Knowledge Management Applied in the Municipal Waste Area

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　　　The issues of municipal waste management are some of the most important challenges of the XXI century, taking in consideration the increased quantities of waste and the worries they generate in the global community, the new technologies and the environmental restrictions.
As the number and complexity of municipal waste management alternatives increase, the selection of the best waste management system, that is to decide on the combination of collection, processing and disposal systems that will best serve the present and future needs of a community, becomes a more difficult task.
Keywords: *knowledge management,* geographical information system.

Waste management processes are not easy to model and the knowledge in the area are still incomplete and uncertain.

Knowledge is defined as cumulative stocks of information and skills generated by receiver utilization of information.

This lead us to believe that the piece of information is the raw material from which knowledge are generated and also the form in which knowledge are communicated and stored.

Knowledge distinguishes from the information by the fact that is dependent on intellectual capacities of the receiver, on his ability regarding the perception, understanding and the utilization of information.

Information and knowledge are complementary because knowledge includes information which are both input for knowledge development and form for diffusion.

Knowledge management represents in fact a business practice with dynamic character, which intend to explain key subjects as: survival, adaptation of organization, growth of abilities in the context of a permanent evolution of the environment.

Knowledge management actually incorporate processes which take advantage of synergetic combinations between data avalanche generated by information technology, creativity and innovating potential of human resources.

In the municipal waste management area there is a demand for techniques, tools that facilitate the forecasting of waste generation and composition, allow the comparison, evaluation of waste management technologies, recycling and composting programme design, facility sizing, location and investment timing.

Due to these factors it is very important that every bit of knowledge about the processes, possibilities of improvement, innovation be effectively revealed and distributed among all the actors involved in the process of waste management.

Knowledge management specific principles as "interests cloud" principle, "beacon" principle, "push and pull" principle, can be applied in this sense.

This way the "interests cloud" principle allows the finding of commune interests, according to target-groups are formed, for networks structuration, discussion forums foundation.

The "clouds" are those groups of persons or objects which by taking into account several criteria bring to light similar features.

Another principle is the "beacon" principle that allows knowledge transparency, finding the best practice, that is top competence.

The "beacons", through their height, light far and in this way make transparent the place where are knowledge, bring to light the top competence, the best practice, which may belong to individual experts, excellence centers or networks.

Being guiding in specific processes, they lead to success.

The "push and pull" principle place knowledge at users disposal in the form of reports. The users retain only the knowledge they need.

The lack of expertise in municipal waste management domain leads to errors, wrong decisions, increased difficulties in managing the problems in the area.

The propagation of a domain expertise can be achieved by software tools that simulate the thought process of human experts. These programs are known as expert systems.

In order to assist researchers and decision makers in all phases of a municipal waste management planning problem, including waste generation forecasting, logistic, vehicle routing issues, location on territory of waste treatment and disposal facilities, an expert system can be developed and used.

One of the most important components of the expert system is the knowledge base.

In the municipal waste management area the knowledge base may contain: waste quantity generated by fractions, waste composition, treatment facilities and final disposal, density of collection area, revaluation possibilities for recyclable waste, the structure, endowment and technical possibilities development of the salubrity firms, frequency of waste collection services, public awareness, and institutional responsibility issues.

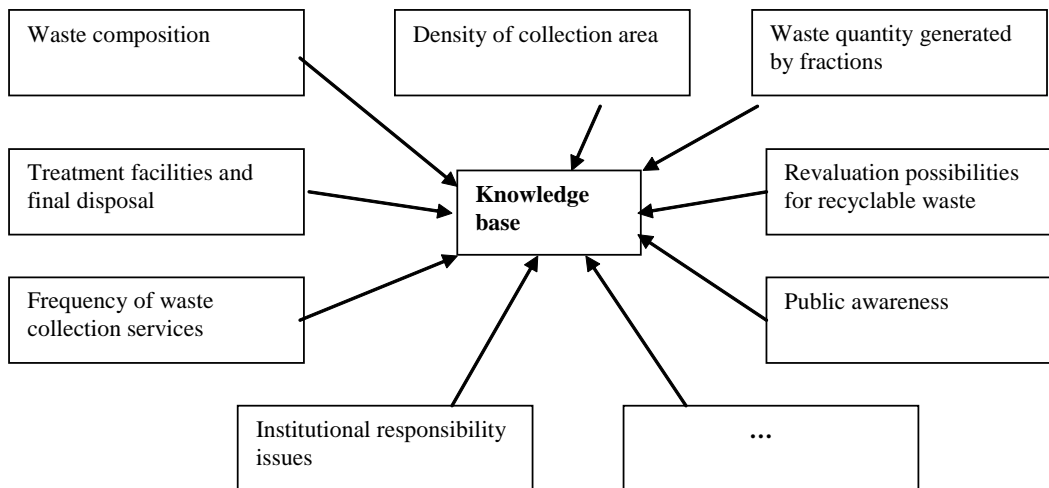Synoptic the knowledge base content is presented in figure 1 like this:

Fig.1.

Waste management professionals may benefit from the permanent collection of expertise in the knowledge bases.

At present an interesting approach for municipal waste management decision support systems is represented by software tools based on geographical information system (GIS) technology and by the WEB based expert systems.

"In particular, GIS technology enables the computer collection, analysis and display of geographical information associated to a territory, resorting also to thematic views displaying homogeneous data. In this way, using mathematical models associated with the capability of spatial analysis, it is possible to plan events, to forecast performances and to settle strategies." [2]

WEB based expert system demonstrate that knowledge propagation over the WEB by the use of expert system services is possible. The scope of a WEB based expert system is to satisfy for a given domain, the needs in a realistic and cost effective manner.[4]

Among publicly available WEB based expert systems there is, in the area of waste management, Landfill Operation Management Advisor (LOMA). A detailed description of LOMA's development phase is available in [5].

The potential problems on which the organizations, from municipal waste management area, can confront when developing expert systems are: the lack of identification me-

thods of the knowledge sources, difficulties in tacit knowledge acquisition, the absence of knowledge management strategies, collecting an overwhelming knowledge quantity only for the sake of knowledge, the knowledge representation. This number of challenges must be surmounted because the solutions to the municipal waste management problem should not only be cost efficient and environmentally adequate but also socially acceptable.

In the context of complexity in permanent growing of the problems and standard, in the area of municipal waste, solutions for efficient knowledge management have to be developed. In this sense, knowledge based systems can facilitate the achievement of goals. In addition, "knowledge based system components may allow the mathematical models to be more user friendly and understandable, potentially extending their usage as an aid to decision making ". [1]

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