# Knowledge Management and Techniques Innovation Management

ALEŠ FUKNÉ-KOKOT[1], DAVORIN KRALJ[2]

Institut for Creative Management, Slovenia[1]
ALMA MATER EUROPAEA, Slovenska 17, 2000 Maribor, SLOVENIA[2]

fukne-kokot@triera.net, davorin.kralj@almamater.si

*Abstract:* - Knowledge management is a set of relatively new organizational activities that are aimed at improving knowledge, knowledge-related practices, organizational behaviors and decisions and organizational performance. Most companies face, every day, the challenge of bringing together dissimilar information sources with complex and time-sensitive business processes. The discipline known as Knowledge Management (KM) is a way of formalizing this process. Knowledge Management (KM) is a discipline that integrates management of people, processes and technologies in order to generate, capture and use valuable knowledge in the organisation. In other words, KM is a technology to multiply the organisational memory, intelligence and creativity in a continuous and systematic way. KM has great potential to improve business and environmental innovation. Its applications can be translated in terms of specific techniques that improve a firm's ability to innovate.

*Key-Words:* - Innovation - Knowledge – Knowledge mapping - Management

## 1 Introduction

Knowledge Management (KM) is based on the premise that, just as human beings are unable to draw on the full potential of their brains, organizations are generally not able to fully utilize the knowledge that they possess. Through KM, organizations seek to acquire or create potentially useful knowledge and to make it available to those who can use it at a time and place that is appropriate for them to achieve maximum effective usage in order to positively influence organizational performance. It is generally believed that if an organization can increase its effective knowledge utilization by only a small percentage, great benefits will result [3]. KM focuses on knowledge processes – knowledge creation, acquisition, refinement, storage, transfer, sharing and utilization. These processes support organizational processes involving innovation, individual learning, collective learning and collaborative decisionmaking. The "intermediate outcomes" of KM are improved organizational behaviors, decisions, products, services, processes and relationships that enable the organization to improve its overall performance[3].

## 2 Protecting Knowledge and Innovation

Intellectual Property Rights (IPR) management systems are responsible for the management and protection of the rights over products, corporate intellectual capital and commercialised results which are obtained out of a company's innovation activity. Sound IPR management lies within a more general corporate strategy. One which is intended to assure an adequate appropriation of the benefits generated through innovation, and which anticipates not only judicial barriers but also technical and strategic ones. Today, IPR management is becoming more and more relevant, though at the same time more complex. In technology-focused and emergent businesses such as biotechnology, microelectronics, software and telecommunications, good IPR management may be decisive for a firm's future. Firms should be responding to such needs on two levels:
- Strategic level - clear policy on how to protect intellectual capital.
- Operational level - trained personnel and routines to facilitate decision making about what means should be used for protection, according to each particular kind of innovation.

There are different types of specific techniques used by companies to protect innovation:
• Legal protection.
• Exploitation of strategic advantages such as first- entry advantages or lead time.
• Technical barriers to imitation.
Industrial secrets, and control measures to guarantee confidentiality with regard to corporate strategic knowledge.
Larger companies are clearly in the vanguard of implementing such tools. SMEs show, on the other hand, a significant lag in IPR management application.

# 3 Creativity Development

Growing numbers of business leaders and entrepreneurs are recognising that innovation can no longer be the sole purview of the R&D department, an innovation team or a small strategic planning group. Innovation needs to be embedded into the very DNA of a company's operations and culture, a part of normal, day to-day operations.
Creativity development techniques are an integral part of building a culture of innovation. They involve the generation of new ideas or the recombination of known elements into something new, providing valuable solutions to everyday problems and challenges. Employee motivation and emotion are often also incorporated into such IMTs.
Creativity development techniques can be implemented by all firms and public organisations that confront and solve problems, and that need to focus on innovation in processes, products or services. Using creativity implies escaping previous beliefs and suppositions, though it faces a related problem with the fact that many organisations are not prepared to confront unforeseen change. Fundamental concepts for all creativity development techniques are:

• The suspension of premature judgment and reducing the negative filtering of ideas.
• Use of the intermediate possible.
• Creation of analogies and metaphors, through symbols, etc., by finding similarities between the situation that we wish to understand and another situation which we already understand.
• Build imaginative and ideal situations (invent the ideal vision).
• Find ways to make the ideal vision happen.
• Relate things or ideas which were previously unrelated.
• Generate multiple solutions to a problem.

Creativity development processes are used by many private and public sector organisations of all kinds, from manufacturing to services, banking and construction companies. Big manufacturing firms, software development enterprises, pharmaceutical companies, etc., all use creativity techniques to increase efficiency and quality, especially in their research, strategic planning and marketing departments.
Small firms and innovative R&D organisations such as biotechnology companies also implement creativity development techniques to help solve problems and improve the use of skills, techniques and processes. Creativity techniques may be applied in almost any functional area of the company: strategic planning, corporate business strategy, product development, improvement of services, functional strategy, finance, human resources, marketing, management of collection of information, product design, software design, quality management, etc. The following examples highlight the use and relevance of Creativity Development techniques in innovation management.

• *BRAINSTORMING* This is one of the best known and most used techniques in the business world based on creativity processes for problem-solving. It is a method of getting a large number of ideas from a group of people in a short time, and can be used for generating solutions for well-defined strategic or operational problems, such as engineering design processes. Brainstorming also forms a basic framework or constitutes the initial phase for the implementation of many other techniques based on creative development.

Brainstorming sessions ideally take place within a group of 6-10 people. The presence of a leader is necessary to stimulate the generation of ideas, as well as a preparation phase to gather the necessary data and information to approach the problem. A scribe writes the problem statement and the ideas generated by the group on a white board. Several guidelines for brainstorming are available, such as suspended judgment, free wheel, quantity and cross-fertilisation. The four basic rules of brainstorming are:
· No criticism and no prior judgement of any idea.
· All ideas, even the most absurd, are welcome.
· Quantity has value, the more ideas the better. If a large quantity of ideas is generated, then the idea pool very likely would contain some high quality ideas.
· Sharing and combining ideas, and constructing ideas based on those developed by other members of the group, to produce new ideas.

- *LATERAL THINKING* Lateral thinking is a way of thinking that seeks a solution to an intractable problem using unorthodox methods or elements that would normally be ignored by logical thinking. The lateral thinking method provides a deliberate, systematic process resulting in innovative thinking. Lateral thinking, using different experimental techniques, fosters creative thinking, turns problems into opportunities, finds alternative solutions, and dramatically increases the number of new and practical ideas using unconventional thinking techniques that normally remain untapped by conventional ways of thinking. Lateral thinking concepts often introduce strange situations, which require the answering of questions for explanation. When one line of enquiry reaches an end then another approach is needed, often from a completely new direction.

This is where the lateral thinking comes in. This kind of thinking teaches people to check their assumptions about any situation. One needs to be open-minded, flexible and creative in reaching a viable solution, and to keep going in order to refine it or replace it with a better solution.

- *INVENTIVE PROBLEM-SOLVING (TRIZ)* TRIZ (pronounced TREEZ) is the Russian acronym for the Theory of Inventive Problem Solving. It is a proven algorithmic approach to solving system problems. It deals with obstacles to innovation, complex problems and problem-solving within existing systems. Its main objective is to find the ideal final result to a pre-identified innovation problem. The TRIZ method differs from other creativity methods in that it does not rely on intrinsic human creativity alone, but also on generic pre-existing solutions and on external information. It can be used for purposes such as finding solutions to meet a need or function, or finding potential applications for a technology. TRIZ was developed originally by Altshuller in the Soviet Union in 1956. It was an attempt to improve on a random approach to innovation and invention by structuring creativity into paths that have been shown to yield results. Often it can be shown that the solution to a problem is obvious if the techniques of other domains were known – in many cases the same basic approach is used time and time again. It is also possible to classify problems and solutions into groups, and to simply examine a predefined list of possible solutions to that particular type of problem.

The method was first exploited in organisations that are highly focused on research and development, however it is increasingly used in the industrial sector (mostly in Europe) although still not well-known.

- *SCAMPER METHOD* The SCAMPER method is a way to turn one idea into several more ideas. SCAMPER is an acronym for Substitution, Combination, Adaptation, Modification, Putting to other uses, Elimination, and Reversing. SCAMPER is further subdivided into five methods. The first, the NM method, consists of five steps involving identifying the problem, forming key words, analysing and questioning the background, and presenting the basic concept. The additive method is composed of innovation and combination, while the subtractive method removes certain elements of the product to produce creativity. The feature changing method changes the general features or impression of the product to achieve a new image. Finally, the size altercating method plays with reduction or enlargement of the product to create the new one.

The SCAMPER method has been applied to generate creativity in the production of fountain pens, the subway, the fax/modem, the tubeless tyre and the digital camera, the evolution of currency and full screen televisions.

- *MIND MAPPING* Mind mapping is an individual brainstorming technique designed by Tony Buzan. Mind mapping can be classified as the exploration of ideas. The technique is based on the potential strength of associating ideas, and was initially named the «ideas tree» method. Mind mapping consists of identifying a first word that represents the nature of the problem under exploration or the progress to be made one idea to another and the process is repeat. This word is written within a bubble in the centre of a white board, and then ideas that are suggested by this word are noted in concentric circles around the central word. Lines are traced from end until all ideas have been mentioned. The result is a visual representation of the problem.

Creativity development techniques are an integral part of building a culture of innovation. They involve the generation of new ideas or the recombination of known elements into something new, providing valuable solutions to everyday problems and challenges. Employee motivation and emotion are often also incorporated into such IMTs. Quality and development of Environmental Management System is constantly improving. New environment issues dictate

the redefining of economic interests in the wake of the recognition, that the natural environment is a limited production factor [9]. The interest of customers, users, developers and others in the environmental aspects and impacts of products is increasing [10]. The theory on the basis of the practical experiences envisages sustainable development planning as a process of continuous improvement [7]. New environment issues dictate the redefining of economic interests in the wake of the recognition, that the natural environment is a limited production factor [6]. The interest of customers, users, developers and others in the environmental aspects and impacts of products is increasing [8]. Leaders of successful, high-growth companies understand that green 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 [11]. Creativity development techniques can be implemented by all firms and public organisations that confront and solve problems, and that need to focus on innovation in processes, products or services [12]. Using creativity implies escaping previous beliefs and suppositions, though it faces a related problem with the fact that many organisations are not prepared to confront unforeseen change.

## 4   Research Process

Greater part of research is theoretical with emphasis on use of literature on innovating company's culture and promoting invention-innovation processes, where these processes are not expressly required by company's market position and they need to be promoted with deliberate managerial influencing. More general resources/literature were needed to be adapted to situation in electricity-distribution sector.

For field research survey method was used. Certain part of interviewed filled out the survey on internet, while the other group in written paper form. The respective survey comprised of questions, referring to invention management, potential innovations, innovations and spread of innovations.

Gathered results, that have merely descriptive character, we assigned numerical grading, which, together with descriptive statistics, were used to determine correlation coefficient as correlation intensity index within individual surveyed country in order to receive justified comparative results. We identified the frequency of individual responses (item 3-5-1) and structure (%). Obtained results, together with analysis and synthesis method, that are used to

determine a research base as well as range of dialectic system/ series of research aspects and derived recognitions, were applied to draw up certain conclusions in respective master paper.

## 5   Research results

In presented results 3 companies were included, comprising information on filled out questionnaires (electro-distribution Elektro Maribor, electro-distribution Tuzla in electro- distribution  Zagreb). The survey was unanimous for all EDP, pattern included 140 interviewed on each EDP.
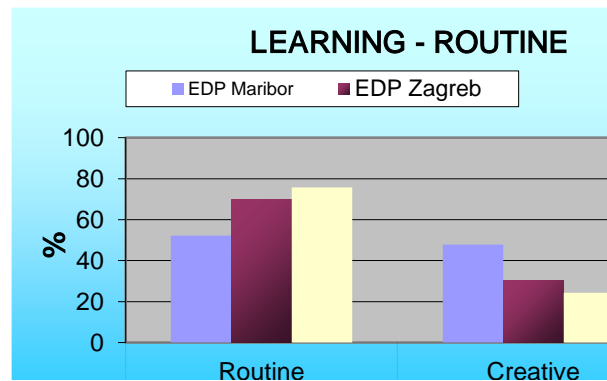
### 5.1 Learning routine



Figure 1: Response of interviewed on question – Is your work merely routine or creative?
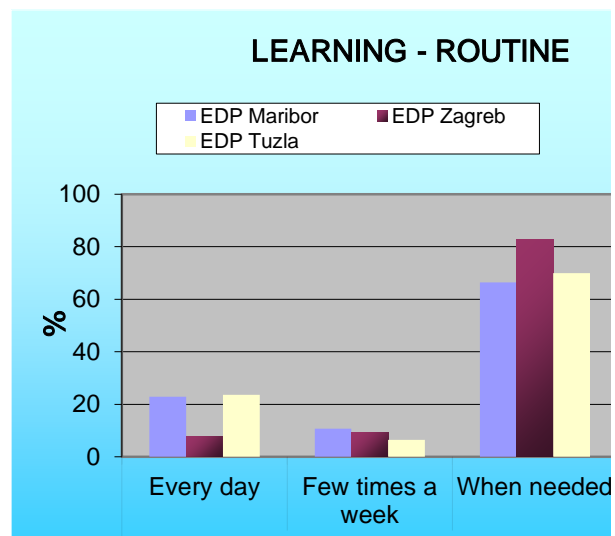


Figure 2: Response of interviewed on question – How often do you attend additional trainings (education)?

Figure 1 indicates response of interviewed on question: »**Is your work merely routine or creative**?«. In EDP Zagreb and Tuzla routine work prevails, where more than 70 % of employees are not involved in creative work. In EDP Maribor share of routine and creative work is balanced.

Figure 2 provides us with the answer on following question: **How often do you attend additional trainings (education)?** EDP Maribor and Tuzla have an equal share of interviewed (some more than 20%), that engage themselves in daily trainings. It is interesting to find out, that less than 10% in EDP attends additional trainings only few times a week. Just in time learning is obviously very popular only when knowledge and information are needed. The reason of just in time learning might be merely found with people, who perform routine work.

Conclusion, in line with data presented, points out that there are more than 50% of people in EDP who still perform routine work. The reasons might lie in long years of EDP monopoly position on market. Creative work is slowly assuming its rightful position, what is evident in EDP Maribor. On the other hand, arguments for increased share of routine work in EDP Zagreb and EDP Tuzla might arise from economic situation; both EDP are still not part of EU, meaning their energy market is still not open.

Companies need to open windows for more creative work, because on the hand they might be awaiting additional stress situation, where certain employees will experience physical changes/ health issues [13].
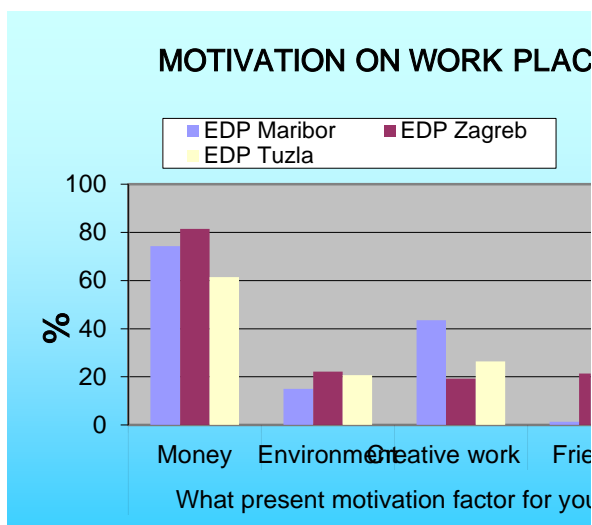
## 5.2 Motivation on workplace



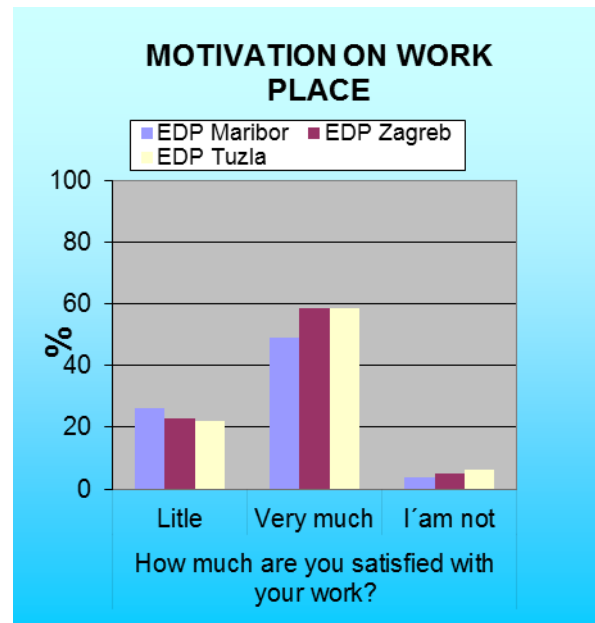Figure 3: Response of interviewed on question – What present motivation factor for you?



Figure 1: Response of interviewed on question – How much are you satisfied with your work?

Figure 3 indicates response of interviewed on question: »**What present motivation factor for you**?« Money is certainly the prevailing motivation factor in all EDP, especially in EDP Zagreb. It is definitely encouraging information, that in EDP Maribor and EDP Tuzla creative work, besides money, presents an important factor. Environment and friends are for EDP Zagreb also important motivation factors.

Figure 4 indicates response of interviewed on question: **How much are you satisfied with your work**? Some 60% of interviewed in EDP Zagreb and Tuzla are very satisfied with their work. Interesting information is that more than 20% in EDP are little satisfied with their work. On the other hand, less than 10% of interviewed are unsatisfied with their work.

Considering given data, the most probable reason for high satisfaction at workplace is that their work complies with their expectations. It is also evident, that less than 1/3 of interviewed is little or not at all satisfied with their work. Most certainly pour indicator where most probable reasons lies in wish for more creative work and additional payment for work performed. Motivation on workplace is showing as a great potential, present in EDP.

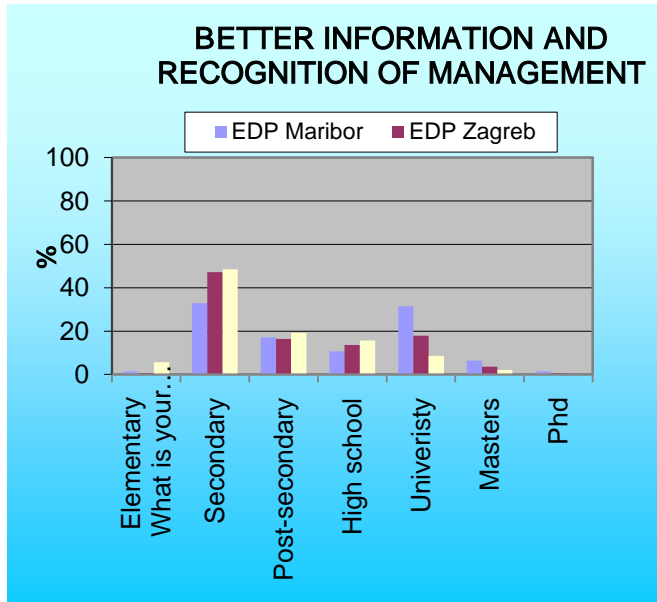## 5.3 Better information and recognition of management



Figure 2: Response of interviewed on question – What is your education level?
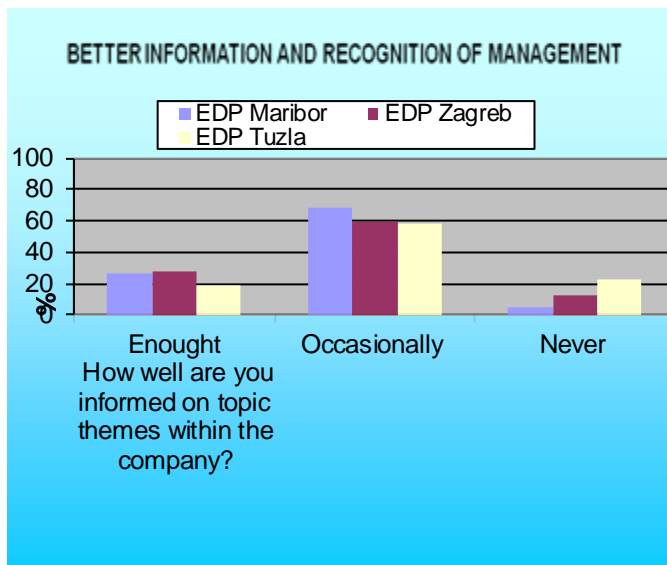


Figure 3: Response of interviewed on question - How well are you informed on topic themes within the company?

Figure 5 shows response of interviewed on question »**What is your education level**?« In EDP Zagreb and Tuzla, more than 50% of interviewed have secondary education. University degree or post-graduate degrees reach higher scales in EDP Maribor and EDP Zagreb.

Figure 6 provides us with answer on following question – **How well are you informed on topic themes within the company**?  Wish on occasional better information satisfies more than 50% of interviewed. It is also evident, that more than 20% of interviewed in EDP Tuzla are never informed on topic themes within the company.

Table  indicates, that in EDP Tuzla there is statistically typical positive correlation between education and better information of employees within the company (r = 0,142, p < 0,05). In EDP Zagreb there is statistically typical positive correlation between education and better information (r = 0,197, p = 0,01). In EDP Maribor there is no statistically typical correlation between education and better information of employees within the company. To summarize presented data; EDP could undertake certain steps for better information of their employees, especially in EDP Tuzla. In this view EDP Maribor shows negative discrepancy, for there is no statistically typical correlation between education and better information of employees within the company. Appropriate information and openness of company's management is fair indicator of employees trust toward management.
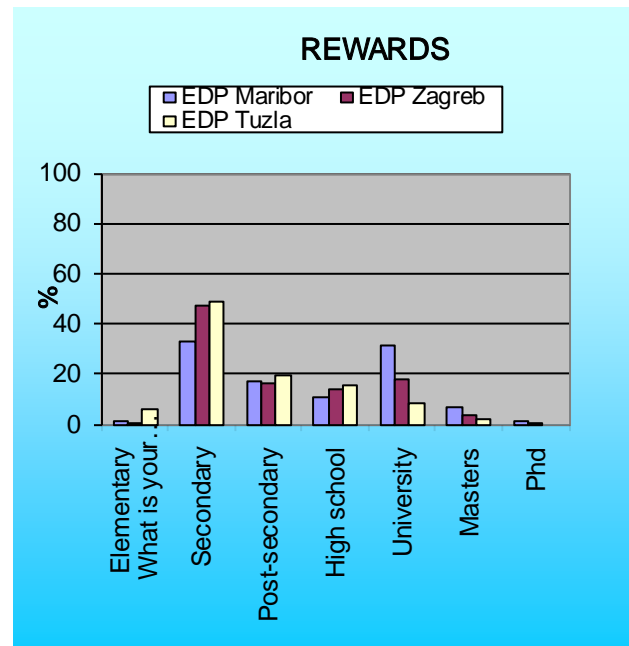
## 5.4 Rewards



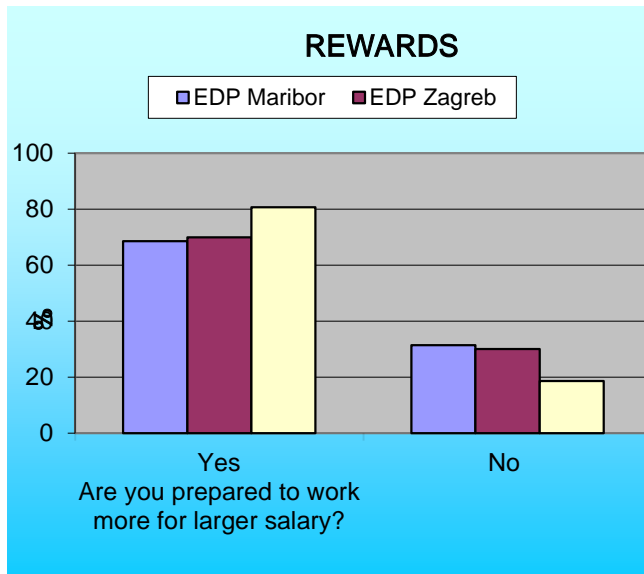Figure 7: Response of interviewed on question – What is your education level?

Figure 8: Response of interviewed on question  -  Are you prepared to work more for larger salary?

Figure 7 shows response of interviewed on question »What is your education level?« It is evident, that some 50% of interviewed has secondary education in EDP Zagreb and EDP Tuzla. In EDP Maribor more 30% of employees have university degree. Figure 8 gives us answers on following question – Are you prepared to work more for larger salary? Reward is for more than 2/3 of interviewed in EDP still stimulation. On the other hand, we cannot overlook the fact that some 30% of interviewed in EDP Maribor and EDP Zagreb are not willing to work longer for reward.

From stated we can learn that money can be stimulation asset, but not for all employees. Special emphasis must be given to those that find no stimulant in money and are stimulated with other means/ actions. In these cases, management has the task to find out, what stimulates them and encourage that [14].

## 6   Conclusion

Top management has a crucial impact to play in building awareness and motivating employees by explaining the organization's knowledge values  and communicating its commitment to knowledge and innovations policy. It is the commitment of the individual people, in the context of shared innovations and  knowledge values, that transforms an innovation management system,   as  a  part of environment excellence, from paperwork into an effective business process.

*References:*

[1] McAdam, R.; Armstrong, G.; Kelly, Brigitta: *Investigation of the relationship between total quality   and innovation: a research study involving small  organisations;* European Journal of Innovation   Management, Volume 1, Number 3, 1998 , pp. 139- 147(9)

[2]  www.oecd.org/innovation/strategy

[3]  W.R. King (ed.), *Knowledge Management and Organizational Learning*, 3 Annals of Information Systems 4, Springer Science+Business Media, LLC 2009

[4]  Pavitt, K.: *The Process of Innovation;* The Freeman  Centre,  University of Sussex,Falmer, Brighton BN1 9QE, UK, 2003

[5]  http://en.wikipedia.org/wiki/10.06.2010

[6] Ogrin U, Kralj D.:  *Economic Efficiency and EMS, WSEAS, ED 06, Issue 10, Vol 2, Oct 2006*

[7]  Kralj, D., Markič, M. (2008) Building materials reuse and recycle. *WSEAS transct. on envi. and devel*, 2008,vol. 4,iss. 5, pp. 09-418

[8]  ISO 14001:2004(E) *EMS requirements guidance  for use*

[9]  ISO 14062:2002(E) *EM-  Integrating environmental aspects to product  design and development*

[10] http://www.bsdglobal.com/ 08.04.08

[11] Freier, I.: *EM from an ecological modernisation and innovation perspective.* DRUID confer. 2003  Aalborg, DK, Jan. 16-18

[12] http://www.businesslink.gov.uk/16.10.2010

[13] Robert R. Renner.: 2008, PHD thesis

[14] Srića, V: Score  motivation – chapter 2.2.4., 2004, s.157

.