical framework for explaining how are new ideas and technologies spread among individuals and organizations. In his work (1983) he discusses that a diffusion approach shows to be a natural framework in which it is possible to evaluate the impacts of diverse development programs, including the public health. What is particularly interesting is that diffusion process is not seen as an independent process, but rather as a part of a larger process. This process begins with a perceived need or a problem, continues with a researched and developed solution (innovation), and then there is a decision that this innovation should be diffused when the process of the diffusion finally starts.

Rogers (1983) defines innovation as: “an individual or an organization with a new alternative or alternatives, with new means of solving problems.” What is particularly interesting, Rogers states that there are probabilities that new alternatives might not be superior to previous solutions, therefore, individual problem solvers engage in the diffusion process to find further information about the innovation. Diffusion in this sense, according to Rogers, is started to contend with difficulties with the uncertainty that veils the innovation, this represents: “a social process in which subjectively perceived information about a new idea is communicated.”
Before we discuss the diffusion of innovation in organizations, it is important to define what we may consider as an organization. Organizations are stable systems of individuals who work together to achieve common goals and this is done through a hierarchy of ranks and division of labor (Rogers, 1976). Furthermore, Rogers (1983) considers that a stable and a predictable organization is obtained through:

1. **Predetermined goals**,  
2. **Prescribed roles**,  
3. **Authority** structure,  
4. **Rules** and regulations and  
5. **Informal patterns**.

Since the intent of any bureaucratic organization is to depersonalize human relationships by formalizing them and standardizing, we may expect that innovation would rarely occur, given the relative stability of organizations. Whether the strict adherence to the rules in the healthcare organizations also influences significantly the decision-making process in adopting environmental innovations, is worth of examining. Rogers (1995), has a positive opinion about this issue and states that innovation is ongoing in almost every organization besides the fact that there are many barriers and resistance to change in an organization.

Until the mid-1970s, innovation in organizations were studied in cross-sectional data analysis by correlating independent variables with organizational innovativeness. Today, this approach is replaced by *process research*. Rogers (1995) researched the innovation process in organizations, dividing it into *initiation* and *implementation* of the innovation process. This process consists of a sequence of five stages, each characterized by a particular range of decisions, actions and events made at that point. What every stage involves is presented in the Figure 2.2.

These five stages usually occur in the order presented, as Rogers suggested. Of course, there are cases when the time sequence of the stages differ. The innovation process may move rapidly or slowly, be stopped by unexpected problems, or even skipped. This remark intrigued me to look more in-depth into innovation processes in the healthcare organizations in Serbia. Not only that studying this phenomenon in this particular setting
may give a proposition of new or adapted framework of innovation process, but also healthcare innovation processes will be understood better. Using the five stages innovation process model by Rogers, we may come to the conclusion whether all these stages are employed in the set time sequence, at the hospitals and clinics. This can later be used as a comparison to other industries, and give a better understanding of the innovation process in healthcare to any interested party.

Figure 2.2 - Stages in the Innovation Process in Organizations
Source: Rogers (1995)

Interestingly, March (1981) noted that innovation in organizations are often driven by solutions, rather than problems. Consequently, organizations tend to scan for innovations and match them to their relevant problems. Therefore, he realized that the innovation process can be either problem-initiated or innovation-initiated. Frequently, he pointed, it is the latter.
Moreover, Rogers (1983) distinguishes three types of innovation-decisions. Whether it is an optional, collective or an authority innovation-decision depends upon who makes the choice if an innovation is adopted or rejected. For these three types consequently, the decision maker can be an individual, members of the system or relatively few individuals who possess status, technical expertise or power. Besides these three types, Rogers mentions a fourth type, particularly interesting for the healthcare setting. It is a contingent innovation-decision. It is a choice to adopt or reject an innovation, which can be made only after some prior innovation-decision. This type we can expect in the healthcare organizations, since it is often a case that a physician can make a decision to adopt a new medical procedure only after the hospital executives decide to buy that particular medical equipment. From Roger’s basic three types of innovation-decisions, it means that an optional decision followed a collective innovation-decision.

2.4.2.1. DOI Theory and Healthcare

Diffusion of Innovation theory was consequently used by many researchers, seeking for answers in which ways innovations were communicated among members of any kind of an organization. Thakur et al. (2012) employed this theory to create a practical model used by healthcare executives for decision-making processes in innovative activities. However, in their study a particular focus is set on the role of IT in the innovation processes.

Atun et al. (2007) also applied the diffusion theory to their research in the healthcare. The reason for applying this theory was to explain how primary healthcare reform was diffused in Central and Eastern Europe, as well as in Central Asia. The conclusion of their research is that the adopted and later diffused family medicine proved to be quite a complex innovation. For this reason, in these healthcare systems, the innovation was “assimilated” rather than “disseminated.” What is the case with the diffusion of environmental innovations in the healthcare sector is left be researched more in detail.

In addition, the literature does not offer any particular instrument which could help in making a decision what might be the most suitable model of diffusion of innovation in particular sector, or depending on the type of adopter or innovation Camerani et al. (2010). Nevertheless, if we consider diverse models and combine them with the characteristics of the healthcare sector, we might already have an idea which model might be applied. In my
opinion, the most relevant might be to research if the diffusion of the environmental innovations in the healthcare system, can be explained by Roger’s model (1995) of innovation processes in organizations; or with the stock and order effect models (Karshenas and Stoneman, 1993). The stock model explains main factors that affect the diffusion of technological innovations, but using the basic idea behind this model and applying it to different kind of innovations as well, in my opinion, could contribute significantly to the existing work of literature. One of the assumptions of this model is that the cost of acquiring new technology (innovation) fell over time and I see this as an opportunity for the late adopters (or the “follower” countries in this case) to adopt it.

Roger’s model is beneficial for this study since it has it’s basis in the organizational structures. The reason I would say that the stock model may also be applied to the healthcare sector is due to it’s core characteristics. Not only that this model puts the focus on the strategic interactions between the potential adopters in the market, but importantly, it considers other agents’ behavior when making a decision whether to adopt an innovation. These characteristics may prove to be relevant in the healthcare sector. Every individual in this system has to respect, the military hierarchy that exists in the healthcare system. This means that each individual is considering the education, rank and reputation of others and form their opinion and behavior accordingly. This is also the characteristic of the stock model which assumes that there will be an effect of other individuals’ decision (seen as a stock) to adopt the innovation.

Also Camerani et al. (2010) argue that such accumulation of positive signals can influence the decision of other potential adopters to adopt the innovation. This implies that potential adopters may find it optimal to dismiss their private signals and imitate the behavior of others. Can this be the case with the healthcare executives as well? May it be possible that the nature of their work makes them to look more closely into who adopts the technology, rather than at the innovation itself? The literature explains this phenomenon as a “social bandwagon effect” (Abrahamson and Rosenkopf, 1997).
2.5. Organizational culture in the healthcare and decision-making

2.5.1 Organizational culture in the healthcare

Empirical evidence suggest that organizational culture matters considerably in the delivery of high performance in healthcare (Jacobs et al., 2013). What kind of organizational culture exists in the healthcare sector? Is there a possibility that a certain type of organizational culture may enhance the decision-making process of implementing eco-innovations in the organization?

Theoretical framework known as the Competing Values Framework proved to be extremely useful in interpreting a wide range of organizational phenomena (Cameron and Quinn, 2006). There are four dominant culture types that emerge from the framework (see Figure 2.3) and they all define the core values, interpretations and approaches that characterize some particular organization. This framework has been used in exploring organizational cultures in diverse sectors, including the healthcare (Acar and Acar, 2012; OCAI, 2013). Each of these quadrants has a label which helps to distinguish the most notable characteristics of four different organizational cultures. Moreover, each type of culture has a matching approach to organizational quality, management skills and leadership roles.

These four dominant culture types are simply described in the Figure 2.4. Clan culture is a cooperative one where organization’s members act as a family, to them trust and solidarity are important. Adhocracy is externally oriented, and this is an entrepreneurial, flexible, creative and innovative organization. Hierarchy is a culture of control in which leadership is highly valued. Orders and rules are very important and the basis of this organisation is
bureaucracy. Lastly, market is a culture of competitiveness, in which organizations employes are success-oriented. Planning and efficiency is respected, and this type occurs at the time of control and stability. Literature and empirical evidence from the healthcare industry show that the hierarchical culture has risen as a dominant culture (Acar and Acar, 2012; Jacobs et al., 2013), besides the fact that employees show the willingness to change the culture more towards the adhocracy type (OCAI, 2013).

Figure 2.4 - The Competing Values of Leadership, Effectiveness and Org. Theory
Source: Cameron and Quinn (2006)

When we have a case of the hierarchical organization that means that the most effective managers tend to move up quickly in the organization and that they are good in organizing, controlling, monitoring, coordinating, and maintaining efficiency (Cameron and Quinn, 2006). We can put it simply by saying that hierarchy leaders are rule reinforces, whereas adhocracy leaders (to which some employes would converge to) are rule breakers. Healthcare practitioners may want adhocracy organization since it would give
them an opportunity to take the initiative and have more freedom at the workplace, which would make them successful, satisfied and happy (Berrio, 2003). Barney (1991) argues that if an organization wants to obtain a sustainable competitive advantage, it’s culture must be flexible to change according to the external conditions. However, due to the nature of the healthcare sector, can it be possible to have an adhocracy type of organization?

Bowles (1998) argues that the cultural context must be considered as well. This cultural context in which senior managers work will affect their behavior and motivations. Moreover, it will influence the way employees from the bottom of the organizational hierarchy work and interact with others. Overall, this will influence the hospital’s performance.

2.5.2. Decision-making in the healthcare

How difficult it may be to make a decision of implementing new environmental innovation in the healthcare sector? This sector is known by the fact that it is constantly being transformed by new technologies and techniques, pharmaceuticals and delivery systems, which makes it one of the most complex and rapidly changing industries (Bernstein, 2004). Nevertheless, even the healthcare institutions have to use some strategies while competing to gain competitive advantage in this fierce environment (Berthon et al., 2004), and some succeed in this, while others fail (Walker, 2009). Porter (1985) argues that organizations can catch competitive advantage with innovation. All of this puts healthcare executives under much pressure and makes it harder for them to simultaneously improve patients safety and quality, as well as cost efficiencies. In addition, “the reputational effects and public perceptions about sustainability represent a delicate balancing act for healthcare” (Boone, 2012). Therefore, the decision-making takes an important role here when healthcare organizations need to be careful that their environmentally friendly activities do not undermine perceptions of patient care and safety. Since social and community benefits need a longer term to show the realized benefits from sustainability initiatives, they often go unmeasured (Boone, 2012), and this is why good performance metrics are needed and executives monitoring the innovative processes within the organization, specifically the implementation process of any new clinical practice.
How strong can be an effect of decision-making? Decision-making may enhance innovation diffusion (Smith and Fingar, 2003). Furthermore, leadership characteristics that could potentially affect leadership effectiveness are leader’s background, autonomy and formality (Boone, 2012). These three characteristics, separately and in combination affect their flexibility and creativity which greatly shape their problem-solving and decision-making. Moreover, Boone well noted that when sustainability is linked to strategic values, it has a number of important consequences for motivating and coordinating sustainability related activities. That sets high-level values that guides employee activity prioritization and decision-making.

In a low carbon future, health institutions will be able to offer high quality health services to their patients if they decide to make a transition towards low-carbon models of care (Mortimer, 2010). To achieve this goal, innovation, leadership and a systematic approach will be of essence, as well as focusing on the needs of users, not solely institutions. Good decision-making comes as an inevitable part of underpinning sustainable clinical practice. Mortimer, additionally underline the importance of four different principles:

1. **Disease prevention** and health promotion,
2. **Patient education** and empowerment,
3. **Lean service** delivery and
4. **Medical technologies with lower environmental impact**.

The fourth Mortimer's principle is the most important for this study. It represents the necessity of incorporating sustainability measures in the evaluation of medical technologies. It is noteworthy to say that patients and clinicians and will need to choose clinically effective treatments with the best environmental profile and to encourage the further development of eco-friendly technology and practice. This is aligned with the view where eco-efficiency does make the old and destructive systems less so, but more needs to be done to broadly adopt these innovations in practice (McDonough and Braungart, 2002). Employees and executives can be motivated to act in a more sustainable manner, because of the intangible assets, like reputation (Fombrun, 1995). In addition, top talent may be attracted by sustainability initiatives (Boone, 2012). This in turn will support long-term success and provide a more enduring competitive advantage of the organization.
III Methodology

This chapter describes the methodology applied that is fundamental for the research and study. As suggested by Saunders et al. (2009), the methodology applied was considered as a number of steps taken, deciding which research philosophy will be used, as well as approach, strategy, choices, time horizons and techniques and procedures respectively (Figure 3.1). Furthermore, data collection is described, as well as ethics important for the study.

![Image of the research "onion"](image)

Source: Saunders et al. (2009)

3.1. Research Philosophy and Approach

From the Figure 3.1 we can see that Saunders et al. (2009) distinguish between four different research philosophies: positivism, realism, interpretivism and pragmatism - each of them represent the way we see the world. Moreover, depending on the research philosophy a researcher choose, assumptions from that philosophy will underpin the research strategy and methods later used. In this study, the author adopted a **pragmatist’s philosophy**. Since finding answers on different research questions were appropriate with changing different positions (epistemological, ontological and axiological), it also suggested that mixed methods, both qualitative and quantitative, will be used within the study.
Since the decision of the research approach provides a distinctive view on how knowledge emerges, I chose to take an inductive approach. An inductive approach operates from specific to general, where observation reveals trends or patterns of a specific variable of interest, which is later used to formulate a general theory of the behavior and nature of that variable and others examined variables (Adams et al., 2007). As suggested by Saunders et al. (2009), conducting a study with a topic that is new and on which there is little existing literature, an inductive approach may be more appropriate to use not only for the data collection, but also for analyzing and reflecting upon what data and theoretical themes suggest. Moreover, this suggests that in the study, qualitative methods will be more employed than quantitative. As Barr (2004) argues, when a phenomenon exists that is poorly understood, qualitative methods are most often used for theory building. The researcher in these circumstances immerse herself in the phenomenon of interest, observing activities within the organizations, interview participants and gather archival information, with an aim to build a better understanding.

3.2. Research Design

Depending on the purpose of the study, a researcher may decide to conduct either exploratory, descriptive or explanatory research; or conduct a study with more than one purpose where these types of researches will overlap (Saunders et al., 2009). This study presents an exploratory research. One of the benefits of conducting this type of research is that it is flexible and adaptable to change, and if there is an appearance of new data or an occurrence of some insights, a researcher may change the direction of the research in the most suitable way (Saunders et al., 2009). This type of research is perceived by the author as the best solution to research the phenomenon, and principal ways of conducting the exploratory research is trough an extensive search of the literature and interviewing experts in the subject. Furthermore, it is important to say that the flexibility inherent in exploratory research does not mean absence of direction to the enquiry. What it does mean is that the focus is initially broad and becomes progressively narrower as the research progresses (Adams and Schvaneveldt, 1991).
3.2.1 Research Strategy

To find answers on the research questions in this study, among the possible set of research strategies, I chose to use the case study strategy, by interviewing C-level executives from diverse organizations related to healthcare. This strategy is seen as the most appropriate since it has a considerable ability to generate answers to the questions “why,” “what” and “how” (Saunders et al., 2009). These are particularly the basis of every research question in this study:

- **Why** is the problem of non-sustainable healthcare practices important,
- **What** kind of eco-innovations emerged in the healthcare sector of countries that adopt these innovations from the external environment,
- **How** do we foster the implementation of eco-innovations in this area and through which channels.

Moreover, within the case study strategy, I conducted a number of interviews, with an aim to gain a rich understanding of the context of the research and the processes being enacted (Morris and Wood, 1991).

3.2.2 Data Collection

In the study, both quantitative and qualitative type of data are researched; quantitative data through data analysis obtained from secondary data sources and qualitative data in form of semi-structured interviews. Gathering data using mixed-methods approach can substantially help to get a holistic picture of what is happening, and this we can get by obtaining a range of different types of data, with the use of different methods (Matthews and Ross, 2010).

For a better understanding and getting an in-depth insight of the phenomenon, several possible literature sources are available to the researcher: primary, secondary and tertiary (Figure 3.2). Due to the broadness of the topic covered in this study, secondary literature sources (journals, books and newspapers) were very valuable understanding the current situation of the use and replacement of toxic chemicals, and these sources very used to obtain quantitative data. Moreover, the primary literature sources (company reports, interviews, government publications) present valuable sources of information that offer
much deeper understanding of the phenomenon, which could not be explained to the
detail if only secondary literature sources were used and this is the reason interviews
conducted for this study I chose as an appropriate way for collecting the necessary
qualitative data.

Figure 3.2 - Literature sources available
Source: Saunders et al. (2009)

3.2.2.1 Sampling techniques
In a study like this, when it is researched how the latest green innovations are adopted in
healthcare organizations, rather than invented in the most advanced institutions, we
approach a new field of study. Therefore, it is wise to use a “snowballing
sampling” (Goodman, 1961), which means asking individuals that have rare
characteristics to identify others who might have the same characteristics as they do
(Welch, 1975). To identify the most relevant individuals, from diverse institutions,
companies and organizations, whose experience and knowledge might give an important
view on the subject in this study, a variant of snowballing was used. Specifically, the
pyramiding technique by von Hippel et al. (2009) based upon the view that people with a
strong interest in the topic tend to know people that have more of the sought attribute than
themselves; was applied by finishing every interview with a question: “Is there someone
you see as a person who might know more about this topic than you?”. 


**3.2.2.2 Primary and Secondary Data**

A total of 13 C-level executives were interviewed with diverse background, but with the field of expertise connected primarily to healthcare, having vast knowledge about the risks and opportunities in current decision-making processes. Wherever possible, interviewees were selected based upon their work in the sustainability field. Why C-level executives were chosen for the study? As Mortimer (2013) stated, clinicians are central to improving sustainability through their individual clinical practice, and notably through designing and implementing new models of care.

In complex studies like this, it is important to remember that a researcher is sampling people to sample episodes embodying emerging patterns in the study or interactions in different settings, not to over-rely on talk or observation of informants (Miles and Huberman, 1994). This makes researchers fall back with putting their interviewees at the first place, when settings, processes and events should be the most important. Moreover, some scholars may be troubled with data gathering dependent solely on the organization’s executive opinion, and just how much exactly can innovation behavior of an organization be explained in this way? Rogers (1983) says not fully. However, this in-depth approach with multiple respondents can contribute to the existing work of literature about innovation. According to Rogers, this approach will provide more reliable data and will permit greater insights about the flow of innovation process in any organization. Clearly, in this way we can learn more about less, rather than less about more.

The basis of the primary data consists of more than 8 hours of interviews. Approach used to collect the data is a **semi-structured and open-ended approach** but with keeping the dialogue of the interview evolving around the important subjects. Three main questions were explored: how do they understand the term “eco-innovation,” specifically, what kind of innovations do they consider as ‘green’? Having a choice between green and non-green innovation, which one would they choose and why? What are they ways they adopt eco-innovations in their organizations? Most important, who can foster the implementation process of eco-innovations and how? Nevertheless, interviewees were free to contribute to the research by offering other data and information that they saw as relevant.
For all the interviews undertaken, the semi-structured qualitative interview structure was used. As suggested by Matthews and Ross (2010), a core group of questions was structured to have greatly, the same approach to every interviewee. This type of interview was particularly useful, since topics and questions were introduced in different ways or orders that were seen as the most appropriate for each interview. Depending of the position that interviewee held in the company or institution at the time of the interview conducted, some minor changes were made to the question list. These adaptations were made just to gain a much deeper understanding of the interviewee’s view on the topic. Before the interview took place, interviewees were informed about the study details which gave them an idea what to expect from the interview and it increased the likelihood of honesty (Gill et al., 2008). Moreover, since all interviewees held high positions at their workplace, time presented a very scarce resource for them and this introduction to the research priority sent, offered the author an opportunity to gain more information from the interviewee. In addition, semi-structured interviews allowed participants to discuss the topic or answer questions in their own words (Matthews and Ross, 2010). Participants of the interview knew beforehand how their perspectives will explain the phenomenon researched, as it eased the flow of the qualitative research. All interviews were conducted through face-to-face interviews and were recorded with an average length of 35 minutes.

People who participated in the qualitative in-depth interviews were male or female and lived in Novi Sad (Serbia) and Copenhagen (Denmark) area. Semi-structured interviews were conducted with the following people:

1. **Volker Welter**, Senior Procurement Adviser, Nordic Office, UNDP
2. **Prof. dr sc. med. Đorđe Gajdobranski** - Director of the Pediatric Surgery Clinic (Institute for Child and Youth Healthcare of Vojvodina)
3. **Prof. dr sc. med. Nevena Sečen** - Head of the Department for Chemotherapy - Pulmonary Oncology Clinic (Institute for Pulmonary Diseases)
4. **Prof. dr sc. med. Svetozar Sečen** - Head of the Department for Coloproctology - Clinic for Abdominal, Endocrine and Transplantation Surgery (Clinical Center of Vojvodina)
5. **Prof. dr sc. med. Petar Slankamenac** - Head of the Intensive Care Unit - Neurology Clinic (Clinical Center of Vojvodina)
6. Prof. dr sc. med. Jovan Vukadinov - MD PhD - Infectious Diseases Clinic (Clinical Center of Vojvodina)
7. Prof. dr sc. med. Aleksandra Mikov - Director of the Pediatric Habilitation and Rehabilitation Clinic (Institute for Child and Youth Healthcare of Vojvodina)
8. Prof. dr sc. med. Aleksandra Kapamadžija - MD PhD at the Department for Family Planning - Gynecology and Obstetrics Clinic (Clinical Center of Vojvodina)
9. Ass. Prof. dr sc. med. Miloš Koledin - Director of the Thoracic Surgery Clinic (Institute for Pulmonary Diseases)
10. Ass. Prof. dr sc. med. Jasmina Katanić - Head of the Department of Laboratory Diagnostics (Institute for Child and Youth Healthcare of Vojvodina)
11. Doc. dr sc. med. Ljiljana Dobrić - Head of the Department at the Department for Neonatology - Gynecology and Obstetrics Clinic (Clinical Center of Vojvodina)
12. Jelena Maletin - Chief Nurse at the Institute for Child and Youth Healthcare of Vojvodina
13. Milena Nikolić - Chief Epidemiological Nurse at the Department for Neonatology - Gynecology and Obstetrics Clinic (Clinical Center of Vojvodina)

3.3. Ethics

A researcher always has to think carefully what might be the impact of the research, how he or she behaves, as well as there is no harm caused by the research, either to the subject of the research or to the society generally (McNeill and Chapman, 2005). Therefore, all research participants were informed in which way this research may have an influence on them, or how their opinions will be used for the study, with an aim of giving these participants an opportunity to make wise choices. Furthermore, the author did not engage in deception by establishing friendships with people who might offer valuable or sensitive data for the study. Ethical principles were respected throughout the whole process of the research, since the validity of data collected was considered as the most important.
IV Analysis

Researching the diffusion of innovation in the healthcare system of Serbia is a particularly interesting case. This country’s political, economic, social and any other aspect changed dramatically in the last twenty-five years. Of course, with these drastic changes within the country, every individual, company and organization was influenced and forced to change, including the healthcare system, which interests us the most in this study.

4.1. National Healthcare System in Serbia

During the 1990s, under the overall economic decline and sanctions, the health system deteriorated evidently in Serbia. At the beginning of 2000s it was evident that a set of health reform needs to be adopted. This exactly happened in 2005 when a Health Care Law was passed. From this moment the management and ownership of community health centres have been decentralized to the municipal level, imposing also a responsibility for capital investments (Bartlett et al., 2012). The health reforms were vastly driven by international donor organizations according to Simić et al. (2012). They also argue that there was a resistance by an anti-reform coalition that held back the implementation of these reforms which was additionally helped to delay them, with lack of good managerial and administrative capacity not only in the community health centres, but also in the Ministry of Health and the Health Insurance Fund. For this reason, it was interesting to research what is the situation several years after the international organizations’ interventions, and whether eco-innovations from most advanced health systems in the world are implemented in the Serbian health system.

Jekić et al. (2012) state that one of the further problems of Serbian health system is that it’s infrastructure is inefficient, expensive and oversized, which results not only in difficult delivery of services, but also in a high level of medical interventions of sometimes questionable clinical quality. However, Jekić et al. also report in their research that there are attempts to modernize the hospital system in Serbia, but that there is also a need to prepare stakeholders for an efficient, modern and importantly, patient-centered hospital system led by clinical centres.
In 2005, the Ministry of Health of Serbia established a *Unit for Quality*, as a part of the project *Developing health system of Serbia*, financed by the World Bank. The aim of this unit was to work on creating and implementing the national policy of improving the quality of the health services. To achieve this project goal successfully, in the process was included every employee from four pilot hospitals and sixteen health centres. The exchange of ideas and solving identified problems were encouraged, with an aim of developing the standards for evaluating the quality of work.

The need of integrating the latest know-how and new technologies in Serbian healthcare system is reflected in the Republic of Serbia government’s *Strategy for the continuous improvement of healthcare and patient safety* (2008). Interestingly, in the strategy it is reflected upon the fact that modern health service users are increasingly expecting to receive such healthcare that will have the minimal risk for their health, but maximum value from the offered health service. Furthermore, the new approach is taking place at the health organizations. No longer it is expected that the health workers are the only ones responsible for the quality of offered health services. The new approach emphasize the importance of accepting the responsibility at the level of the overall organization, including the management. Importantly, this approach is more focused on *why* something is happening, not *who* caused it, with an aim of finding ways to prevent the bad quality of offered health services.

### 4.1.1. Organization of Healthcare Organizations in Serbia

Health institutions in Serbia offer health services on three different levels - primary, secondary and tertiary (*Guide to the healthcare system*). Health practice at the **primary level** is represented by institutions in which citizens can go without a referral. These institutions are: health center, pharmacy, student polyclinic, etc. The most important institution at the primary level is *health center*.

In case when health centres do not have a possibility to offer an appropriate specialist healthcare, the doctor will refer the citizen to the **secondary level** (*hospitals*). There are 77 hospitals in Serbia, in which every patient gets the healthcare he or she needs: outpatient treatment (medical checkup at the polyclinic) or hospital treatments...
Patients are referred to the hospital when their health problems exceed the technical conditions of the health center or there is a need for an opinion from an expert.

In cases when health problems of the patient surpasses the technical conditions of hospitals, or there is a need for an expert’s opinion from the highest level of healthcare, the patient is referred to the clinical centers, clinics, institutes or clinical hospitals. This is the tertiary and the last level in the healthcare system in Serbia. To have an appointment with the doctor from the tertiary level, every patient needs a referral from his health center doctor, which are given upon the recommendation received from hospital doctor.

<table>
<thead>
<tr>
<th>Type of healthcare institution</th>
<th>Number of healthcare institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health centers</td>
<td>158: 116 independent 42 as a part of medical centers</td>
</tr>
<tr>
<td>Independent pharmacies</td>
<td>35</td>
</tr>
<tr>
<td>Institutes at the primary healthcare level</td>
<td>16</td>
</tr>
<tr>
<td>Generic hospitals</td>
<td>40: 16 independent 24 as a part of medical centers</td>
</tr>
<tr>
<td>Specialized hospitals</td>
<td>37: 20 for acute and chronic conditions 17 for rehabilitation</td>
</tr>
<tr>
<td>Clinics</td>
<td>6</td>
</tr>
<tr>
<td>Institutes</td>
<td>16</td>
</tr>
<tr>
<td>Clinical hospitals</td>
<td>4</td>
</tr>
<tr>
<td>Clinical centers</td>
<td>4</td>
</tr>
<tr>
<td>Institutes at different healthcare levels</td>
<td>29: 23 institutes for Public Health 6 other institutes (for transfusion, forensic medicine etc.)</td>
</tr>
</tbody>
</table>

Table 4.1 - Organization of public healthcare institutions in Republic of Serbia
Source: Guide to the healthcare system. Ministry of Health of Republic of Serbia

The reason for carefully evaluating past and current experiences from the healthcare practice proved to be crucial. This not only helped me to identify all the key determinants which caused some projects to fail or succeed, but also emphasized the most important actors in the decision-making process of innovation processes towards sustainability.
4.2. Analysis of interviews with healthcare executives

4.2.1. The Background

As described in detail in the Chapter III (Methodology), this research used a primary dataset, twelve in-depth interviews with the C-level healthcare executives. It was necessary to grasp the current position of eco-innovations, as well as opportunities and barriers in the process of their implementation in the healthcare. My focus of research is set on a country which mostly relies on innovations from outside its system, and I classified it as a “follower” country. The Serbian healthcare system is used for this research, because I believe that it is important to understand not only how eco-innovations are successfully invented and implemented in the most advanced healthcare systems in the world. Rather, I wanted to focus on a country that may represent many other countries around the world. This means, not enough resources to innovate, but rather to follow and implement. This research tends to offer a good insight for decision-makers in diverse organizations (both private and public), and help them to understand what may be the weak spot in the implementation process, and what or who may foster this process.

Serbian healthcare system has three levels of healthcare, and I focused solely on interviewing C-level healthcare executives from the tertiary level (and in two cases nurses that held the highest positions in the institutions they worked in, and were recommended by their superiors). In the Table 4.2 you can find more information about the interviewees and the healthcare institutions they work in.

All interviewees work in the healthcare institutions owned by the Government of Autonomous Province of Vojvodina, which makes this research even more specific. This is because these healthcare executives are exposed to the governance of the regional government, including the national government (through the Ministry of Health). With an aim of understanding how eco-innovations may be implemented in the healthcare sector, interviewees are chosen as executives of ten different clinics. Ownership of each clinic is non-for-profit. The nature of work in each of these clinics shows how eco-innovations may be interpreted differently in each of them, still a unique model of implementing these innovations is achieved at the end of the study. However, I will refer to this model later in this chapter, as a conclusion how the overall process happens.
<table>
<thead>
<tr>
<th>Interviewees</th>
<th>Type of healthcare institution</th>
<th>Level of healthcare institution</th>
<th>Positions</th>
<th>Beds</th>
<th>Employees</th>
<th>Physicians</th>
<th>Ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof. dr.sc.m. Svetozar Šćenki</td>
<td>Clinic for Abdominal, Endocrine and Transplantation Surgery (Department for Coloproctology)</td>
<td>Tertiary (Clinical Center of Vojvodina)</td>
<td>Head of the Department</td>
<td>11</td>
<td>7</td>
<td>3</td>
<td>non-for-profit</td>
</tr>
<tr>
<td>Prof. dr.sc.m. Jovan Vukadinov</td>
<td>Neurology Clinic</td>
<td>Tertiary (Clinical Center of Vojvodina)</td>
<td>Head of the ICU (previously CEO)</td>
<td>8</td>
<td>14</td>
<td>3</td>
<td>non-for-profit</td>
</tr>
<tr>
<td>Dr. sc. med. Ljiljana Đorđić</td>
<td>Infectious Diseases Clinic</td>
<td>Tertiary (Clinical Center of Vojvodina)</td>
<td>MD PhD (previously CEO)</td>
<td>90</td>
<td>91</td>
<td>4</td>
<td>non-for-profit</td>
</tr>
<tr>
<td>Prof. dr.sc.m. Aleksandra Kapamadžija</td>
<td>Gynecology and Obstetrics Clinic (Department for Family Planning)</td>
<td>Tertiary (Clinical Center of Vojvodina)</td>
<td>Head of the Department</td>
<td>100</td>
<td>94</td>
<td>3</td>
<td>non-for-profit</td>
</tr>
<tr>
<td>Assoc. Prof. dr.sc.m. Miloš Koledin</td>
<td>Gynecology and Obstetrics Clinic (Department for Neonatology)</td>
<td>Tertiary (Clinical Center of Vojvodina)</td>
<td>Chief Epidemiological Nurse</td>
<td>100</td>
<td>60</td>
<td>13</td>
<td>non-for-profit</td>
</tr>
<tr>
<td>Prof. dr.sc.m. Nevena Šćenki</td>
<td>Neurology and Obstetrics Clinic (Department for Neonatology)</td>
<td>Tertiary (Clinical Center of Vojvodina)</td>
<td>Head of the Department</td>
<td>22</td>
<td>4</td>
<td>3</td>
<td>non-for-profit</td>
</tr>
<tr>
<td>Assoc. Prof. sc.m. Jasmina Katanić</td>
<td>Gynecology and Obstetrics Clinic (Department for Chemotherapy)</td>
<td>Tertiary (Clinical Center of Vojvodina)</td>
<td>Director</td>
<td>86</td>
<td>250</td>
<td>15</td>
<td>non-for-profit</td>
</tr>
<tr>
<td>Dr. sc. med. Đorđe Gajdžibranski</td>
<td>Pediatric Surgery Clinic</td>
<td>Tertiary (Clinical Center of Vojvodina)</td>
<td>Director</td>
<td>350</td>
<td>810</td>
<td>9</td>
<td>non-for-profit</td>
</tr>
<tr>
<td>Prof. dr.sc.m. Aleksandra Mikov</td>
<td>Pediatric Habilitation and Rehabilitation Clinic</td>
<td>Tertiary (Clinical Center of Vojvodina)</td>
<td>Director</td>
<td>45</td>
<td>65</td>
<td>1</td>
<td>non-for-profit</td>
</tr>
<tr>
<td>Prof. dr.sc.m. Jelena Maletin</td>
<td>Institute</td>
<td>Tertiary (Clinical Center of Vojvodina)</td>
<td>Head of the Department</td>
<td></td>
<td></td>
<td></td>
<td>non-for-profit</td>
</tr>
<tr>
<td>Assoc. Prof. sc.m. Jasmina Katanić</td>
<td>The Department of Laboratory Diagnostics</td>
<td>Tertiary (Clinical Center of Vojvodina)</td>
<td>Head of the Department</td>
<td></td>
<td></td>
<td></td>
<td>non-for-profit</td>
</tr>
</tbody>
</table>

Table 4.2 - Information about the interviewees and the healthcare institutions they work in
Every interviewee was asked to specify the capacity of the department or clinic they were in charge of, just to see if there would be some kind of pattern in the connection between the size of the unit and the adoption of new ecological medical practice. The size of departments or clinics vary from 0 to 350, with employees from 3 to 810. Looking at the successfulness of organizations, or their executives in implementing eco-innovations and their size, results show that there is no direct connection. It is not that the bigger the organization, the more eco-projects will be initiated. More, it proved to be about the people who initiated the environmental projects and the perspective of these projects.

4.2.2. Executives´ perception of eco-innovations

The term eco-innovation is well-defined in the literature and what it covers. However, each executive was asked to explain in their words what this term means to them (Figure 4.1). The majority of interviewees (38%) responded that eco-innovation in the healthcare sector for them represents an efficient waste management. However, I take this as a potentially biased answer, since the only eco-innovation that they had a chance to become familiar with is the new waste management protocol, implemented in 2008. Second most expressed view is that eco-innovations mean a complete eco-approach to healthcare, making it an advanced healthcare. However, it is worrisome to see that two executives that have this view also made a remark how this advanced system is not what institutions need to lean towards. Their opinion is that the current situation is not satisfying at all and that the basic needs of the patients are not met (even with capacities (beds)). They state that it is hard to expect that some eco-initiatives will be started in these conditions.

![Figure 4.1 - Healthcare executives' personal view of eco-innovations](image)

- Ecologically sound patient rooms
- Advanced healthcare
- Eco-technological equipment
- Use of biodegradable materials
- Efficient waste management
- Organic food
- Eco-friendly children toys
Other views (each 8%) represent a singular view of some executives, but in my opinion are very creative and show that each of the respondents truly has a different view of eco-innovation. These views differ due to the nature of the work of each executive. For example, head of the department of coloproctology thinks that the best eco-innovation for his workplace would be a Scandinavian type of patients’ room, very illuminated and that respects environmental standards. For a Chief Nurse at the Institute for Child and Youth Healthcare, providing organic food is seen as an environmental innovation from which everyone would benefit, but first, children. Moreover, in a specific part of the healthcare system, such as the pediatric rehabilitation, eco-friendly children toys are considered to be a good environmental innovation, as well as the physical environment (hospitals). As Prof. dr Mikov stated (personal interview, October 22, 2013):

“Rehabilitation is mostly the work between children and therapists. In this work, physical environment is very important, as well as many toys used for stimulating children to perform better. Children often bite these toys and taking care what kind of toys we provide to them is very important. Moreover, it is important that eco-innovation is a justified investment, not only that someone calls it eco for populistic reasons”.

4.2.3. Sustainability initiatives in the healthcare sector

In the context of a country, or a region in this case, that adopt innovation from an external environment, environmental innovations that were adopted, implemented and later succeeded or failed are the most frequent one - waste management and telestroke.

4.2.3.1. Waste Management

Why does the waste management represent an eco-innovation? Waste management is specific because it does not end itself. Specifically, the goal of the waste management is not only about managing the waste but most important in minimizing the adverse effects of waste generation of human health and the environment (Dehoust et al., 2010). National Strategy for waste management, with an aim of reaching European Union standards, was adopted in 2003. by the Government of the Republic of Serbia. Medical Waste Management Regulations (Pravilnik o upravljanju medicinskim otpadom, 2010) regulate the manner and procedure for the management of hazardous waste from the healthcare institutions.
<table>
<thead>
<tr>
<th>Interviewees</th>
<th>Type of healthcare institution</th>
<th>Level of healthcare institution</th>
<th>Personal view of eco-innovations</th>
<th>Importance of eco-innovations</th>
<th>Drivers of eco-innovations</th>
<th>Type of eco-innovations that occur(ed)</th>
<th>Barriers in implementation process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof. dr sc. med. Svetozar Sečen</td>
<td>Clinic for Abdominal, Endocrine and Transplantation Surgery</td>
<td>Tertiary (Clinical Center of Vojvodina)</td>
<td>Ecologically sound patient rooms (Scandinavian type)</td>
<td>High</td>
<td>Government regulations</td>
<td>Waste Management</td>
<td>The human factor</td>
</tr>
<tr>
<td>Prof. dr sc. med. Petar Slankamenac</td>
<td>Neurology Clinic</td>
<td>Tertiary</td>
<td>The advancement of the system; comes after fulfilling basic system needs</td>
<td>High</td>
<td>Government regulations</td>
<td>Telemedicine</td>
<td>Financing</td>
</tr>
<tr>
<td>Prof. dr sc. med. Jovan Vukadinov</td>
<td>Infectious Diseases Clinic</td>
<td>Tertiary</td>
<td>The advancement of the system; comes after fulfilling basic system needs</td>
<td>High</td>
<td>1. Government regulations and 2. International Organizations</td>
<td>Waste Management</td>
<td>Financing</td>
</tr>
<tr>
<td>Prof. dr sc. med. Aleksandra Kapamadžija</td>
<td>Gynecology and Obstetrics Clinic</td>
<td>Tertiary</td>
<td>Modern technological equipment and the use of biodegradable materials</td>
<td>High</td>
<td>Government regulations</td>
<td>Waste Management</td>
<td>The human factor</td>
</tr>
<tr>
<td>Dr sc. med. Ljiljana Dobrić</td>
<td>Gynecology and Obstetrics Clinic</td>
<td>Tertiary</td>
<td>Efficient waste management</td>
<td>High</td>
<td>Government regulations</td>
<td>Waste Management</td>
<td>-</td>
</tr>
<tr>
<td>Milena Nikolić</td>
<td>Gynecology and Obstetrics Clinic</td>
<td>Tertiary</td>
<td>Efficient waste management</td>
<td>High</td>
<td>Government regulations</td>
<td>Waste Management</td>
<td>-</td>
</tr>
<tr>
<td>Prof. dr sc. med. Nevena Sečen</td>
<td>Pulmonary Oncology Clinic (The Department for Chemotherapy)</td>
<td>Tertiary</td>
<td>Efficient waste management</td>
<td>High</td>
<td>1. International organizations and 2. Government regulations and 3. Physicians</td>
<td>Waste Management</td>
<td>-</td>
</tr>
<tr>
<td>Prof. dr sc. med. Dorde Gajdobrański</td>
<td>Pediatric Surgery Clinic</td>
<td>Tertiary</td>
<td>Complete eco-approach to healthcare</td>
<td>High</td>
<td>Government regulations</td>
<td>Waste Management</td>
<td>The human factor</td>
</tr>
<tr>
<td>Jelena Maletin</td>
<td>Institute</td>
<td></td>
<td>Organic food</td>
<td>High</td>
<td>Government regulations</td>
<td>Waste Management</td>
<td>Minor Technical Issues</td>
</tr>
<tr>
<td>Prof. dr sc. med. Aleksandra Mikov</td>
<td>Pediatric Habilitation and Rehabilitation Clinic</td>
<td></td>
<td>Eco-friendly children toys</td>
<td>High</td>
<td>Government regulations</td>
<td>Physical Environment</td>
<td>-</td>
</tr>
<tr>
<td>Ass. Prof. sc. med. Jasmina Katanić</td>
<td>The Department of Laboratory Diagnostics</td>
<td></td>
<td>Good management of bio-hazardous waste</td>
<td>High</td>
<td>Manufacturers of reagents</td>
<td>Waste Management</td>
<td>Cost of eco-friendly products</td>
</tr>
</tbody>
</table>

Table 4.3 - Innovations in the healthcare sector
For healthcare, this meant dealing with solid medical waste (both harmless and harmful). It was very important to impose strict rules to the healthcare sector and establish good organizational structures that would deal with this issue. Due to the great risk for the population health, dangerous waste is controlled and managed by special treatments. Good practice that is implemented set the rules for managing this waste with: segregation, storing, labeling, transporting and disposal (Ministry of Health of the Republic of Serbia, 2008). Overall, each of these steps regulated by law, separately and all together are very important, and should not be taken as a simple and easy step. Each action in the efficient waste management is a potential place of mismanagement of hazardous waste which could pollute the environment. Good regulations, organizational structure and provided trainings are needed to implement eco-innovations such as this one. This is a successful eco-initiative, but with varying results among the clinics (due to staff willingness to follow the rules). The most positive result from efficiently managing waste comes from Gynecology and Obstetrics Clinic.

4.2.3.2. Telemedicine (Telesstroke)

Prof. dr Slankamenac as a previous director at the Neurology Clinic wanted to use the advances in the communication technologies and with the use of telemedicine, improve the possibility of remotely evaluating patients with a stroke (Telesstroke Vojvodina, 2013). This is why he started a Telesstroke project in 2008, as the first telesstroke initiative in Balkans. This eco-initiative had many benefits. First, it was very convenient for patients because they would receive the right treatment in a faster way, which is immensely crucial when it comes to the stroke. If the patient would not receive the treatment in time, there is a higher probability that the stroke would leave severe consequences.
This includes a possibility that patient becomes unable to work, which presents a loss in his or her family’s income and a loss for the overall society. Second, emergency physicians often do not have enough experience or training to treat the patients that suffered a stroke. Through the telestroke audio-video system, emergency evaluation is enabled by experienced vascular neurologists. Third, regional centers can build their reputation as a good healthcare institutions which is important (patients are known to avoid regional centers even for insignificant testings (e.g. blood testing), when they lose their faith that regional physicians can help them, and commute and make general hospitals crowded). Moreover, when regional healthcare institutions lose their reputation, they also receive less amounts of investments, instead of promoting the expertise in those regions.

Figure 4.3 - Telestroke - regional physician receives an emergency evaluation by a vascular neurologist (Prof. dr sc. med. Slankamenac, on the left)
Source: Telestroke Vojvodina (2013)

The overall procedure included costs related to remote evaluation, including technical support and expert opinion by a vascular neurologist available 24 hour per day in the stroke centre. If better treatment outcomes are considered, the cost of treatment of stroke patients via Telestroke is overall significantly lower (Telestroke Vojvodina, 2013). Unfortunately, besides all the benefits that projects brought and could bring in the future, the work on is stopped in 2011, due to the lack of financing from the regional government.
4.2.3.3. Drivers and barriers in the implementation process of eco-innovations (results from the past or current examples)

Concerning the importance of implementing eco-innovations, every interviewee stated that this type of innovation is highly important for the healthcare sector. Since, they considered it to be very important, they were asked to explain who or what are the drivers of eco-innovations, and if any, what were the barriers in the implementation process of eco-innovations. It is important to know here that interviewees were asked twice during the interview to say what are the drivers and barriers in the eco-innovations implementation process. The first time they were asked was in the context of past and current examples, and the second time it was in the context of future, potential eco-innovations. The majority of the executives strongly believe that government regulations are the most efficient driver. International organizations were also mentioned, along with the physicians, and laboratory executive stated that for them they are manufacturers of reagents. It is interesting to see that the executive at the Thoracic Surgery Clinic, had immensely high opinion of his institution’s practice, and acknowledged the eco-approach to healthcare they have. This executive expressed his satisfaction with the results his institution gives, and interestingly, for him, the best driver for implementing eco-innovations are physicians from that clinic. He believed that physicians and their teamwork are the only driver that can really change something in their institution.

Concerning the barriers, three barriers emerged as the most important ones during the implementation process: the human factor, financing and minor technical issues. Only once it was the cost of eco-friendly products, and this is associated with the specific detergents used in the laboratory’s equipment. One-third of the interviewees responded that there were no any barriers in the implementation process.

4.2.4. Organizational culture, structure and cooperation

To see what is the connection between the organizational culture and the implementation process of implementing eco-innovations, interviewees were asked is their organizational culture open or closed, what is the organizational efficacy, cooperation between different departments, and whether they consider their institutions as market-oriented ones, and with some competitive advantages (see more at the Table 4.4).
<table>
<thead>
<tr>
<th>Interviewees</th>
<th>Type of healthcare institution</th>
<th>Level of healthcare institution</th>
<th>Organizational Culture (open/closed)</th>
<th>Organizational Efficacy</th>
<th>Compliance with government regulations</th>
<th>Cooperation between different departments</th>
<th>Market-oriented institution</th>
<th>Competitive advantage of the healthcare institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof. dr sc. med. Svetozar Sečen</td>
<td>Clinic for Abdominal, Endocrine and Transplantation Surgery</td>
<td>Tertiary (Clinical Center of Vojvodina)</td>
<td>Open (negative selection)</td>
<td>Low</td>
<td>Completely</td>
<td>Chaotic</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Prof. dr sc. med. Petar Slankamenac</td>
<td>Neurology Clinic</td>
<td>Open</td>
<td>Good</td>
<td>Completely</td>
<td>Relatively Good</td>
<td>No</td>
<td>1. Expertise in dealing with ambiguous non-infectious medical cases</td>
<td></td>
</tr>
<tr>
<td>Prof. dr sc. med. Jovan Vukadinov</td>
<td>Infectious Diseases Clinic</td>
<td>Open</td>
<td>High</td>
<td>Completely</td>
<td>Relatively Good</td>
<td>No</td>
<td>1. Cooperation with top experts 2. Good Practice Standards</td>
<td></td>
</tr>
<tr>
<td>Prof. dr sc. med. Aleksandra Kapamadžija</td>
<td>Gynecology and Obstetrics Clinic</td>
<td>Open</td>
<td>High</td>
<td>Completely</td>
<td>Good</td>
<td>No</td>
<td>1. Employees' expertise 2. Good Practice Standards</td>
<td></td>
</tr>
<tr>
<td>Dr sc. med. Ljiljana Dobrić</td>
<td>Gynecology and Obstetrics Clinic</td>
<td>Open</td>
<td>High</td>
<td>Completely</td>
<td>Good</td>
<td>No</td>
<td>1. Employees' expertise</td>
<td></td>
</tr>
<tr>
<td>Milena Nikolić</td>
<td>Gynecology and Obstetrics Clinic</td>
<td>Open</td>
<td>High</td>
<td>Completely</td>
<td>Good</td>
<td>No</td>
<td>1. Employees' expertise</td>
<td></td>
</tr>
<tr>
<td>Prof. dr sc. med. Nevena Sečen</td>
<td>Pulmonary Oncology Clinic</td>
<td>Open (military hierarchy)</td>
<td>High</td>
<td>Completely</td>
<td>Good</td>
<td>Yes</td>
<td>1. Higher level of healthcare service 2. Physical Environment</td>
<td></td>
</tr>
<tr>
<td>Prof. dr sc. med. Đorđe Gajdobrański</td>
<td>Pediatric Surgery Clinic</td>
<td>Closed (military hierarchy)</td>
<td>High</td>
<td>Completely</td>
<td>Very good</td>
<td>No</td>
<td>1. Employees' expertise</td>
<td></td>
</tr>
<tr>
<td>Jelena Maletin</td>
<td>Institute</td>
<td>Open</td>
<td>Good</td>
<td>Completely</td>
<td>Very good</td>
<td>No</td>
<td>1. Employees' expertise 2. Organization 3. Hygiene</td>
<td></td>
</tr>
<tr>
<td>Prof. dr sc. med. Aleksandra Mikov</td>
<td>Pediatric Habilitation and Rehabilitation Clinic</td>
<td>Open</td>
<td>High</td>
<td>Completely</td>
<td>Very good</td>
<td>No</td>
<td>1. Employees' expertise 2. Physical environment</td>
<td></td>
</tr>
<tr>
<td>Ass. Prof. sc. med. Jasmina Katanić</td>
<td>The Department of Lab. Diagnostics</td>
<td>Open</td>
<td>Good</td>
<td>Completely</td>
<td>Very good</td>
<td>No</td>
<td>1. Employees' expertise 2. Regional monopoly</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.4 - Organizational culture, structure and cooperation
Out of twelve interviews with healthcare institutions’ executives, two executives expressed that their organizational cultures are closed. One of them believes that the hierarchical structure in the healthcare does not explicitly allow everyone to express their ideas, while other executive expressed his opinion with a negative selection. He believes that the political context in the country has become an integral part of the healthcare sector as well, which has a negative impact on organizational culture, structure and future prosperity of the institution. This executive has negative experience as the project manager of the Telesstroke initiative. He also thinks that the organizational efficacy is on a much lower level than needed and that cooperation between the departments is chaotic. Therefore, his opinion is that institution he works in, has no competitive advantage.

Others also express an opinion that the healthcare as it is, has a hierarchical structure, but nevertheless, they consider to work in the institutions with open organizational cultures. They all consider that the organizational efficacy is on a high level (or close to it). Working in the public institutions, they all stated that their work comply with the government regulations, except for two executives. Head of the Thoracic Surgery Clinic, Ass. Prof. dr Koledin stated (personal interview, October 22, 2013), very interestingly, that in his opinion, they are more advanced than the government regulations. He noted:

“Our institution is exceptionally advanced with adopting the newest trends in the healthcare. This means that even the government regulations are not following us accordingly. We are a benchmark to other healthcare institutions and we compare us to healthcare institutions from western European countries and United States.”

The cooperation between the departments is described as exceptionally close and this institution is the only one that is presented by it’s representatives in this study (Ass. Prof. dr Koledin and Prof. dr Sečen) as a market-oriented institution (through some commercial programs offered to the patients). It seems that the advanced healthcare service offered to patients of the Institute for Pulmonary Diseases, also makes employees very satisfied to work there and besides the most stated competitive advantage of almost every interviewee, employees’ expertise, two executives from this Institute highlight other competitive advantages that their Institute has including: physical environment, the newest equipment, comfort for the patients and good practice standards.
4.2.5. Adoption and implementation of environmental innovations

Work in all healthcare institutions is formalized and standardized according to the healthcare executives. Moreover their employees have a good interaction between them, which can ease the process of future innovations implementation (they could share their experiences, give advices, etc.). So far in this study we have seen how healthcare executive, as forerunners or gatekeepers of their organizations understood eco-innovations, how much they follow the rules or expect rules to be imposed from the senior management or governance level, but now we need to understand why would they want to implement this type of innovations at the first place? What may be their motives? If policymakers, international community, manufacturers or even healthcare executives themselves would clearly see these motives, it would be easier to approach any type of organizational problem and offer a solution to it. From the Figure 4.4 we can see that the most important reason and motive for healthcare executives (33% of responses) is a better patients’ status. Second, 17% of executives expressed that for them it a motivation to protect the environment and to reach world standards in the healthcare practice (by offering a high-quality healthcare). 11% answered that they would be motivated to implement eco-innovations to improve population health. Lastly, there were interesting answers given, that were expressed only once by some executives and these are: better physicians’ status with better conditions at work; reputation of the institution he works in; safety at work, by for example having rules of efficient waste management there is less space for error and workplace injury; and lastly rewards, an opportunity to reward high-performing employees.

Figure 4.4 - Healthcare executives’ motives to implement eco-innovations
Concerning the employees´ attitude towards eco-innovations, opinions highly vary. One-third of executives believe that their employees have a positive or very positive attitude towards them. Others are concerned that only 30% would be ready to implement new practices (Prof. dr Slankamenac), they are not informed enough (Prof. dr Sečen and Prof. dr Gajdobraški), would have a positive attitude if informed (Ass. Prof. dr Katanić), or that express unwillingness or difficulties in implementing them (Prof. dr Kapamadžija and Jelena Maletin). Nevertheless, results show that employees´ trainings were held including presentations and lectures, or visits by manufacturers to offer advices and guidelines for easier and faster implementing and managing new solutions. Depending on the case and type of eco-innovations, the responsible varied. Results show that primarily responsible were healthcare management, chief nurses, ecology engineers, departments of technical affairs or manufactures through their technical support.

4.2.6. Current and future trends in the implementation of eco-innovations

In the last part of the interview, every executive was asked to give an opinion about the current healthcare system in which they work in, with focusing on the role of eco-innovations in this system. I asked them to define potential drivers and barriers that may arose in the implementation process of eco-innovations. This is the second time I asked them about the drivers and barriers, but not relying on their experience, but on a complete eco-approach to healthcare. In this way, executives´ opinions helped me to understand and construct a model of decision-making and actors that influence the process of implementing eco-innovations in the healthcare sector.

4.2.6.1. Barriers in the implementation process of eco-innovations

As previously described, one-third of executives said that according to their experience, there were no barriers in the implementation process. Others saw it in people who were supposed to adopt the change, and one-third said that the barriers were the financing of the project or some minor technical issues that arose. However, after easy-to-answer questions on organizational culture, when brought back to the subject of barriers, every executive (including the ones that first said there were no barriers), thought there would be barriers in the implementation process (Figure 4.5).
As we can see from the Figure 4.5 the biggest barrier in the implementation process may be the monetary issue (costs of the eco-innovations and financing of these projects). Almost half of the interviewees (45%) believe that would endanger the most the implementation process of eco-innovations in the healthcare sector. Second, 23% of answers say that government policies are not stimulating this type of innovations and their implementation in the healthcare sector. Also, 23% of answers find the barrier in the people who need to encourage or adopt new practices is the human factor (therefore, a part of this answer may also overlap with the government policies answer, as executives believe that if people in the government would fight more for these initiatives, things would accordingly change to better). Lastly, 9% of responses believe that the problem would be some technical issues that could arose, but since there is always a technical and management support on any types of new practice that could potentially be implemented, I would disregard this issue as a very important barrier to the implementation process.

4.2.6.2. Drivers in the implementation process of eco-innovations

If we leave out the physical environment as a potential driver (8%), we can see (Figure 4.6) that there is an opinion that who would foster the change and implementation of environmental practices in the healthcare, are people (92%). Inside the human (people) factor, we can see that nearly half of the responses (47%) set external environment as the main driver for environmental practices (35% believe that government is the one who can be the most influential in fostering and implementing eco-innovations, and 12% the international community: international organizations, manufacturers or clinics).
Third, 35% of responses believe that people working within the institutions could potentially drive the change (19% believe in the power of teamwork, 12% in the organizational culture within the institutions and only 4% that individuals could foster some change). I believe that this comes more as an executives’ wish that people from within could truly change the practice, when in reality they are aware, and concluded the interviews, with an opinion that the external environment is the one that can really change the practices and start eco-initiatives in their institutions. Lastly, 12% expressed an opinion that geopolitical culture (the cultural context) could be used to familiarize people with eco-innovations in the way that could understand it truly and embrace it in their practice.

4.2.7. The model of implementation of eco-innovations in the healthcare sector with the most important stakeholders in the process

As a result of the conducted interviews, I was able to construct a model that could explain who are the main stakeholders in the implementation process eco-innovations in the healthcare sector. This model explains the flow of the actions and ways that any type of eco-innovation has to take to reach the healthcare institutions and in the last instance, patients and the society. You can see the model and it’s characteristics in Figure 4.7. Comparing to Roger’s model (1995) which explains the diffusion of innovations in organizations, we can see that in the process of implementing eco-innovations, there are also two stages, initiation and implementation. What sets apart these stages is the decision made by the responsible whether to adopt the innovation or not. In the context I
examined, this refers to the government (national or regional). To understand better the model, solid lines represent direct impact that any stakeholder can have on others (where the arrow points) and dashed lines a potential impact that some stakeholder may have on others.

Figure 4.7 - The model of implementation of eco-innovations in the healthcare sector

In this model can see that international community has a potentially tremendous impact on the initiation process for making a decision to adopt new, environmental innovations in the healthcare. International community, with NGOs, national governments or international organizations can initiate a sustainability initiative presenting it to the national or regional government. Maletin (personal interview, October 22, 2013) noted:

“NGOs may also present a very good opportunity for us to initiate an implementation process of eco-innovations. We cannot and should not just wait the prepositions from the government.” However, top-expertise and the latest trends could be easily transferred through other actors from the international community to national and regional healthcare institutions. The reason healthcare institutions would benefit from this is due to their dependence on the government decisions, and lack of independent financial resources.
As Prof. dr Svetozar Sečen (personal interview, October 28, 2013) noted:

“International community is the one that should impose the latest trends, including eco-initiatives, to the national government. The government is not investing enough in the healthcare sector, which is ridiculous due to its tremendous significance for the society, environment and overall, for the country. Currently, I see no specifically defined strategy towards an eco-friendly healthcare. The situation in this area is rather chaotic and responsible individuals for the implementation are mostly bounded by diverse reasons, to truly and successfully implement the latest trends.”

To better understand the previous statement, it is noteworthy to say that in 2011, Serbia’s health expenditure per capita was 622.1$, below the world level of 951.6$ (World Bank, 2013). Compared to more advanced healthcare systems this expenditure is substantially lower (United Kingdom - 3,608.6$; Germany - 4,875.0$; Denmark - 6,647.7$; United States - 8,607.9$ (World Bank, 2013)). Healthcare executives and their employees have many ideas and remarkable expertise, but without needed financing, these ideas are left aside, hardly becoming a real practice in the institutions. When the national or regional government decides that some innovation can fit the healthcare agenda and current government policies, it modifies it and then makes a decision whether to push the project forward. If the project gets a green light, national or regional healthcare institutions are informed about it. Organizational structures are modified or upgraded and responsible individuals appointed to the task. Those can be healthcare management, chief nurses, ecology engineers or department of technical affairs. From that point onwards, eco-innovation becomes an ongoing element in organization’s activities and becomes routinized. Feedback is sent through the healthcare institution's management to the government as usually the main financer of these projects. Interesting stakeholder in this process are manufacturers (of equipment, reagens etc). They also play an important role in this process since they can initiate an adoption of eco-innovations through their products. Therefore, they are in this model in the initiation stage, having an impact directly on the healthcare institutions. They do not present their products to the government, since their innovations have to be adopted directly by the healthcare employees. Many equipment manufactures hold monopoly in their field, thus additional products that have to be used for those products, have to be bought from same manufacturers.
4.3. UN approach to sustainability in the healthcare

Due to the great importance that international community may have on the implementation process of eco-innovations in the healthcare sector in countries such as Serbia, I explored which international initiatives might have far-reaching positive consequences. One of the sustainability initiatives that is worth mentioning is a joint UN agencies’ programme, so-called the Joint Programme on Greening Procurement in Health Sector (GPHS).

From November 2012 until March 2013, I had an opportunity to work at UNDP Office in Copenhagen, where I got acquainted with the sustainability agenda at UN, and that was related to healthcare. Specifically, I had a chance to participate in three UN-Interagency meetings when it was discussed what will be the mandate of this interagency group, which areas of healthcare and sustainability initiatives it will cover, how will these activities be delegated, etc. Since March 2013, much has been done and in a personal interview (December 17, 2013) with Mr Volker Welter, Senior Procurement Officer at UNDP, who is in charge for this Joint Programme, I had a chance to examine what is the view of United Nations upon the future of sustainability initiatives in the healthcare sector.

The programme is anticipated to start officially in January 2014 and to last four years. It’s Secretariat will be based in Copenhagen under the structure of Nordic Office with a UN coordinating mechanism that will also serve as an administrative interface with diverse partners and donors. The overall objective of the programme is to reduce the environmental burden caused by the health sector by focusing on procurement. Procurement is seen as a strategic tool to influence UN Agency procurement practitioners, funding entities and suppliers in changing their practices.

It is very interesting to see that among diverse sustainability initiatives that United Nations can implement, it was decided to focus on procurement. The idea is primarily to increase the information base, along with developing procurement standards, policies and innovative solutions that will in turn reduce various environmental health hazards, such as the GHG emissions, hazardous medical waste, toxicity and others. Current health sector impose quite heavy environmental burden due to it’s centralization and focus of hospital treatment (expanding lives at any costs) and a tendency of over-medicalization. Moreover,
these activities have an economical burden too. The present system produces type of research with a tendency to increase the cost of healthcare substantially. Certain companies invest immense amounts of money in cancer drugs that may expand the patient’s life by just several months, neglecting for example environmentally related diseases (almost a third of the global burden of diseases). Wrong financially incentives are being produced and with the environmental consequences of the current health sector, this sector is put high on the priority list of the international community to be solved.

The GPHS programme incorporates five different outcomes:

a. **Normative guidelines and standards** on green procurement of pharmaceuticals, medical devices and health products,

b. **Quick impact green procurement activities** - an immediate list of activities that covers products like specific training package for green procurement in the health sector, list of necessary products for substituting mercury, PVC, etc.,

c. **Engagement with suppliers: Communication and Collaboration** - Structured dialogue with the private sector,

d. **Engagement with Global Health Financing Institutions in the Health Sector** - for these big funding entities in the health sector the area of green procurement and sustainability are absolutely not on a radar screen,

e. **Innovative green solutions** - innovative approaches that reduce the environmental harm (how can we use procurement to address the issue of antibiotics resistance, pilot studies on water and health issues, etc.

Without any doubt, United Nations are aware of the pressing issue of non-sustainable healthcare practices, but can fortunately be a market shaping force concerning the greening of procurement processes in the healthcare. Certain UN Agencies already have some ongoing sustainability initiatives in the healthcare, but those initiatives are mainly bounded by specific regions or institutions with a rather local than a global outlook. However, from empirical findings from this study, it is easy to conclude that there are plenty opportunities for local, regional or national initiatives even solely for Serbia, not mentioning the rest of the world.
V Discussion

“The choice, after all, is ours to make.”
Rachel Carson

5.1. Sustainability in the healthcare sector

Looking at the results analyzed in the previous chapter, it is positive to see that executives do not consider technological innovations as the only type of eco-innovations that could be implemented in the healthcare sector. Particularly, in the context I examined, organizational eco-innovation seems to be more accepted. Why this type of eco-innovation may be easier to implement? One of the reasons is the cost of the project. Technological eco-innovations are mostly expensive to be diffused across the whole healthcare sector in a country. Since the financing of these environmental initiatives would require government financing, the most diffused and successful eco-innovation in the healthcare sector, examined in this study, was imposed by the government (waste management). However, social eco-innovations that are linked to behavioral change face very different time horizon than sustainability initiatives that are linked more to changing some pressing technology issue. For this reason, this type of eco-innovations is a more complex one, since behavior change is not something that can established by a decree. It would require a long-hole, a communication strategy, champions and a very long perspective (Volker Welter, personal interview, December 17, 2013).

Before we discuss the types and examples of diffused eco-innovations in healthcare organizations, we should discuss the organizations themselves. Each of these institutions proved to be a stable and predictable organization (Rogers, 1983). Results confirm that their structures are hierarchical, employees have prescribed roles, regulations to follow, predetermined goals (structure is formalized). Moreover, as Rogers (1983) noted, in the healthcare sector studied, contingent innovation-decisions are made. This type of innovation-decision is a confirmation of executives’ position in the implementation process. This means that they can make a decision to adopt or reject an innovation, only after a prior innovation-decision, which is made by the government mostly. In certain cases, (telestroke project) due to a rejection of government to buy the technological equipment (no innovation-decision), the project failed.
The connection between the size of the unit that adopts the innovation and its innovativeness has not been found. Baumann et al. (2002) stated that small and medium-size organizations may face more difficulties in implementing successfully eco-innovations. In our case, size does not show the difference, since the executives working in the smaller departments proved to have good ideas (like telestroke) with a regional perspective, but the financing proved to be the biggest problem.

5.1.1. Role of eco-innovations in the healthcare sustainability approach

NIVEL (2013) argues that when we talk about innovations, there is often a gap between “knowledge” and “action.” As in the previous example with telestroke, examples of best practice are known, but it could even take years to spread these best practices. We can see from the results that financial means available to tackle these innovations are the major problem for a successful implementation of these innovations. Another obstacle that arose as problem during the implementation was the disruption of routine or an aversion to change. It is interesting to see that the problem is not knowledge or expertise. Boone (2012) state that top talent may be attracted by sustainability initiatives, but as previously mentioned, in examined institutions there are already top talents, but employees are too much dependent on government regulations, which can make them powerless. Moreover, as March (1981) noted, innovation in studied organizations are often driven by solutions, rather than problems. This innovation-initiated pattern can be linked to the dependance of the government financing.

Furthermore, results from this study show only a minor part of potential innovation that can be implemented or behaviors adopted from a long list of Naylor and Appleby (2012), described in the Chapter II. When it comes to healthcare institutions that rather adopt than invent eco-innovations, we can see that this includes:

- **Direct innovations**: less resource-intensive buildings or equipment, reduction of “care miles” through telecare and improved waste management,

- **Indirect innovations**: efficient, effective care, well coordinated care and effective medicines management and

- **Behaviors**: engaging professionals.
I assumed correctly that in case if government measures (Table 2.1 - Naylor and Appleby, 2012), are not present in some countries, healthcare executives might face difficulties in implementing eco-innovations in their organizations besides the fact they are aware of them. This study proves that stakeholders’ perception of innovation and the context, together influence innovation process significantly (Atun et al., 2007).

5.1.2. Role of diverse stakeholders in the healthcare eco-approach

A “social bandwagon effect” by Abrahamson and Rosenkopf (1997) was also examined in the study, but the results show that executives and their employees have the expertise and knowledge and they look upon their colleagues from national and international context. Moreover, Boone (2012) believes that an executive that advocates for sustainability, expressing sustainability initiative in the mission and vision of the institution and performance management system is a key organizational element that can effectively support the sustainability initiatives. However, it seems that the “social bandwagon effect” and executive that advocates for sustainability, are not enough to foster the change, again due to their dependance on the government and their financing resources. This was concluded as well by Prof. dr Gajdobranski (personal interview, October 22, 2013):

“I expected that after the isolation that our country went through during the 90s, would be overcame in time, and that the clinical practice will accordingly change in a better way. I hoped that each of our medical worker, who went abroad to work and learn, would by returning in the country build a critical mass that would foster the change. However, in this moment, I am skeptical that we can foster the change from within, as I hoped we could. Rather, I think that someone from upper levels of governance have to impose the rules and regulations, and I believe that those people, above the hospital management are the ones who can truly change something. Our collective consciousness is not yet on a remarkably high ecological level that would start this change, not without others help.”

As Damanpour and Evan (1984) said, if organizations truly want to implement innovations, it is a requirement that all stakeholders support and contribute to the process. Participatory management is needed, as Prof. dr Gajdobranski also concluded. The necessity of participatory management is also expressed in the UN GPHS Programme as one of the most important outcomes that this programme may have.
Results confirm that external environment (government), more than internal environment (top management, organizational structure or culture), influence the decision-making process in the healthcare organizations. Moreover, international community proved to be the most influential in the implementation process through its projects, donations or credits. This happens not only through laws, regulations and standards as indicated by Rennings (2000), but also through many initiatives started by them.

5.2. Important factors in the implementation of sustainability initiatives in the healthcare sector

5.2.1. Organizational culture in the healthcare institutions

Out of four dominant organizational cultures described by Cameron and Quinn (2006), this study proved that in the healthcare sector examines, hierarchy and leadership are highly valued. Orders and rules are very important to follow. We can put it simply by saying that hierarchy leaders are rule enforcers. Barney (1991) argues that if an organization wants to obtain a sustainable competitive advantage, its culture must be flexible to change according to the external conditions. However, these changes can only come through national and international initiatives, but it cannot be expected of the public healthcare executives to start the change and have the adhocracy type of organizational culture, since it would ask for a very flexible and dynamic organization, which would not suit the healthcare system.

Bowles (1998) argues that the cultural context must be considered as well. This is a very important factor that can influence the overall decision-making process. Results show just how important human factor is both as a driver and barrier in the process of implementing eco-innovations. Also, the consciousness of the employees is not on a remarkable level concerning the eco-innovations. Overall, this influences the way employees from the bottom of the organizational hierarchy work and interact with others. Generally, this will influence the hospital’s performance and examples confirm it. From Prof. dr Slankamenac failed Telestroke project we can see that the department collaboration is in the end chaotic and there are no other projects. On contrary from the interview with Ass. Prof. dr Koledin, we can see that in his institution, teamwork in on a remarkable level, which consequently gives excellent results.
Employees and executives can be motivated to act in a more sustainable manner, because of the intangible assets, like reputation (Fombrun, 1995). This happens to be one of the motives that would make a person eager to implement eco-innovations and offer patients better quality healthcare, but not the dominant factor in this study. It would be more beneficial if executives and employees would be informed about the better status of patients’ that can be achieved due to the implementation of eco-innovations. In this way, investments in eco-innovations would be justified more easily by them.

5.2.2. The importance of decision-making in the implementation process

Executives bear many difficulties in their decision-making processes for implementing eco-innovations. Wilts et al. (2013), emphasized several different barriers that exist and affect a good implementation of the waste management in the organizations. This refers to barriers such as: insufficient diffusion of innovations, lack of knowledge and finance, or even established patterns of consumer behavior. These barriers occur in the case of Serbian healthcare sector as well. A good practice in the implementation of waste management does vary among institutions. On one hand there are cases of several healthcare institutions that show remarkable results in managing their waste, which is quite significant since it is often infectious waste. On the other hand, we can see cases of certain institutions that did not oblige to managing their waste in specifically written ways, which let uninterested staff to deal with it in a bad manner (e.g. leaving the waste outside of the buildings on the road, instead of sorting it in specifically assigned containers).

Currently, the case of Serbian healthcare institutions only show the implementation of good practice in waste management, but not of waste prevention. Waste prevention may be the next step in the decision-process of implementing eco-innovations in the healthcare sector. This action would take into account much more than just waste. It will be more about the innovative and efficient ways of handling resources (Wilts et al., 2013). In this context, not only that the decision-makers would reduce environmental impacts of waste that their institutions generate, but at the same time would save costs for diverse actors alongside the value chain (Berkhout et al., 2003). This cost-savings are one of the reasons that decision-makers must take into account. This can be applied not only to the decision-makers in the organizations and companies, but also to the policy-makers. This study
contributes to policy makers with exploring what are the current obstacles in healthcare executives’ practices, and showing the possible places for improvement.

In cases when decision-makers would decide to manage their resources through waste management, I would advise them to encourage their organization’s members to share their experiences and ideas, which could in turn help not only to manage, but also to downsize the waste. If this would not happen due to the members indifference into the matter (as it happened in some healthcare institutions in Serbia), decision-makers must enforce a set of strict rules that would bring the same results.

In case of inefficient waste management there is a threat that infectious medical waste will infect someone, which represents the negative externality of such healthcare activities. The healthcare sector can be very fruitful sector for imposing rules and guidelines, since the sector is based on a strong respect towards the organization’s hierarchy. The same was noticed by Volker Welter (personal interview, December 17, 2013):

“We had very successful global environment UNDP project addressing waste management in selected hospitals. A lot of good practices were introduced. The problem that remain with such a scene is that you create islands of excellence without necessarily providing mechanisms how they can spillover these practices to national health systems. You create an island of excellency where things are working but as long as you are not making sure that such a practice is recognized by the national policy-makers or getting it incorporated in the standards of the national system, you have no guarantee that at the end of the project, the well-established practices will continue to be exercised... When the projects fail, they fail because this linkage was not undertaken. You have to make sure that you are placing senior policy advisors in the ministries of health that make sure that what comes out as positive out of this project can be communicated to the government. Then, the government is the one who needs to change the national standards.”

NIVEL (2013) suggests that new strategies oriented towards the social interaction and leadership, as well as collaboration with external experts (even healthcare economists) would have numerous benefits for a more successful implementation of eco-innovations.
Knight and Jenkins (2009) through their research of adoption and application of eco-design techniques came to the conclusion that checklists and guidelines are top ranked choices of applying eco-design theoretical settings in the organizations. We can see that manufacturers’ guidelines are used for a more successful implementation (especially in laboratories), but for other parts of the healthcare sectors, trainings proved to be very important.

Lastly, the model I proposed as a graphical representation of the implementation process of eco-innovations in the healthcare sector is based on the same fundamentals as the Roger’s model (1983). This means that contending with difficulties and uncertainty that veils the innovation, the diffusion of innovation is represented as: “a social process in which subjectively perceived information about a new idea is communicated.” The most important motives, barriers and drivers, as well as the impact that national and regional government, and importantly the international community can have on the implementation process of eco-innovations are well described and reasoned in the study. The contribution of study is manifold, since it contributes to diverse actors including healthcare employees and executives, government officials, manufacturers of healthcare products or services and to international community. The study offers an understanding on how to approach better to different stakeholders to foster the implementation of eco-innovations more efficiently. Moreover, it is noteworthy to say that patients, clinicians and policy-makers will need to choose clinically effective treatments with the best environmental profile. Moreover, they will have to encourage the further development of eco-friendly technology and practice. This is aligned with the view where eco-efficiency does make the old and destructive systems less so, but more needs to be done to broadly adopt these innovations in practice (McDonough and Braungart, 2002).

5.3. Applicability to real-world practice

Uncertainty and high complexity that accompanies early warning signals, represent an obstacle and this is why we still see that many companies and institutions do not stop their activities that may lead to hazards (Gee, 2013). The most common defense is that there is no strong scientific evidence that would urge them to change. This study explored a complex principle of sustainability, trying to raise awareness among diverse healthcare
stakeholders that they need to start the change from within. We are witnesses of drastic climate change and there is a strong empirical data about the correlation between activities that societies undertake and its’ consequences. Not only devastating consequences on our environment, but also on the health of us and our descendants. There are many ways of addressing these issues from scientific, business and public standpoint and by spurring sustainable innovations and their implementation in diverse sectors.

Focusing narrowly on maximizing short-term profits at the expense of workers, communities and the planet, cannot be sustainable. The application of precautionary principle is still opposed by different interests. This happens due to short term economic costs from its use, but there is a moral and legal justification for timely actions that would address the impact of potential hazards (Gee, 2013). The economic shortsightedness is one the biggest risks in our current systems. I do not state that there are no companies, organizations or institutions that do not consider long term perspectives in their practices which influence positively our society, environment and economies, but there are, unfortunately, many examples of business practices that emphasize short term payoffs, imposing to us and future generations tremendously high costs of living. Very interestingly, there are opinions that the future of businesses, and them turning more to sustainability agenda, will be shaped by the marketplace, rather than the dictates of corporate law (Gunther, 2013). There are some very concrete examples how certain important stakeholders may boost innovation process in a more sustainable manner. For example, Volker Welter (personal interview, December 17, 2013) brought up the case of Kaiser Permanente and noted:

“Kaiser Permanente, as a very big organization, was insisting with the suppliers that they do not want PVC floors in hospitals anymore. The suppliers came back and said there aren’t floors that are not containing PVC. However, Kaiser Permanente insisted on it. The next year, one or two of the suppliers came back with new floors for hospitals that did not contain PVC. This is for me one very concrete example how just by putting up standards, not even on a national or a regulatory level, but just by important players in the field ... you push your own suppliers to be innovative. From the moment on you are asking for alternatives, substitutes and so on, market will come up.”
VI Conclusion

The paper presented and empirically explored the implementation of sustainability initiatives in the healthcare sector, with a focus on the most important stakeholders in this process. Results were obtained from a comprehensive literature review and in-depth interviews with thirteen C-level healthcare executives, which are regarded as the gatekeepers or frontrunners in the organizations they manage. Moreover, this study analyzed what kind of eco-innovations are present in the healthcare sector and provided a summary of the decision-making process in different kind of healthcare organizations in Serbia, with an analysis of possible gaps or opportunities in the process.

6.1. Sustainability initiatives - lessons learned

Results that emerged from this study offer every individual, organization or an institution involved in the healthcare sector an insight what can be changed to foster innovations or faster implement them. For example, the study showed that there is no direct connection between the size of the healthcare unit and it’s innovativeness. More, it proved to be about the people who initiated the environmental projects and the perspective of these projects. Executives’ opinion of eco-innovations is mostly biased by previously implemented eco-innovations. For this reason, they consider waste management to be a good example of eco-innovations in the healthcare. Nevertheless, different executives’ expertise shaped their different views of eco-approach to healthcare. Interesting answers about eco-innovations arose such as organic food, eco-friendly children toys or ecologically sound patient rooms. However, it is worrisome to see that two executives had an opinion that the current situation in the healthcare is not satisfying at all and that even the basic needs of the patients are not met (in terms of available hospital beds). They stated that it is hard to expect that any eco-initiatives will be started in this kind of conditions.

Two eco-innovations that were implemented and subsequently failed or succeeded are telestroke and waste management. Telestroke had manifold benefits. Considering better treatment outcomes, the cost of treatment of stroke patients via Telestroke is overall significantly lower, which is one of it’s biggest benefits. Nevertheless, this project failed, due to lack of financing. On the other hand, waste management was successfully implemented, but with varying results among clinics.
The most important lessons learned for advancing the sustainability agenda in the healthcare can be drawn from the data obtained in the study. First, you need to build alliances across institutions. Since this area represents a multidisciplinary area, it is of great importance to build networks of partners and institutions. Second, political climate changes in time along with government strategies and initiatives. This means that real actions happen on a level lower than the governmental. From a global view, it should be operated on a midlevel of institutions. As noted by Volker Welter (personal communication, December 17, 2013):

“Central governments are not innovators. Central governments very often simply implement what civil society below the radar screen or at that level, years ago have started to implement. The central government will come at the later stage. It does not mean that all is lost because you can take action on a level below. States can take actions, regions can take actions, cities, private corporations, NGOs and international foundations can take action.”

Third, advancing the sustainability agenda may be easier to do in countries like Serbia than in United States or Western Europe. While United States and Western Europe have very strong institutional structures, it is more complex and difficult to operate in them which might be in a certain way a potential leapfrog for these countries. On the other hand, developing economies and countries carefully follow WHO guidelines which means that it does not mean that in these countries there will be less chances of success.

6.2. Sustainability - aversion to change or an opportunity?

To easily approach eco-innovations and successfully implement them, policymakers, international community, manufacturers and healthcare executives need to know what may motivate healthcare management to implement these innovations. Results show that healthcare executives would mostly be motivated to implement eco-innovations to enhance patients’ status. Concerning, the employees’ attitude towards the implementation of eco-innovations, their executives mostly believe that the 50% would be ready to implement them or that they are not informed enough. Nevertheless, results show that in order to ease the process of implementing new environmental solutions, employees’
trainings, including presentations and lectures, or visits by manufacturers to offer advices and guidelines would help to more easy and fast implement and manage new solutions.

The major barrier in the implementation of eco-innovations in the context of a country that rather adopt than invent them, is the monetary issue. This monetary issue is twofold, since both the cost of eco-innovations and the financing of eco-initiatives may be a problem. Other barriers that were noted are non-stimulating enough government policies and the human factor. However the human factor may also overlap with the government policies answer, as executives believe that if people in the government would advocate more for these initiatives, things would accordingly change to better. It is interesting to see that the problem is not knowledge or expertise. Even the most stated competitive advantage of majority of healthcare institutions is said to be the employees’ expertise.

Concerning the drivers that could foster the implementation of eco-innovations, 92% of executives believed that people can foster the change. Out of this 92% nearly half of the responses (47%) set external environment as the main driver for environmental practices (35% believed that government is the one who can be the most influential in fostering and implementing eco-innovations, 12% the international community). Moreover, 35% believed that people working within the institutions could potentially drive the change. I believe that this comes more as an executives’ wish that people from within could truly change the practice, when in reality they are aware, and concluded the interviews, with an opinion that the external environment is the one that can really change the practices and start eco-initiatives in their institutions.

6.3. Fostering cooperation between society, companies and institutions

As a result of the conducted interviews, I was able to construct a model that could explain who are the main stakeholders in the decision-making process for implementing sustainability initiatives in the healthcare sector. Moreover, this model explains the flow of actions and ways that any type of eco-innovation has to take to reach the healthcare institutions and in the last instance, patients and the society. International community has a potentially tremendous impact on the initiation process for making a decision to adopt new, environmental innovations in the healthcare. Expertise and the latest trends could be
easily transferred in this way to national and regional healthcare institutions. The reason healthcare institutions would benefit from this is due to their dependence on the government decisions and lack of independent financial resources.

As we can see from the findings, government plays an important role in the implementation process of eco-innovations in the healthcare, but not the crucial one. As suggested by Andersen and Clubb (2013), policy-makers tend to respond to early warning signals from environmental hazards, only when the costs of our inaction are calculated. Furthermore, these estimates are usually left to economists alone to be calculated, when this work should be seen as an area for broader discussion and interdisciplinary collaboration. This work can be strengthen by joint research of experts from economics, health, ecology, demography and other relevant disciplines. Through joint projects there is a higher probability that their voices will be heard by policy-makers and international community.

Furthermore, as seen from the study, international community may potentially have a tremendous impact on the national governments in spurring the sustainability agenda. Stirling (2008) well noted that when there is a possibility of opening a political process for debates, rather than closing it, an outcome will be an “empowering wider social agency in technology choice.” Moreover, opening a public debate on future innovation pathways will help diverse stakeholders to clarify what the conflict is truly about (de Marchi, 2003). It is important to remember that renewable energy systems or corresponding infrastructure often need more than a decade for adaptation and diffusion respectively (Rennings, 2000). Therefore, it is realistic to expect that it will take more than a half of a century for major changes to take place, this including important changes in social and economic systems, alongside with the learning processes that will take place.

6.3.1. Implications for theory and practice

This study has manifold implications to the theory and practice. The study contributes to the theory by defining how eco-innovations are understood by top-level executives related to healthcare and what is the level of importance of these innovations for them. Moreover, study explored the most important stakeholders in the process of implementing eco-
innovations, which gives a better understanding and an opportunity to other researchers to see what might be other ways that would bring more fast innovations to the health sector. This model can be used for a comparison with other countries’ healthcare systems that implement eco-innovations.

Contribution of this study to practice is through offering an understanding for healthcare practitioners how to approach possible influencers, who they might be and what kind of organizational culture would contribute the most to establishing good connections. Through understanding the model of decision-making in the healthcare, this research offers an in-depth insight to policy-makers, what are the opportunities and barriers for them to foster the implementation process of eco-innovations in the healthcare sector.

6.4. Limitations of the thesis

One of the limitations of this study is that only top-level executives from the regional healthcare sector were examined, thus not having an overview of the national healthcare system. Moreover, this study tackled only the opinions of healthcare executives from the tertiary level of healthcare service in Serbia. Therefore, we cannot say that these results must be the same for the primary and secondary level healthcare institutions. Nevertheless, the tertiary level is naturally the first one to implement the newest trends, including eco-innovations, which made it relevant to examine in this study. Furthermore, this study draws conclusions from the executives’ point of view, which might reflect only their opinion, and not the opinion of the overall organization.

6.5. Suggestions for further research

Further research might consider the impact of different healthcare eco-innovations that are diffused across a number of different countries that rather adopt than invent these innovations. Also, it would be beneficial to examine what kind of strategy would be the most suitable for a context such as Serbian to foster the implementation of eco-innovations in the future. Moreover, it would be of great value to follow the work of the UN GPHS programme and examine it’s work and outcomes in a scientific manner. Whether this programme will affect the performance of healthcare institutions, in which countries and through which sustainability initiatives is left to be researched.
VII Acknowledgements

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VIII References


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IX Appendix

9.1. Primary data

Interview Volker Welter, UNDP (transcript in English language)

Interview Prof. dr sc. med. Đorđe Gajdobranski (transcript in Serbian language)*

Interview Prof. dr sc. med. Nevena Sečen

Interview Prof. dr sc. med. Svetozar Sečen

Interview Prof. dr sc. med. Petar Slankamenac

Interview Prof. dr sc. med. Jovan Vukadinov

Interview Prof. dr sc. med. Aleksandra Mikov (transcript in Serbian language)*

Interview Prof. dr sc. med. Aleksandra Kapamadžija

Interview Ass. Prof. dr sc. med. Miloš Koledin (transcript in Serbian language)*

Interview Ass. Prof. dr sc. med. Jasmina Katanić (transcript in Serbian language)*

Interview Doc. dr sc. med. Ljiljana Dobrić

Interview Jelena Maletin (transcript in Serbian language)*

Interview Milena Nikolić

* can be provided upon request

9.2. Protocol for C-level healthcare executives

Name of the hospital/clinic: ________________________________

Type of the hospital/clinic: ________________________________

Name of the interviewee: ________________________________

Position of the interviewee: ________________________________

Beds: _______________________________________

Employees: _______________________________________

Physicians: _______________________________________

Revenues: _______________________________________

Ownership: _______________________________________

* can be provided upon request
Questions:

Innovation:

1. How do you see eco-innovation in healthcare?
   1.1 Types of eco-innovation:
       - medicine,
       - biodegradable material,
       - equipment,
       - energy efficiency,
       - waste management,
       - others?

2. Importance of eco-innovation for your organization?
   2.1 Occurrence: top/bottom/all levels
   2.2 Drivers of eco-innovation (it comes from internal/ external environment - suppliers, government, international organizations, patients, doctors, conferences)

3. Examples of eco-innovation?
   3.1 Successful examples of implementing eco-innovations?
   3.2 Incidents in implementing some innovative solutions in your practice?

New ideas/decision making:

1. Organizational culture (open/closed)
2. Organizational efficiency (quality assessment? - compliance with the government policy and regulations, organizational structures and operations, departmental cooperation, quality of patient care?)
3. Market orientation (bottom line assessment (triple bottom line assessment -> full cost accounting (takes into account social and environmental performance in addition to financial performance))
4. Competitive advantage (new adoption is a fit to the organization / hire someone who fits the organization)

Roll-out process strategy:

1. Centralization and formalization style of working (planning ahead?)
2. Relationships and interactivity between employees
3. Commitment to the changes rather than control mechanism/top-down strategy (best practices from the regional community to model the planning?)
   2.1 Your motives to innovate/adopt eco-innovations?
   2.2 What is an attitude of your employees towards eco-innovation if they adopted it? If they did not, are you aware of their opinion towards it?
4. Streamline the business process (putting innovations into practice) - providing trainings with lead communicators?
4.1 Who in your organization is primarily responsible for the roll-out process and how?
Current and future trends

1. If you consider that the roll-out process can be fostered in any way, what would foster the innovation or who?
   - empowering individuals from healthcare organizations to share their ideas / improving effective and collaborative team (from healthcare organizations) dynamics, (e.g. using a structured “brainstorming” or “ideation” or “creative process” to support teams in creating innovative solutions),
   - physical environment (Are people able to easily get together to communicate and work together? Are they able to escape and think in peace and quiet? Can they find a space to spread out and dig into prototypes/results/data?),
   - organizational culture (organizational policies, management behaviors),
   - geopolitical culture (every culture, every education system, has strength and weakness; What cultural strengths can be leveraged, and what cultural impediments must work to be overcame?)
   - more collaboration with international clinics/ other clinics in the country,
   - government approving grants?

1.1 Is there any support from the international community that you are aware of: capacity building, technology transfer, funding, technical support? If yes, which? If not, which one would you prefer to have the most?

1.2 Barriers or?
   1.2.1 Do government policies encourage or discourage from developing more sustainable approaches at the local level?
   1.2.2 Costs?
   1.2.3 Others?

2. Your opinion about the future trends of eco-innovations in healthcare? (global/local outlook)

9.3. Protocol for UNDP

1. Since you have an extensive experience with procurement in the healthcare sector and being one of the pioneers of sustainability movement within UN, what are in your opinion the most important consequences (environmental, economical, social, health) of current healthcare practices?

2. Who are the most important stakeholders in the current healthcare setting around the world?

3. Could you tell me more about the UN-Interagency Sustainability Initiative - The Joint Programme on Green Procurement in the Health Sector (GPHS)? Which activities were undertaken so far; what are the results? Any already implemented project or you expect to start in the following period?
4. What are the criteria in choosing a country, healthcare institution, sustainable initiative to start a project? Any specific country first? If yes, why?

5. When it comes to national healthcare systems and sustainable initiatives, what are the opportunities and risks you and they have to manage, or expect to manage? What do they see as a barrier or a driver in the implementation process?

6. What are your motives to consult individuals, companies or organizations to help them to operate in a sustainable way?

7. In your opinion, what may be the motives of diverse market actors to foster or oppose the implementation of sustainable initiatives in the healthcare sector?

8. Are there some particular cases of companies, organizations or healthcare institutions that were innovative in their practices, making them greener? Are there any complementary activities or projects from national healthcare systems or other international organizations? What did they change? Some particular toxic chemical by substituting or removing it? Efficient waste management? Biodegradable materials in use? Others?

9. Do you have some particular cases when healthcare sustainability projects failed? If yes, why did these projects fail?

10. When it comes to incorporating expectations for management of which impacts it has on the local population and environmental, social and cultural resources, is there a particular group of sustainable initiatives which are rather more challenging to implement than others? Why?

11. In which markets or countries you have the most difficult time to operate or are expect to have difficulties? Why?

12. In your opinion, and drawing from your immense experience, what are the lesson learned and how do you see the future - are companies, institutions, organizations striving towards more sustainable healthcare practices?

13. How do you see a role of UN, and more specifically The Joint Programme on Green Procurement in the Health Sector (GPHS) in the market? In your opinion, what kind of institutions, companies or organizations can foster the implementation of more sustainable green practices? In what way and why?

9.4. Transcript of the interview with Volker Welter (UNDP)

Due to bad internet connection, there are certain gaps in the interview. However, I took notes during that time with an aim of not losing any important information. Note: M in the transcript refers to me (Mirjana Milic) and V to Volker Welter and ... to interruptions in the conversation.
The transcript:
...
M. I sent you a set of questions. I hope that you find them quite interesting or convenient for my thesis topic.
V. Yes, the questions are really good.
M. Thank you.
V. How many people are you interviewing?
M. Currently, I already interviewed 12 C-level healthcare executives from Serbia. They are mainly professors, as well as executives in different healthcare institutions, because I was quite concerned for my Italian thesis with the diffusion of environmental innovations in the healthcare sector, so I wanted to conduct a research in a country that is rather adopting environmental innovations from external environment than investing, since I think many scientists tend to write their papers about US healthcare system, UK or other more advanced systems. So, I wanted to see what are the barriers or risks and some opportunities for international community or even those healthcare institutions to invest in these greener healthcare practices. Or, is it necessary for them to implement these practices. Since there are many countries around the world that have diverse problems in the implementation of the newest practices, I wanted to focus on their problems, rather only on successful experiences... I will use this data that I obtained through interviews for this research and upgrade the findings with yours opinion and potentially with opinion of certain people from non-governmental institutions or national institutions.
V. Ok. Good. I understand. It goes without saying that we are very interested in your thesis.
M. Thank you.
V. Ok. Let me first start with the first question. It is not country specific that you are asking for, so this is a very general question. Let me perhaps start from the following angle. I think that current healthcare practices in most of the countries have a tendency for very heavy medication and less, lets say, on health prevention or what regards to healthy lifestyle. You can ask very cynical question some time that it might be better that doctor sometimes write a prescription to run regularly around the block than of prescribing medicines. In other words, I think that the current healthcare practices we have a tendency of over-medicalization of issues. There is also a tendency for extending life at all costs, regardless of what stays of the dignity of that individual. If we look at it, it has an enormous impact cost-vise, medically-vise and so on. Another tendency in the current healthcare practices is looking only at the patient, without looking at the social or a family contact of the patient that is getting sick. Very often there is a linkage. By hyper-specialization of medical disciplines we tend to overlook these issues. Now, talking about the environmental consequences of such current healthcare practices, I think that combined with centralization and focus on hospital treatment and the tendency of over-
medicalization, there is a quite heavy environmental burden imposed by the health sector. Not only in the sense of green house gas emissions, but also what concerns the environmental impact of pharmaceutical residuals in the environment. You think that pharmaceutical residuals of 50 or 100 different medicines can be present in all countries water supply. Then I think this is rather scary. Now, obviously, the argumentation is that concentrations that we are measuring are far below the medical efficiency dose, but who knows? And who knows how compound effects are coming out and who knows what does the long-term intake of small doses does? I would say that this is definitely one of the most important environmental consequences that current healthcare systems cause. In a combination with the over-medicalization, over-centralization, it also really ignores the social contacts of patients. What concerns the economical aspect, I mean, the present system is producing a type of research that has a tendency to increase the cost of healthcare, enormously. He have medical companies that are investing significant sums of money in cancer drugs that are expanding life by three or four months, while other aspects are completely neglected. There are wrong financial incentives being produced, along with this also environmental consequences of the current healthcare practices. But the economic aspect goes farer. The issue I was mentioning is this attitude expending life with whatever means even if someone is very very old and sick, and normally would die. The economic costs of such practices, the last half year of patients, are enormous. And they do not stand any reasonable relationships to what you can do. Why we cannot say, as we did in the past, if the person is old and will die, why are we artificially connecting this person to machines, probably in pain and awful conditions? That is also the social and health impact. When we look at the WHO data statistics, composition of the global burden of diseases, we argue about 25-30% of the global burden of diseases is...... When we look at the fact that almost the third of the burden is environmentally linked, we definitely see a linkage between environmental practices and impact of the health system. This is very much neglected in the current healthcare systems. Why do we not come to a situation where healthcare practitioners are saying: “Wait a moment, if in this region there is an increase of the lung cancer, it must be very much linked to certain level of air polluters, lets get the public think about that.” We miss that very often I fear. Let me stop here with regards to question number one.

M. Yes. Your answer on this question was particularly important to me, because I wanted to have your opinion since from an economical point of view, I am going to write about externalities and what is happening even with the production of pharmaceuticals or with efficient waste management, and whether it has a negative impact on our environment and then it has an impact on the environment, as well as on our society.

......
V. When we talk about the most important market actors in the healthcare sector around the world, basically, we can talk about pharmaceutical industry and their very, very crucial role. In addition, I think that insurance companies have market mechanisms with pharmaceutical industry. When we talk about these actors, particularly in the developing countries government organizations, NGOs, donation organizations continue to play a crucial role, so I would not call them directly market actors but they are stakeholders. This distinction is remarkable and plays a significant role when it comes to national governments.

....

V. Perhaps, let us switch now to question 3. Now, the program for green procurement in the healthcare sector - the overall objective of the program is to reduce environmental burdens of the health sector by using procurement as a tool. We have incorporated five different outcomes through this program. The outcome one is normative guidance on green procurement of pharmaceuticals, medical devices and health products. It also includes a guidance for green MVP (Minimum Value Product) procurement process. The outcome two is a list of what we call an immediate list of activities that covers products like specific training package for green procurement in the health sector, it covers a list of necessary products for substituting, it covers mercury, PVC and so on. The outcome three of the joint program relates to a structured dialogue with the private sector. We believe in our program that we should not operate through a shock therapy. We cannot go from one day to another by changing current practices. This is why we conduct a structured dialogue with a private sector explaining that it will be a win-win situation for everyone. The outcome four relates to activities that we undertake in cooperation with big funding entities like GAVI and others. For these big funding entities in the health sector the whole issue of green procurement and sustainability are absolutely not on a radar screen. These big funding entities have been established in cases of major emergencies and that are not thinking about diverse problems they can also address. We try to play an advocacy role with these institutions, so they are including the green procurement aspect in they procurement guidelines. And then the output five in the joint program document relates to innovative approaches that reduce the environmental harm. It includes how can we use procurement to address the issue of antibiotics resistance, pilot studies on water and health issues and so on. The overall approach that we take is to start from a recognition of emergency of environmental problems. It means that we cannot necessarily rely on agreements on the government level, because more than 180 governments that are coming to an agreement, the child may already have fallen down into the water. If we look at the climate negotiations it is a classical example how it can go wrong. The climate negotiations are taking places from beginning of the 90s and 23 years later what we notice is that globally speaking carbon-
dioxide emissions are increasing for 69% since the beginning of the climate negotiations. And this is not a coincidence. It is simply very, very difficult to get a consensus among 180 governments on a very complex, multidimensional problems like climate change. That being said, it does not mean that all is lost because you can take action on a level below. States can take actions, regions can take actions, cities, private corporations, NGOs and international foundations can take action. There are success stories where this has worked. There is even a great success story in health sector. This success story is so called WHO pre-qualifications program for medicines. This acts as de facto as a world drug regulatory authority. However there was never a formal decision made by 180 governments to accept the program because they would still negotiate 20 years or more. De facto impact of pre-qualifications program for medicines is positive because big funding organizations started using it and said we will fund only medicines from this program. We want to establish something similar because it works. That is the core idea. It is not just a dream because we have real life examples that it is functioning. At the same time we do not see the private sector as an enemy but, potentially speaking, as an ally because we think that win-win aspects are very strong in the overall approach.

V. ... companies, from the moment when EU was establishing minimum air-pollution standards, companies were improving efficiency of motors. You can imagine a similar innovation process towards pharmaceutical companies. For instance when you are assuming certain minimum standards of pharmaceuticals in the environment. All area of green chemistry is one of the newest research areas that would have a major push forward. The other aspects in our program we want to establish for the very first time energy rating system for health equipment. It is not yet there. Experience shows, from the moment you establish new standards, companies are coming with new and better products. So, innovation I see as an opportunity to reduce an environmental burden and frankly speaking to reduce the environmental cost of the health system. I see this as opportunities towards a more sustainable healthcare. Now, coming to your question 6 with regards to the motives. You refer here specifically to our initiative?

M. Yes. I am referring as well to your personal motives and your initiative as well. Why you would like to help to push healthcare system in a more sustainable way? And then I am also referring to question number 7 when I am asking you what do you think motives might be of other healthcare stakeholders to push sustainability agenda.

V. Let me perhaps start from the big picture. All the achievements that have been reached in poverty reduction worldwide, potentially speaking, are at threat by environmental problems like climate change. So, if development organizations are not addressing such big environmental problems we may have work over the decades in vein. Therefore, the UNDP Strategic Plan puts a major emphasis on the whole issue of sustainability. Now,
the health sector comes here into play because both UNDP as well as other UN agencies initiatives have quite a major involvement in the health sector. So, it is perfectly logical that we are linking now our global mandate of sustainability to the development projects that we are undertaking in the healthcare sector. Basically from a global perspective, it would be absurd if talk about sustainability on one hand and then we are heavily involved in a healthcare sector without involving what we advocating for. Now, the starting point obviously are the countries or activities where we are already heavily involved. That means in the framework of Millennium Development Goals reduction of maternal and child mortality, reduction of HIV, AIDS and so on. These will be the starting points where we are intervening and trying also to include an environmental sustainable agenda. It derives from the UN Mandate and individuals we are contacting are key players in the scientific community, or big international conferences like CleanMed, we are orienting ourselves a little bit more towards companies that are playing a lead role in sustainability. That means that they are linked either to a global compact or playing a crucial role for other initiatives, like the global reporting initiatives. Concerning organizations, we have many contacts now with Nordic donors, and not just because we are here in Copenhagen, but simply because the problem awareness is pretty well developed in the Nordic region. I am not claiming that is the only one where it is the case, but as the UN we obviously have a global mandate and we try our best to make sure that institutions from developing countries like Brazil, India are represented in the initiative and we are contacting them accordingly. So, I would not claim that environmental consciousness is something that is limited to Northern Europe. Now, on your question 7, on the motives of other market actors in the healthcare sector - money talks, its about money. This particularly concerns the pharmaceutical industry. The private sector however is not homogeneous. We have to be very clear. There are well advanced companies, well advanced in the sustainability agenda that perceive our initiative as a very interesting and that can help us actually in improving health products or developing new products. There are other companies who’s business model is more on a cheap model side, and which may feel threatened. There it is very important that we as the UN system get the message across. We do not want to push anyone out of the market. This is not an initiative to promote the Nordic pharmaceutical industry and push out the Brazilian or Indian one. This is a initiative where we want to work with you, where we want to transfer perhaps more developing practices to other manufacturing companies and where we want to give you a chance to compete on a fair basis. Apart from private companies, there are other market actors. There are in the governmental organizations professional associations. There are insurance companies. For example, insurance companies are much more sensitive towards potential affect of the health sector and they also invested their interest in building models for big pharmaceutical companies. We had discussion with Kaiser Permanente for example. This is the biggest public health service provider in the US,
nonprofit. They have instituted a policy to get rid of the PVC in the hospitals. So, there are some very interested openings, and not all of them are associated to pharmaceutical industry. But, first we need to be mindful about pharmaceutical industry, because they are very, very powerful and important and unfortunately on the international transparency index, they get worse transparency rating that the military industrial complex, which is quite an achievement.

M. That is true. I actually had a chance to exchange a word or two about the pharmaceutical industry with Mr. Vuk Jeremic, the President of the 67th session of UN Assembly, about the same concerning issue. It is the dark of the darkness at the moment. Maybe we can go now to question number 8.

V. Ok, good. Yes, there is a number of companies and healthcare institutions that were innovative in their practice, making them greener. Let me mention the case of Kaiser Permanente. Kaiser Permanente, a very big organization, was insisting with the suppliers that they do not want PVC floors in hospitals anymore. The suppliers came back and said there aren't floors that are not containing PVC. However, Kaiser Permanente insisted on it. The next year, one or two of the suppliers came back with new floors for hospitals that did not contain PVC.

M. This is great.

V. This is for me one very, very concrete example how just by putting standards, not even on a national or a regulatory level, but just by important players in the field like insurance companies. By putting up new standards you push your own suppliers to be innovative. The list can be extended endlessly. Because from the moment on you are asking for alternatives, substitutes and so on, market will come up. We have another example when we talk about health sector, PVC gloves. In the beginning we were thinking, we do not want PVC containing gloves. They were then produced, they were expensive, now they are cheaper. Lets talk about mercury containing thermometers. From the moment we were saying here, we want to get rid of mercury in the thermometers, you got the digital thermometers. Now, in many countries you get them cheaper that the mercury ones. All these are examples how putting up standards push the players to be innovative, and it is a long, long list.

M. It is really good to see that there are many fruitful examples already and that the list can be really, really long.

V. We have really concrete examples. These were just three that came up in my mind, but I mean, if we go systematically through I am sure we will have a list of at least 20 or 30 products, substitutions, innovations that were pushed by such standards.

M. That is really good. Concerning the complementary activities, while I was working at the UN, I know that we were collaborating with UNEP concerning their sustainability initiative. Is there any joint initiative now or how does it function?

V. Yes, UNEP is a part of our initiative. In all likelihood we will also have the UN General Secretariat on board. New Your radar documented it and said that this is fantastic. It is a
great potential, a transformative change and we want to talk with the Climate Change Advisor of Ban Ki-moon.

M. Congratulations for your work!

V. Yes, and recently a UNDP Administrator was here in Copenhagen and she mentioned two projects only and one of them was our initiative for green procurement in the health sector.

M. That is really, really nice to hear. Congratulations again.

V. So, there is a senior management commitment. Now, concerning your question 9 - some particular cases when the implementation of sustainability projects failed. Let me rephrase it. We have very successful healthcare sustainability projects, for instance on waste management. A medical waste is a risk to health, workers, nurses, cleaners and to environment. We had very successful global environment UNDP project addressing waste management in selected hospitals. A lot of good practices were introduced. The problem that remain with such a scene is that you create islands of excellence without necessarily providing mechanisms how they can spillover these practices to national health systems. So, I would describe that so far as a problem in this type of project. You create an island of excellency where things are working but as long as you are not making sure that such a practice is recognized by the national policy-makers or getting it incorporated in the standards of the national system, you have no guarantee that at the end of the project, the well-established practices will continue to be exercised. So this is what I would describe somehow as a potential setback or throwback of sustainability projects undertaken. In other words, the message is to make sure to get the national policy-makers think how to incorporate good sustainability practices from the islands of excellency in their policymaking. When the projects fail, they fail because this linkage was not undertaken.

M. That is true. I also had an opportunity while interviewing C-level healthcare executives from Serbia to see that there was a sustainability initiative - project initiated by European Union, which was concerned with implementing more efficient waste management practice in hospitals. The results of this project were, as you said, islands of excellency, but unfortunately I saw that different healthcare institutions had varying results because they were not obliged to comply completely to a certain set of regulations. Therefore, some of them were quite advanced with the implementation process and with successful outcomes, and other not. Rather than showing the successful stories of these institutions, their stories and implementation process was left as an island of excellency.

V. Yes, in other words you have to make sure that you are placing senior policy advisors in the ministries of health that make sure that what comes out as positive out of this project can be communicated to the government. Then, the government is the one who needs to change the national standards. Yes, now your question 10.
M. Yes. Do you think that there is any particular sustainability initiative that may be more challenging to implement than others, or you consider everything as a global initiative?
V. No, it is clear that some issues are more difficult to implement than others. I think all sustainability initiatives that are linked to behavioral change face very different time horizon than let’s say sustainability initiative that are linked more to changing some pressing technology issue. I would say that sustainability initiative that are linked towards the behavioral change are more complex ones. Because, behavior change is not something you can establish by decree. It requires a long-hole, a communication strategy, champions and a very, very long perspective. Let’s take the example of waste management for instance. There are technological solutions to medical waste management. In a certain way it is easier to come up with a technological solution than to change a garbage practice in a hospital, or in a region where people systematically are putting medical waste in the right boxes and taking all the precautions. Do you understand the difference?
M. Yes, yes. Of course.
V. I would say that at the end of the day it may be more difficult to change the behavior.
M. Yes, that is also true and one of the most common seen things I saw from an extensive literature review is that many people tend to think that the technology is the only environmental innovation that can be implemented in the healthcare. People tend to neglect other types of environmental innovations that include social, institutional and organizational one. This is also the case where it should be mentioned.
V. I fully agree with you. This is a very one-dimensional perspective. It goes partially back to institutions that are behind the funding. Also, it is a typical US approach, Bill and Melinda Gates Foundation approach. I mean, technology is one of the solutions, but it is not the only one. These organizations are not addressing all issues.
M. Yes, that is true. They tend to neglect other possibilities that may be more beneficial, but as you said are as well, quite complex.
V. Yes. Yes.
M. Referring to question number 11, do you think that is quite connected to question number 4? Which criteria did you use for choosing a country? As you said, you are going to focus more on developing countries, and this might be more difficult than focusing on USA for example?
V. I am not so sure actually.
M. Really?
V. Yes. Let me explain you why. UN standards that came out as from WHO are not necessarily accepted by countries like US. They argue - we have our own strong regulatory authority. However, many developing countries are carefully listening to what WHO is saying. So, I would say actually, there is a potential of leapfrogging in a certain way for some of these countries. Especially for countries that not yet have too strong institutional structures like let’s say in the European Union, which is a very complex
institutional machinery, or let's say in the USA. Therefore, operating in a developing country does not necessarily mean we have less chances of success.

M. That is a very interesting point.

V. Yes, now on your question 12, what are the lessons learned and how do you see the future. I think one lesson learned is - if you want to advance sustainability agenda, you need to build alliances across institutions and across professional boundaries. Build alliances. No institution or no specific professional discipline has found a silver bullet for environmental issues. You need to come up with networks of partners, institutions, well-intentioned people. That is one lesson to be learned. The second lesson is, I think, linked to the overall political climate. You see to what extend have environmental issues like climate change or increase in pollution in our environment, chemical pollution are perceived in the public, and it differs from year to year, and is connected to changing political agenda. However, below the government level, there are options for having an impact. Frankly speaking the longer I am dealing with this area I am feeling that the real action is not taking place on the central government level. Central governments are not innovators. Central governments very often simply implement what civil society below the radar screen or at that level years ago have started to implement. So, do not trust too much in the capacity of central governments to manage change or introducing sustainability agenda. Try to operate on a midlevel of institutions and then the central government will come at the later stage. Now, how I see the future? Frankly speaking, I think that things will go much worse before they are getting better. Any look at the environmental indicators points out to drastically deteriorating situation. It is very unlikely at the present rate of carbon-dioxide emission even two Celsius degree as a target can be kept, so we face the real possibility of 4-6 Celsius of climate change that will have a disastrous consequences for many regions of developing countries. 4-6 degrees Celsius climate change means that in some regions of the world figures are much higher! So, I am afraid as long as some of the environmental catastrophes are not happening in the centers of power, in Europe and USA, people will not really see the real world impact of it. Governments may not be sufficiently fast in taking the right cause of action. I do not want to paint it all black, but just take this example with the last hurricane that was happening in New York. Again, it stimulated the climate discussion in New York. One, two or three more disasters that will be related to climate change will push governments. Until the developed countries and its' societies do not see the real life impact of climate change, I am afraid they will not foster the change at the speed that is required.

M. Yes, it is very important to note that as well.

V. Yes. Now, on the question 13. I think that the role of UN is basically, to be honest, a program without commercial agenda and background in a sense that we want to make sure that the developing countries are truly involved in this type of dialogue. It would be a disaster if such an initiative is being perceived as a Nordic initiative or something from the developed countries. It is global or it is not. The potential for change I think is very
very high, especially because of the commitment of the WHO and I think we can reach a comparative change in considerably short time period. I remain optimistic in that specific area. I keep dreaming on.

M. Yes. I truly consider you as one of true pioneers fighting for sustainability and I truly consider myself to be lucky that I had an opportunity to work with you, because truly, after my internship when I was deciding what to write about in my thesis, I really wanted to write about innovative practices primarily in the healthcare since were concerned with procurement of pharmaceuticals and medical equipment during my stage. My professors were kind enough to let me conduct a research about this area. Moreover, many professors from Serbia were also eager to participate in the study. All of this truly makes me happy and I am satisfied with the results.

V. This is great. Really great.

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