The implementation of Voluntary Environmental Agreements and Sustainable Balanced Scorecard in the Health Care Region of Greece.

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Abstract.- Through the implementation of Voluntary Environmental Agreements (VEAs) and Sustainable Balanced Scorecard, a Health Care Region will be able to significantly increase the sustainability performance of the operation of its sustainable health facilities. A systematic literature review was conducted in environmental management policies in the healthcare system, in order to define the environmental footprint in the Greek health sector. VEAs are used as a policy tool to promote environmental innovation in local hospitals, as well as the Sustainable Balanced Scorecard for method tools to assess the sustainable performance of local hospitals in a health care region. The operation of local hospitals has a number of negative effects and a significant number of positive effects on the local environment under proper environmental management policies and innovation. This has also been mentioned in the reports of the governmental-NHS Sustainable Development Unit (SDU), and international, non-governmental organization-Health Care Without Harm (HCWH). Local hospitals, both public and private, are now more than ever invited to adapt to the new developments and move towards a more environmental and social friendly mentality- strategy in the regional health care system. The need to address modern environmental problems should lead to the creation of Voluntary Environmental Agreements (VEAs) to every health care region, which will promote the health care sustainable development goals in local hospitals. The Sustainable Balanced Scorecard could give a trustworthy sustainable performance evaluation of the local hospitals, to create a commonly shared sustainable language, which is especially crucial for an organization made up of so many highly skilled, diverse and strong-willed professionals.

Key-Words:- Hospitals, Health Care System, Health Regions of Greece, Environmental management policies, Sustainable Development Goals, Voluntary Environmental Agreements, Balance Scorecard.

1 Introduction

In 2012, according to the World Health Organization, about 25% of total deaths worldwide were attributable to the fact that people work and live in an unhealthy environment and there were calls for urgent action to protect health from climate change [1] [2] [3]. Officials of the World Health Organization emphasize the necessity of investments that will reduce environmental risks in local communities, cities, houses and workplaces and transformative health systems towards achievement of the Health Care Sustainable Development Goals [4] [5]. Local hospitals operate daily on a 24 - hour basis, which results to the production of different types of waste and consumption energy and other resources. Local hospitals, both public and private, are invited to adapt to the new developments and move towards a more environmentally friendly mentality- strategy for the local communities [6][7]. Regarding Greek hospitals, a comprehensive state-of-the-art environmental action plan could be drawn up in the form of Voluntary Environmental Agreements (VEAs) [8].

Voluntary Environmental Agreements (VEAs) are a type of voluntary tools, quite widespread mainly in developed health systems, which are concluded mostly between the state and the professional associations of Sustainable hospitals. These Voluntary Environmental Agreements are designed and implemented under the guidance and evaluation of specialized independent bodies (e.g. Universities) and aim at the coordinated reduction of environmental effects arising from the operation of Sustainable hospitals [9].

As the most important management innovation of the 20th century, the Balance Scorecard (BSC) has been adopted in a broad range of industries from manufacturing to health care system and has received considerable attention from both academic and industry press [10]. The Balance Scorecard adoption in the healthcare system is considered to have similar issues to other kind of industries, such as the manufacturing industry [11].

In this article, we suggest the proposed Sustainable Balanced Scorecard to be implemented in local hospitals and focus on the sustainable performance to assess the various related sustainability performance policies in the Greek health care region. For the purposes of this article, sources using a research method called 'systematic review' from various articles, literature in online-based research databases, e.g. Springer Link Science Direct, JSTOR Pubmed, EBSCOhost, Scopus, Emerald, Wiley and Inderscience. The papers were studied and cases from Greece and abroad were evaluated that were relevant to sustainable and environmental management policies in the healthcare system, Balanced Scorecards and Sustainable Balanced Scorecards, Voluntary Sustainable and Environmental Agreement methods.

The methodological suggestion of this article is a public sustainable performance program under Voluntary Environmental Agreements with Sustainable Balanced Scorecard in a Health Care Region in Greece.

2. Sustainable health care in the local communities

The ANH (Alliance for Natural Health) first defined sustainable healthcare for its readers in the journal Nutrition Practitioner in 2006. "*A complex system of interacting approaches to the restoration, management and optimization of human health that has an ecological base, that is environmentally, economically and socially viable indefinitely, that functions harmoniously both with the human body and the non-human environment, and which does not result in unfair or disproportionate impacts on any significant contributory element of the healthcare system*" [12].

Generally, local hospitals' accept different categories of pressures; (1) demand-side changes (climate change, sustainable developments goals, environmental policies, social protection programs, changes in demography, fertility, ageing, migration, changing patterns of disease, changing risk factors, and hospital-acquired infections), (2) supply-side changes (climate change, sustainable developments goals, environmental policies, social protection programs, changes in technology, clinical knowledge, and workforce), and (3) political and societal changes (climate change, sustainable developments goals, environmental policies, social protection programs, financial pressures, internationalization of health system, and global changes in the market for medical research and development) [13]. In the same era the WHO suggests, that the 2030 agenda for the Sustainable Development Goals is an opportunity for governments and the international and local community to renew their commitment to improve health as a central component of development. Dr Margaret Chan, Director-General of the World Health Organization, mentioned "*the challenge is*

the world to consider that conference on climate change is the most important health agreement of the century: an opportunity not only to reduce climate change and its consequences, but to promote actions that can yield large and immediate health benefits, and reduce costs to health systems and communities" [14].

According to Sustainable Development Goals, the environmental management policies in the local health care system setting is one in which services improve their environmental performance without impacting negatively on the healthcare services, as well as on the social protection and economic development in the local communities. In an ideal situation, solutions are sought that improve all sustainable development goals, improve local environment, as well as the economic and social value and health in local communities. Local hospitals and regional health care systems exist to serve their local communities, not only to provide healthcare services, but to bolster the local economy and quality of life by hiring local workers and contractors, buying locally through purchasing agreements and building clinical facilities in neighboring communities. In addition to these benefits, the environmental management policies bring a variety of other benefits to the local health care system: a) As local community health becomes a top priority for hospitals and care systems, many leaders are placing greater value on reducing pollution and creating a smaller environmental footprint, b) Health care organizations are also increasingly pursuing lean approaches to become more environmental efficient in various processes, a natural fit with local environmental efforts, c) Some environmental efforts, such as retro commissioning, can improve patient health by contributing to lower infection rates.

In the last decade, voluntary environmental management systems and voluntary environmental agreements have been chosen to solve environmental problems in local hospitals. In order to understand the extent and magnitude of environmental effects in local communities and the benefits of the rational use of energy by health facilities in regional health care system, one must take into account - inter alia - that the latter are big building complexes with extended mechanical equipment, operating on a daily basis, comprising zones with different requirements in temperature, humidity and ventilation, consuming large quantities of hot water etc. In the USA, the Environmental Protection Agency's (EPA's) health care program for Energy Star. "Retro-commissioning, for example, is a way that many hospitals begin to cut energy because it's a cost-effective method to quickly demonstrate cost effectiveness to senior leadership." The survey showed that 42 percent of respondents have implemented or plan to use commissioning or retro-commissioning, an audit to review building performance of energy systems, a low-cost measure that can yield big savings. One survey respondent noted: "As a result of retro-commissioning a number of buildings, we have saved approximately $600,000 in steam and over $250,000 in electricity. Another EU project the Green@Hospital project was conceived to help hospitals to save energy through the most modern ICT technologies and ad-hoc new algorithms. To reach the ambitious goals, an EU consortium consisting of four hospitals, two research centres and five companies, was put together and worked together since 2012, testing innovative solutions in real operating conditions. Four pilot hospitals, two research centres and five firms have worked together since 2012 testing innovative solutions in real operating conditions. Important savings have been reached, exceeding the expectations and replicability has been verified, including the calculation of the Pay Back Time. The tested solutions are suitable to be easily replicated in other healthcare facilities, reducing by 15.4% the energy consumption in the selected areas. The Greek panther of the project Saint George Hospital in Chania, analysed a building optimization and control (BOC) algorithm, which is implemented in the existing building energy management system (BEMS). The result of the project for the hospital was the achievement of the annual primary energy efficiency, which was almost 36%. [15] [16] [17] [18] [19]. For the waste management procedure in the Greek health care region, Zamparas and an associate researcher in 2017 and 2019, developed a multi-criteria model to examine available procedures, techniques and methods of handling infectious waste in the large healthcare unit of Patra and Regional health care hospital in Western Greece-Rio University Hospital. The results indicated a very good value in environmental management criteria, due to the values obtained for the commitment towards the environmental policy standards and the waste management procedures. However, further improvements on staff awareness (such as development programs to enhance sensitivity) and more green purchasing suppliers, should be further addressed [20] [21].

2. Environmental and sustainable management policies in local hospitals

The CEOs of local hospitals most often cite the following environmental and sustainable management policies, as the reasons they are pursuing voluntary environmental initiatives: a) Improving brand image and reputation, b) Saving money, c) Increasing employee satisfaction and retention, d) Managing risk and regulatory compliance, e) Improving facility operations and pursuing performance excellence, f) Demonstrating corporate social responsibility and corporate governance issues [22] [23] [24]. Moreover, local hospitals' CEOs often attend the environmental factor, as the reason they are pursuing environmental management risk. They are based on the premises that business activities tend to create environmental risks for ecosystems, water, air and human health. As a result, positive outcomes are expected, such as decreasing costs and improving profitability due to better energy efficiency. Reputation risks will also be reduced. As a consequence, business productivity and employees' moral increases, turnover decreases, and reputation risks are better managed. It also gets easier to work without social pressure from local stakeholders, as there's social license to operate. It is about making the responsibilities, rights, and expectations of local stakeholders clear, so that interests are met and a consensus on a sustainable hospital's long-term strategy is achieved. Same serious effects of these policies can go from aligning stakeholders' interests with management to avoiding unpleasant financial surprises and having a better social acceptance as a result of wealth being fairly distributed.

Environmental laws and regulations that apply to hospitals can be divided to those dealing with municipal and hazardous medical waste management and to those related to energy saving issues [25] [26] [27] [28]). An important environmental risk factor affecting the operational functioning and cost-effectiveness of hospitals is the purchase and management of supplies and of the stock thereof. Local hospitals are daily supplied with large quantities of various kinds of products that end up in the various departments thereof. Therefore, a "*green procurement"* policy should be implemented [29]. Green Procurement is a point of interest for the EU, as it can save more energy and materials, while reducing waste and pollution and encouraging the implementation of systems of sustainable practices [30]. The process of integrated environmental management in a hospital can be achieved by planning, designing and certification of an Environmental Management System (EMS). ISO 14001 and E.M.A.S. are the most widespread environmental management systems [31] [32] [33]. The energy consumed refers mainly to the operation of medical equipment, the sterilization, the thermal needs of the facilities -such as heating of different areas- the production of hot water and of steam for heating, the cooking and electromechanical installations, such as air conditioning, lighting etc. [34]. In 2010 in Greece, the Special Environmental Inspectors' Office of the Ministry of Environment and Climate Change sent to 177 health units a questionnaire, the basic results of which showed that they produce on average 0.7 kg of hazardous waste per bed and that a large number of hospitals lacked both in environmental terms approval decision and in internal management regulation. In addition, audits performed in nursing units in the period 2010-2012, revealed deviations in the application of the legislation [35]. In Greece, University Hospitals produce the largest quantities of medical waste (0.70 kg / bed / day), while private mental health clinics produce the smallest quantities (0.043 kg / bed / day) Military hospitals rank first in terms of toxic and infectious waste generation (0.68 kg / bed / day) [36] [37]. In modern and sustainable hospitals, the utilization of natural environment is important and needs further investigation [38] [39] [40]. Many hospitals do not pay proper attention to the lighting of their buildings [41]. The need for air renewal and air quality is important for hospitals [42]. Also, the construction of local incineration plants could also be a solution [43]. The American Hospitals Association reports in the Sustainable Operations Survey 2015[44] for the "*Green Hospitals",* that adopting and implementing environmental sustainability initiatives can have significant financial and non-financial benefits. The ASHE President-elect Terry M. Scott, CHFM, CHSP, SASHE, director of engineering/construction services, says: *"I think sustainability is gaining ground with many CEOs, although some may think it is a costly endeavour. Nothing could be further from the truth".* The Memorial Hermann Northwest and Memorial Hermann Southwest hospitals in Houston claim that *"An aggressive energy-reduction program can reduce a facility's energy expense by $2 per sq. ft. That translates into millions of dollars saved annually."* [45] [46]. The role of health managers in the pursuit of environmental goals is crucial for sustainable hospitals. Therefore, they can develop environmental education and employee awareness programs, set measurable environmental goals, reward environmentally aware employees, etc [47]. Regarding the cost-benefit analysis of the environmental management policies, the implementation of environmental accounting, the

financial assessment in the operation, investment and financial management, can improve their production processes and bring better environmental and sustainable results in the sustainable hospital [48] [49] [50] [51].

3. Implementing a Voluntary Environmental Agreement in a Regional Health Care System in Greece

Voluntary Environmental Agreements (VEAs) are agreements among the corporate, governmental and/or non-profit sectors, not required by legislation, that aim in improving environmental quality or natural resource utilization. VEAs represent a new environmental management policies approach and have experienced recent growth in many countries and regions, such as the USA and the European Union. These agreements are diversified and incorporate various kinds of objectives, incentives and procedures [52].

The need to resolve contemporary environmental problems has led to the creation of Voluntary Environmental Agreements (VEAs) in a Regional Health Care System in Greece. Related Voluntary Environmental Agreements have been designed and implemented in the Health Care system since early 1990 with relevant pioneering movements developed in Canada through the Green Hospital Scorecard [53] and in the USA through the Foster G. McGaw initiative. In Great Britain, the Ministry of Health has given special attention to energy saving issues in hospitals of the National Health System (NHS, UK). These voluntary environmental agreements take the form of public health care programs or voluntary consultation-negotiable programs by health care sector (public and private). Local hospitals that will participate in Voluntary Environmental Agreements shall have a number of benefits and incentives (e.g. environmental awareness, cost savings, rational use of resources, state aid, etc.). In its effort to design a Voluntary Environmental Agreement, each Health Region shall initially set up a committee consisting of the following: the Governor of the Health Region, the Deputy Governor of the Health Region, the Head of the Administration and Finance Department, the Head of the Single Technical Services Directorate, and the Head of the Research and Development Department. Initially, the overall environmental strategic objectives shall be defined (e.g. energy saving by developing energy innovations, green hospital supplies, compliance with environmental legislation, etc.). In a second phase, the committee shall evaluate the whole project and shall seek the scientific assistance of a specialized, Greek, health - related University with the role of technical advisor. The representatives of the specialized University, within the context of "Voluntary Agreements" shall use the “Balanced Scorecard” as a measuring model of sustainability performance, and shall follow the following steps.

Step 1: Examination of the current environmental condition of the Greek Health Care Regions (Y.P.Es.) by using the strategic operational tool S.W.O.T. analysis (*Strengths, Weaknesses, Opportunities,Threats*). This will reflect the strengths of local hospitals (e.g. experienced and well-trained human resources), its weak points (e.g. lack of environmental awareness of human resources), the opportunities (e.g. modern European funding tools that may be committed), and the threats (e.g. bad reputation of the national health system).

Step 2: The management of the health care region and the members forming the committee, shall design the policy-strategy to be implemented.

Step 3: The research team at the University shall now define the strategic priorities (e.g. optimum medical waste management and municipal waste reduction), the performance indicators (e.g. environmental costs) and the annual targets delivering a report to the Management of the Health Region for each hospital of its direct supervision.

The annual goals for each Health Unit shall be reflected in the Balanced Scorecard. The annual goals shall be further specialized and quantified in the scoring forms that each hospital shall be invited to complete. Such scoring forms shall indicate the strategic priorities (e.g. oil consumption), the objectives (e.g. annual rate of oil consumption reduction), the weighting factor (e.g. 0) and the scores to be collected by quarter (e.g. Q 1, Q 2, Q 3, Q 4). Hospitals occupying the first three (3) places shall be awarded annually at a special event. At the same time, local hospitals awarded for their sustainability performance shall have the opportunity to be benefited by the policymakers of the regional health care system (e.g. state subsidy for introducing an eco-management and audit system, priority in financing projects of public investment program, etc.).

4. Sustainable Balanced Scorecard as a method tool for Voluntary Environmental Agreements

(VEAs) in the regional health care system.

Kaplan and Norton defined Balance Scorecard, as a framework that helps organizations translate strategy into operational objectives that drive both behaviour and performance. The measures and objectives are viewed across four dimensions of performance: financial, customer, internal business process, learning and growth. [54]. According to Kaplan and Norton, non-profit and healthcare are organizations that have deployed the scorecard effectively and gained benefits from it. The principal difference in these sectors has been a more careful consideration of customers. Customers become elevated to the top of the Balanced Scorecard strategy map as, ultimately, effective delivery of services to customers explains the existence of most government and non-profit organizations. Also, the financial perspective may be portrayed at the top of strategy maps, concomitant with the customer perspective, to signal the importance of satisfying the donors and citizens, who provide funding for the services that the organization delivers. Once these modifications have been made, managers in government and non-profit organizations have used the scorecard to gain agreement on the strategy and then align the organization to deliver it effectively, much like their private sector counterparts [55]. The adoption of Balanced Scorecard strategy to a local hospital takes time and some certain steps must be followed. Yang and co-authors suggested three main phases and 17 steps to implement the Balanced Scorecard strategy. Adoption starts with planning phase of development of the Balanced Scorecard, developing the contents of the Balanced Scorecard and taking the action and getting the feedback from implementation [56]

I. Planning Phase of Developing the BSC
   Step 1: Developing objectives for a BSC
   Step 2: Criteria for choosing an appropriate organizational unit
   Step 3: Gain senior leadership support and Sponsorship
   Step 4: Build up Balanced Scorecard team
   Step 5: Formulating a BSC project plan
   Step 6: Implementing a comprehensive communication Plan
II. Development the Contents of the BSC
   Step 7: Gathering and distributing background material
   Step 8: Developing or confirming a miss ion, values, vision, and strategy
   Step 9: Strategy system of organizations
   Step 10: Gaining common consensus from the organization strategy
   Step 11: Developing objectives and measures for the four perspectives
   Step 12: Developing the cause and effect relation ships
   Step 13: Establishing targets for measures
III. Action the BSC and Feedback.
   Step 14: Setting Strategic Initiatives for targets
   Step 15: Cascading the BSC into the non-profit organization management system
   Step 16: Allocation the budget for targets
   Step 17: Implementation and examination of the ongoing BSC plan

According to Hansen and Schaltegger on the balanced scorecard (BSC), a performance measurement and management system aiming at balancing financial and non-financial as well as short and long-term measures. Modifications to the original BSC which explicitly consider environmental, social, or ethical issues are often referred to as sustainability balanced scorecards (SBSCs). They suggest, there is much scholarly discussion about SBSC architecture and how it can be designed to relate performance dimensions, strategic objectives, and the logical links among these elements. To synthesise the widely scattered research findings and publications on the SBSC, we conducted a thematic analysis in a systematic literature review containing 69 relevant articles spanning a period of two decades. They found that sustainability-oriented modifications of the BSC architecture are motivated by instrumental and social/political to normative theoretical perspectives. Moreover, these modifications can be mapped with a typology of generic SBSC architectures. The first dimension of the typology describes the hierarchy between performance perspectives and strategic objectives and how it is related to the organisational value system. The second dimension describes how sustainability-related strategic objectives are integrated into SBSC performance perspectives and how this is related to corporate sustainability strategy. This study contributes to the development of the emerging SBSC literature and practice and, more generally, to research on corporate sustainability performance measurement and management [57]. According to Nikolaou and Tsalis the balanced scorecard (BSC) has recently been considered a proper tool for evaluating and designing the objectives of corporate sustainability. On the one hand, the theoretical body of literature provides normative sustainable balanced scorecard (SBSC) frameworks to indicate *'what should be measured'* or what *'should be done'*

in order for firms to improve their sustainability performance. On the other hand, the empirical body of literature examines the barriers and the challenges faced by the firms in their endeavour to adopt the proposed normative frameworks. To introduce environmental and social issues into the four perspectives of BSC, Nikolaou and Tsalis propose the popular GRI guideline, which provides various standard indicators to audit corporate sustainability performance. The obvious advantage of the proposed combination is to facilitate firms in various sectors to compare sustainability performance outcomes and inform more accurately and transparently stakeholders about their sustainability performance [58].

Similar to other types of Balanced Scorecard in the hospital, implementing sustainability performance in local hospitals can be presented by four perspectives:

I. The Learning and Growth perspective for sustainability performance, where the required skills and infrastructure are defined. The learning and growth category of the balanced scorecard focuses on the people in the organization and answers the question, *'Can we continue to improve environmental and social value?'*

II. The Internal Processes perspective for environmental and social issues, where environmental and social management focuses on the internal processes that are critical to meet the needs of the clients. The internal business processes category of the balanced scorecard is all about key sustainability performance indicators. For a sustainability performance indicator to be included in the balanced scorecard, it must answer the question, *'What must we excel at environmental and social issues in the hospital?'*

III. The perspective for environmental management policies of the Clients that, in this case, would cover patients and doctors. The customer category of the balanced scorecard examines metrics related to patients and physicians. Specifically, this category answers the question, *'How do customers see the environmental and social performance of hospital?'*

IV. The financial perspective for environmental management policies, where the economic objectives of the organization are defined. The financial category of the balanced scorecard encourages the identification of a few relevant high-level financial measures. In particular, you should choose environmental and social measures that help answer the question, *'How do we look to our stakeholders for the environmental and social policies of hospitals?'*

Following Nikolaou and Tsalis framework, it consists of three steps: the combination of BSC and GRI guidelines, the development of a scoring–benchmarking technique in order to build a SBSC scoring–benchmarking index, and the application of the SBSC scoring index through information drawn from sustainability reports published on the local hospitals in the local region health care. Firstly, the critical points of BSC and GRI guidelines are later combined in an attempt to develop a new SBSC. Secondly, a combination of scoring–benchmarking techniques and SBSC are proposed. Thirdly, the proposed SBSC scoring–benchmarking technique is applied to a sample of sustainability reports that were published on the region health care.

Sustainability reports and environmental and social performance in local hospitals are core components of the regional health care system and should therefore be considered s key dimensions of sustainable health care benefits package. A Sustainable Balanced Scorecard model tools for assessing the sustainability performance in the Greek health care region can support the analytical capacity to inform the CEO of local hospital and policymakers of a health care region.

5. Conclusion

Local hospitals and regional health care systems everywhere have the potential not only to adapt to the environmental law and regulation, but also, in the process, to promote social and economic value, greater health social equity and environmental health through investing in healthier buildings, purchasing green, and implementing sustainable operations. At the same time, based on a different perspective, social responsibility and environmental management policies are in the locus of attention, not only as the most modern characteristics of a strategy for the local hospitals, but also in relation to local economic policies aiming towards better financial and social results for local communities and stakeholders. In other words, environmental and social issues are today related to hospitals strategy and have already become the organic part of regional sustainable health care system.

The scientific research that investigates the assessment of health management policies up to date, is supported by methodologies applied to health economics and examine the efficiency of international health systems based at national level. That methodology provides clear answers in many cases to local health care system, but fails to integrate the actual environmental and social

information and environmental and social performance of local hospitals and regional health care system.

The incomplete environmental and social statements and incomplete sustainable cost-benefit analysis result in inadequate operational decisions taken from policymakers of the health care region. Voluntary Environmental Agreements (VEAs) proposed to be implemented in local hospitals, focus on the environment and society aim at various related strategic objectives of the regional health care system.

The Sustainable Balanced Scorecard is a tool that could measure the sustainability strategy of a local hospital and it is also a tool for sustainable development goal in the regional health care system.

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