

Processes Innovation and Sustainable Development

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Abstract:

The Government of the Republic of Slovenia adopted Slovenia's National Strategy (hereinafter SNS), which sets out the vision and objectives of Slovenia's development in June 2005. Therefore, the Strategy does not focus solely on economic issues but also involves social, environmental, political, legal and cultural issues. Slovenia prepared its input to the first progress report of the European Commission on the implementation of the Renewed EU Sustainable Development Strategy. The article focuses on Sustainable Development as a tool for environment protection and processes innovation. Integrated environmental management integrates the requirements of sustainable development and environmental legislation; the EC eco-audit regulation; Sustainable development as a tool to continual improvement cycle and with processes innovation the need to save money in the processes via reduced resources and utility costs.

Key words: innovation, environment, management, processes, sustainable development strategy

1 Introduction

Slovenia prepared its input to the first progress report of the European Commission on the implementation of the Renewed EU Sustainable Development Strategy. The Government of the Republic of Slovenia appointed the Government Office for Growth as the focal point of monitoring the Renewed EU Sustainable Development Strategy. Slovenia's input is divided into three parts. The introductory explanation is followed by the overview of the main findings pertaining to Slovenia's Development Strategy implementation which is at the same time Sustainable Development Strategy of Slovenia. The content of the third and last part mostly focuses on the measures and objectives, reviews the progress made in terms of key challenges of the Renewed EU Sustainable Development Strategy and follows the structure of the template that was suggested by the European Commission [1]. In this part have a big role innovation processes. Innovation is of vital importance not only for those who want to increase or sustain economic growth in a given area (region, state and the like) but also for those who benefit(in)directly. According to this, producing as much as possible is no

more a central issue that should affect or change the economic course of development or improve quality of life [11]. The basis for the Slovene input is constituted by: (i) the reports prepared by the relevant ministries following the structure of the template, (ii) documents, adopted by the Government of the Republic of Slovenia – Slovenia's Development Strategy, Development Report 2007, Implementation Report on the Reform Programme for Achieving the Lisbon Goals 2006 and (iii) Renewed EU Sustainable Development Strategy [1]. The role and significance of innovation processes, as a part of sustainable development and processes innovation, becoming ever more important in the competitive market. It is about a new approach in managing sustainable development and environment resource planning in society [2]. Integrated production processes innovation model which promotes production processes innovation was derived from the model of managing company policy following the interest theory and business excellence. The successful development and implementation of processes innovation in an organizational system can produce a significant saving in the amount of business and environment resources and therefore a smaller environmental impact [7]. The

heightened awareness of the importance of environmental protection, and the possible impacts associated with products manufactured and consumed, has increased the interest in the development of methods to better comprehend and reduce these impacts [3].

The last three decades have witnessed a radical change in world and regional circumstances as well as in social and entrepreneurial ones. Consequently, following a holistic approach to competitiveness, it is of utmost importance to consider all the relevant factors of competitiveness. These factors could be subdivided into systemic thinking, production processes management, and business excellence. Moreover, competitiveness is the basis for successful company performance as well as for a better quality of life.

2 Problem Formulation

2.1 Slovenia's Development Strategy

The Government of the Republic of Slovenia adopted Slovenia's National Strategy (hereinafter SNS), which sets out the vision and objectives of Slovenia's development in June 2005. At the forefront of the new Strategy is the overall welfare of every individual. Therefore, the Strategy does not focus solely on economic issues but also involves social, environmental, political, legal and cultural issues. Due to such prioritisation of the objectives, Slovenia's Development Strategy (hereinafter SDS) also serves as Slovenia's strategy of sustainable development[1].

SDS lays down four strategic goals of Slovenia's development:

- (i) The economic development objective is to exceed the average level of the EU's economic development (measured in GDP per capita in PPP) and increase employment in line with the Lisbon Strategy goals;
- (ii) The social development objective is to improve the quality of living and the welfare of all individuals, measured by the indicators of human development, social risks and social cohesion;
- (iii) The cross-generational and sustainable development objective is to enforce the sustainability principle as the fundamental quality measure in all areas of development, including the objective of a sustained increase in the population;
- (iv) Slovenia's development objective in the international environment is to employ

its distinct development pattern, cultural identity and active engagement in the international community to become a recognisable and distinguished country around the world [1].

Further on, SDS sets out five key development priorities of Slovenia:

- (i) A competitive economy and faster economic growth;
- (ii) Effective generation, two-way flow and application of the knowledge needed for economic development and quality jobs;
- (iii) An efficient and less costly state;
- (iii) A modern social state and higher employment
- (v) Integration of measures to achieve sustainable development [1].

The SDS implementation is monitored by the Slovene Development Report, a document that is annually prepared by the Institute of Macroeconomic Analysis and Development (hereinafter IMAD) and adopted by the Government of the Republic of Slovenia as a guideline for formulation of national economic and development policy. Development Report 2007 contains the first findings related to the realisation of the adopted strategic guidelines in the initial period of SDS implementation [1]. Special are ethics principles important in environmental management system [4]. Organizations of all kinds are increasingly concerned with achieving and demonstrating sound environmental performance by controlling the impacts of their activities, products and services on the environment, consistent with their environmental policy and objectives.. They do so in the context of increasingly stringent legislation, the development of economic policies and other measures that foster environmental protection, and increased concern expressed by interested parties about environmental matters and sustainable development. [9].

Development factors of the knowledge-based society show a relatively favourable situation and trends in the area of human capital, whereas insufficient progress has been made in the quality and efficiency of tertiary education. The education structure is still improving, in large part thanks to the high participation of youth in education, which is above the EU average. According to some indicators, participation in lifelong learning is also rising and is relatively high, yet it is also necessary to involve older and less educated people in it. Faster progress must also be achieved in promoting the study

of physical and technical sciences and improving the quality of tertiary education, including by changing the system of funding tertiary education. The first steps in this direction have already been made by promoting enrolment in science and technical programmes and

thus increasing the number of higher education institutions. The growing difficulties in employing highly educated people are a further signal that higher education should be modernised [1]. Figure 1 presents policy aspects of managing with environment.

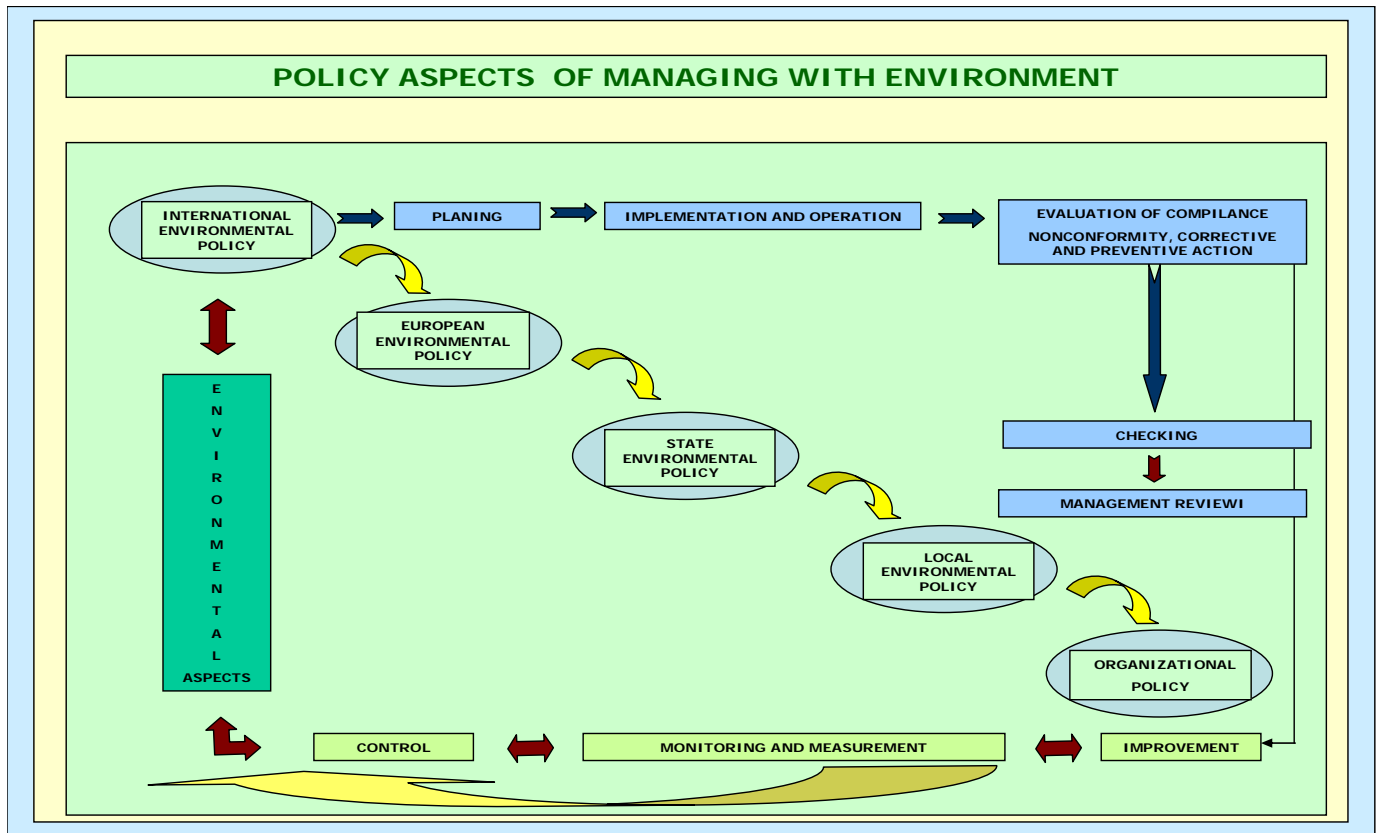


Figure 1: Policy aspects of managing with environment

2.2 Innovation – Friendly Organization

Leaders of successful, high-growth companies understand that innovation is what drives growth, and innovation is achieved by awesome people with a shared relentless growth attitude and shared passion for problem solving and for turning ideas into realities. Companies that continuously innovate will create and re-invent new markets, products, services, and business models – which leads to more growth. Innovation is founded on your enterprise's ability to recognize market opportunities, your internal capabilities to respond innovatively, and your knowledge base. So, the best thing to do to guarantee growth is to build a

sustainable innovation organization around the following components:

1. Vision and strategy for innovation
2. Culture supporting innovation
3. Processes, practices and systems supporting innovation
4. Top management team leading innovation
5. Cross-functional teams mapping innovation road
6. Empowered employees driving innovation [17].

Figure 2 presents the wheel of business evolution.



Managing Organizational Change The Wheel of Business Evolution

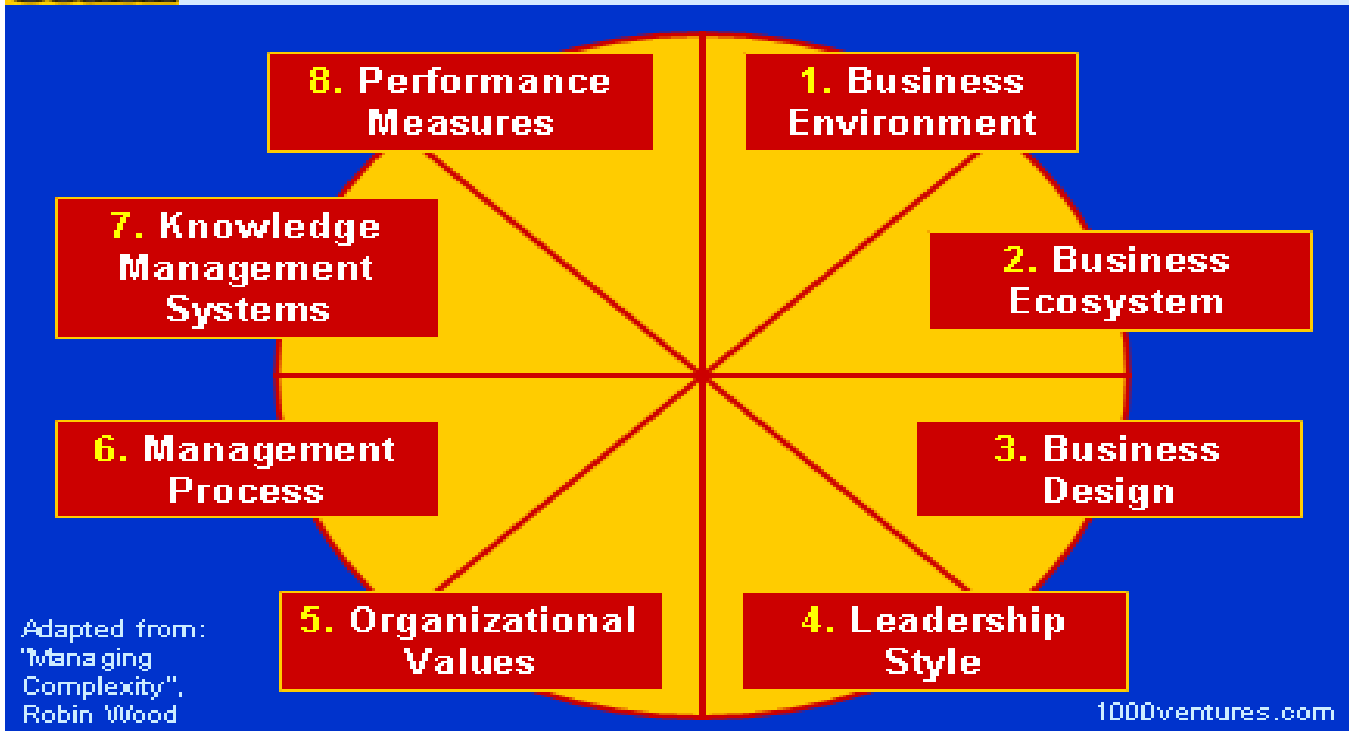


Figure 2: The Wheel of Business Evolution [17]

Innovation process, to be effective, must be sustainable. The organization must provide an environment to “incubate” ideas which mature and translate through implementation into products or services. An innovative organization is lead, not managed. A sustainable innovative organization is fluid and “organic”, almost biological in nature to foster constant creativity vital for the success of modern organization. The sustainable innovative organization foster creativity by following a variation of the model discussed below:

- Organizational mission is defined and aligned to incorporate widespread trust and respect for individuals.
- The Corporate mission is communicated throughout the organization.
- A successful creating organization is a constantly changing dynamic organization to create new practices, processes, services and products of value to itself and its customers [18].

Organizational innovation reflects the recognition that new ways of organizing work in areas such as

work-force management (such as employee empowerment, new people partnership, or positive action to involve all employees in order to make work organization a collective resource for innovation), knowledge management, value chain management, customer partnership, distribution, finance, manufacturing, etc. can improve your competitiveness [17].

2.3 Waste and Recycling

The ReEPNP 2005-2012 lays down that the components of the Environment Protection National Programme as regards waste shall be accounted for by the following operational programmes (OPs): (i) Operational programme for waste disposal with the aim of reducing the quantities of disposed biodegradable waste, (ii) Operational programme for hazardous waste management (currently in preparation), (iii) Operational programme for collection of municipal waste (currently in preparation), (iv) Operational programme for packaging and waste packaging management, (v) Operational programme for waste oil management, (vi) Operational programme for battery and accumulator management, (vii) Operational

programme for disposing polychlorinated biphenyls and polychlorinated terphenyls, (viii) Operational programme for construction waste management, (ix) Operational programme for reducing and preventing pollution due to titanium dioxide production waste, and (x) Operational programme for waste electric and electronic equipment management[1].

Each OP sets the objectives which are defined in quantitative and temporal terms. These objectives do not exceed the overall European requirements. The progress achieved as regards waste management is measured with selected environmental indicators (2005): (i) generation of municipal waste, (ii) discharged non-hazardous waste, (iii) generation of hazardous waste, (iv) import and export of non-hazardous waste, (v) generation and collection of waste oils, (vi) direct input of substances (total mass of all solid, liquid and gaseous substances other than water and air, which are not directly contained in the substance, entering both production and consumption processes) and (vii) waste management. On the basis of the Environment Protection Act, the implementing regulations have been adopted which govern waste management. The basic regulation pertaining to this field is the Rules on waste management, which is supplemented by two groups of regulations. The first one comprises the regulations laying down the conditions for the operation of waste management installations and the conditions for cross-border transmission of waste, whilst the other comprises the regulations dealing with individual types of waste [1]. Radioactive waste management is regulated by the Ionising Radiation Protection and Nuclear Safety Act and by the regulations adopted on the basis thereof.

Recycling and reuse of materials have long been associated with wise construction practices. Experienced contractors are now reaping the economic advantages of Construction Waste Management. Communities are also seeing the side benefits as listed below.

- A. Trim Costs.
- B. Establish a Market Advantage.
- C. Create Environmental Benefits.
- D. Help the Economy.
- E. Assist Charitable Organization

Organizations such as Habitat for Humanity can use surplus building materials. Pick-up of materials at the project site can sometimes be arranged [13].

2.4 Waste Recycling in Slovenia

The modern concept of working out environmental protection policies is based upon the notion of sustainable development. The latter has been gaining increasing importance both in the international community and the Member States of the European Union as a form of development bringing prosperity to future generations. It fosters the prevention and mitigation of pollution at source and emphasises sound use of natural resources as well as preservation of biodiversity. In the environmental sphere, sustainable development is understood as an interdependent relationship between the economy, infrastructure, settlement and the way of living, taking into consideration the bearing capacity of the environment and natural resources [12]. Construction Waste Management is a part of a growing movement toward a sustainable world. Sustainability or “green” management techniques are designed to protect the environment, save resources, and conserve energy. The use of construction waste management techniques which rely on salvage, recycle and reuse of materials have proven to have economic benefits for the construction industry. Economic development coupled with ecological health was first termed ‘sustainability’ in the late 1970s. The terms ‘sustainability’ and ‘sustainable development’ were used by the United Nations’ World Commission on Environment and Development in its report “Our Common Future” in 1987. Since that time, the ideas have worked down from a world-wide platform to practical applications in the local economy. The state of Washington declared its policy to promote construction waste management planning in design and building through changes in the Revised Codes of Washington in June of 2002. [15]. From these statements arise the role and the importance of Environmental Management and Waste Management as waste being one of the by-products of constructions. There needs to be a change in the Waste Management approach philosophy – from managing to economizing waste [6]. This approach means a change in the philosophy of the management of a company, which proves that environmental policy is a part of business policy. So the elements of Environmental Management are included in all elements of business processes, activities and products of this company as in planning, producing and the life cycle of individual products. For this purpose there are various tools and regulations in the organisational and technical-technological field and in the field of controlling human resources and the treatment in line with employee’s abilities. The consequences of this (tools and regulations) are economy effects which develop into Sustainable Development effects [8]. Especially in

the case of environmental protection and Environmental Management it is important that we are very cooperative, creative and aim-oriented.

In Slovenia in year 2006 the total amount of recovered waste, which was generated by production and service activities, was 59%. Total amount of disposed waste was 31% and the rest was delivered to abroad (5%) or temporary stored. In 2006, 5,910,356 tons of waste was generated by production and service activities. In comparison to 2005 the amount of waste increased by 6%. The greatest share in the total amount of waste was generated by manufacturing (39%), followed by electricity, gas and water supply (26%) and then in construction (19%). The rest (16%) was generated by other activities. In 2006, 42% of waste was internally recovered or internally disposed (which is 16% less than in 2005) and the remaining 58% of waste was delivered to the others for recovery or disposal (32% more compared to 2005).

In 2006, generation of hazardous waste amounted to 97,323 tons which is 16% less compared to 2005. Of the total amount of hazardous waste generated, together with the stored hazardous waste from previous year, 73,206 tonnes (72%) was delivered to the others for recovery or disposal, which is 6% more than in 2005. The rest of hazardous waste, 28,300 tonnes (46%), was recovered or disposed individually by the business entities themselves (which is 51% less than in 2005).

In 2006 recovery of waste totalled to 3,557,552 tonnes which is an 8% increase compared to 2005, however

there was a decrease in internal recovery of waste by 21%. In 2006 disposed waste amounted to 1,899,402 tonnes which is 11% more than in 2005 (the amount of internal disposal decreased by 12%). During 2006 the amount of waste exported totalled to 325,215 tonnes which is 36% less than in 2005 [16]. Table 1 presents amount of waste from production and service activities and its handling, Slovenia, 2002-2006.

	Amount of waste generated	Amount of waste generated and waste store	Internal treatment of waste	Amount of waste delivered to the others
	t			
2002	4,067,315	4,089,604	2,786,969	1,302,635
2003	4,570,267	4,686,134	3,163,418	1,522,715
2004	5,893,306	5,981,378	3,658,143	2,323,235
2005	5,585,080	5,669,138	3,034,056	2,635,082
2006	5,910,356	6,031,088	2,544,588	3,486,499

Table 1: Amount of waste from production and service activities and its handling, Slovenia, 2002-2006

Figure 3 presents waste recovery and waste disposal in Slovenia, 2002-2006

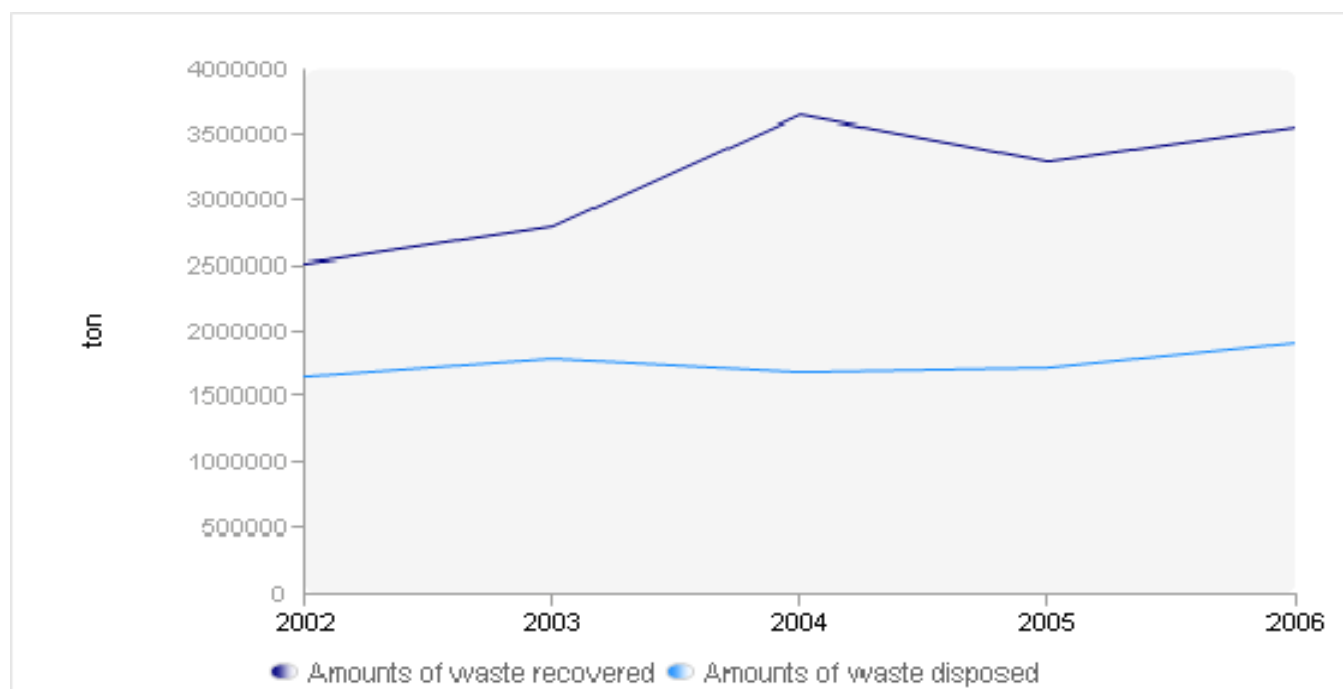


Figure 3: Waste recovery and waste disposal in Slovenia, 2002-2006

3 Problem Solution

3.1 Construction Waste Recycling

As constructions is an activity which to a high degree includes mainly a part of the data from the Article 107 of the Environment Protection Act (OJ RS No 41/2004) and also the assessment frameworks used by the European Environmental Agency it is reasonable to determine the environmental indicators in accordance with the legislation of the Republic of Slovenia and with European guidelines. The “Environmental Indicators” report for a specific area is prepared and published at least every 4 years by the Ministry of the Environment of the Republic of Slovenia as well as by the community, the commune, or other bigger autonomous local community with a reasonable use of the Article 107 of this law. Figure 3 presents type of construction waste. New economic issues dictate the redefining of economic interests in the wake of the recognition, that the natural environment is a limited production factor and not, as had previously been considered, only the supplier of raw materials [6]. These have previously been free goods without an assigned market value, while the environment has been an agent for the neutralisation of wastes and emissions of production and consumption [2]. Innovation is necessary on all domains and everybody is included in innovation. The role of management is shown in creativeness for the support of collaborators' creativeness. The processes innovation is so a segment in the innovative business system. In the example of environment protection it is necessary that we are as much collaborative, creative and target directed as possible [5]. New environment issues dictate the redefining of economic interests in the wake of the recognition, that the natural environment is a limited production factor and not, as had previously been considered, only the supplier of raw materials. The integral-orientated mentality represents a deviation from the previously established linear way of thought and activity, which is no longer sufficient in the light of the contemporary complexity of events. However, these one-dimensional elements are soon faced with insurmountable obstacles. This is why the integration of energy goals into the system of entrepreneurial policy is so vital [9].

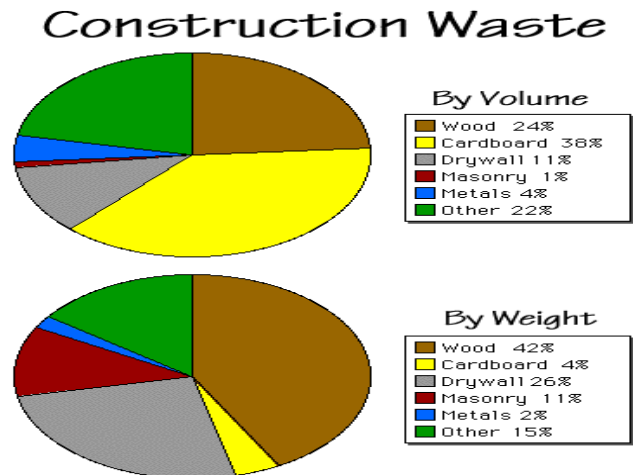


Figure 4: Type of construction waste [14].

The whole process of creative problem solving is a complex system in itself, dynamically changing over time, with permanently interacting system elements, it requires a systems thinking perspective in order to be understood and applied [10]. To effectively manage environmental concerns, the EMS elements should be designed or revised so that they are effectively aligned and integrated with existing management system elements. Management system elements that can benefit from integration include:

- organization policies;
- resource allocation;
- operational controls and documentation;
- information and support systems;
- training and development;
- organization and accountability structure;
- reward and appraisal systems;
- measuring and monitoring systems;
- communication and reporting [19].

Figure 5 presents EMS model integrated in management system.

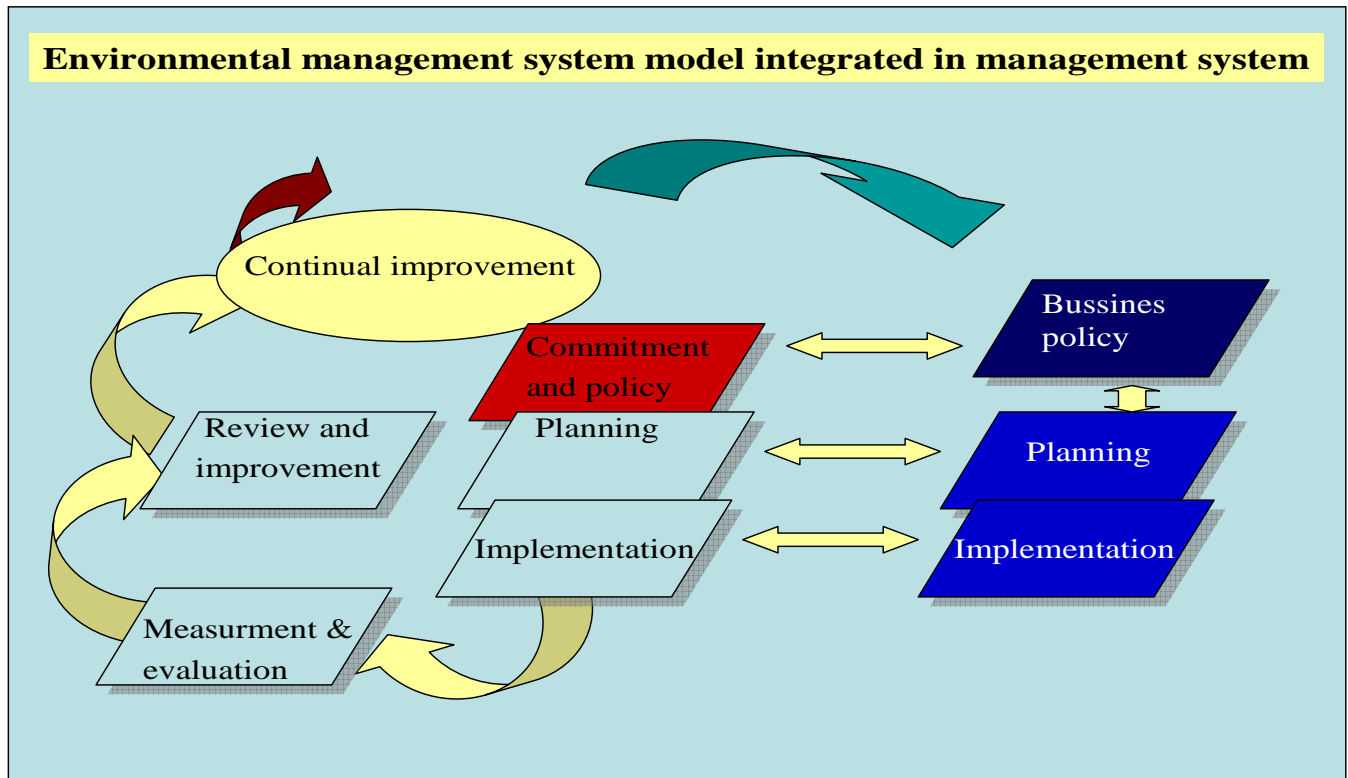


Figure 5: Environmental management system

If you look at the recycling facts, you will see that since 1990, the United States has improved dramatically in their recycling activities. Recycling facts report that fifteen years ago, the U.S. recycled roughly fifteen percent of our waste materials, which today has doubled to thirty percent! The following recycling facts are both interesting and fun bits of information to increase your knowledge on the art of recycling [4]. The process of recycling begins by product design and development. Some of these benefits may include: lower costs, stimulation of innovation, new business opportunities, and improved product quality [20]. Strategies for recycling building materials:

- Set a goal
- Select a contractor with proven recycling experience
- Use a Construction Waste Management Specification
- Monitor the waste reduction program [21].

Ecological concerns provided the need for intensive research of recycling of waste. Why is such kind of study important? Because of environmental protection:

- by minimizing waste,
- saving of fossil fuels due to recycling,
- to improving recycling process,
- optimized use of available resources,
- improved intellectual capital,
- optimized, effective and efficient processes,
- enhanced organizational performance, credibility and sustainability
- reduced costs [22].

The organization shall identify and plan those operations that are associated with the identified significant environmental aspects consistent with its environmental policy, objectives and targets, in order to ensure that they are carried out under specified conditions, by

- a) establishing, implementing and maintaining a documented procedure(s) to control situations where their absence could lead to deviation from the environmental policy, objectives and targets, and
- b) stipulating the operating criteria in the procedures(s), and

- c) establishing, implementing and maintaining procedures related to the identified significant environmental aspects of goods and services used by the organization and communicating
- d) applicable procedures and requirements to suppliers, including contractors [22].



Figure 6 presents new recycled construction waste composite from lightweight concrete with aggregates with expanded glass and isolation waste from hard polyurethane.



Figure 6: New recycled construction waste composite from lightweight concrete with aggregates with expanded glass and isolation waste from hard polyurethane

4 Conclusion

NSDS follows the general principle of the Renewed EU Sustainable Development Strategy and its key objectives. It covers its key challenges to a satisfactory degree as well and at the same time it integrates the Lisbon goals with the national setting. Slovenia is well aware of the fact that the principle of sustainable development necessitates to be perceived as a continuous process (and not as a one-time document) that has mechanisms set up for monitoring, reporting and adapting of the strategy if necessary. The theory on the basis of the practical experiences envisages sustainable development planning as a process of continuous improvement [5]. Therefore, what we should develop is an innovation management culture. Integrated sustainable development and environmental management integrates the requirements of environmental legislation; the EC eco-audit regulation; as a tool to continual improvement cycle and with

processes innovation the need to save money in the processes via reduced resources and utility costs .

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