Important issues and topics …

- Knowledge intensive companies are more successful than the labour intensive companies;
- Informations and knowledge are tools for competitive advantage and company’s flexibility;
- Knowledge management is reorganize companies – from firm hierarchy to the flexible working groups;
- IT support for knowledge management processes are very effective and user friendly tool;
- Some (technical) science disciplines are rapidly expanding and demand more comprehensive approach to handle – e.g. electronics, new materials, nanotechnology;

**PRACTICAL ISSUE:**

How to implement contemporary KM tools with the KMS software and technology (e.g. semantic web) in industrial environment ?!

Are the knowledge portals, semantic webs or ontology tools right choice and what are the obstacles for full implementation ?!
Parent Company Gorenje, d.d. and 43 Companies:
- 29 abroad
- 15 at home

European Market Share 4%
Present in 60 Countries

9000 employees
Sales under Own Brand Name 70%

Expansion of Other Activities ➔ Core Business Synergy ➔ Growth Potential

HOUSEHOLD APPLIANCES DIVISION
Refrigerators & Freezers, Cookers, Ovens and Hobs, Washing Machines, Dryers, Dish washers, Components, Complementary Products, Intelligent home program and hardware ...

INTERIOR FURNISHING DIVISION
Furniture:
- Kitchen
- Anteroom
- Living room
Ceramics
Bathrooms

HEATING & INDUSTRIAL EQUIPMENT DIVISION
Industrial Equipment Tool & Die making Heating program:
- Radiators
- Air-conditioner
- Water heaters

SERVICES DIVISION
Trade engineering Car Sale Catering and Tourism Immobilies

NEW! ENVIRONMENT PROTECTION & ENERGY DIVISION
Environment protection Energy
Why semantic … rational processes & smart production

When you buy Benetton sweater, whole chain feels it – even the sheeps.
_Nordström, Funky Business_

---

Why semantic … “Knowledge management cycle”

- Practice of planning, organizing, actuating and controlling activities that enable;
- Utilization of existing knowledge (residing on individual, team and organizational level);
- New knowledge creation;
- When it is needed in current and future decision making activities;
- With the purpose of improving the organization’s efficiency and effectiveness;
Sophisticated electronic appliances – “Intelligent House”

Contemporary industrial design

“Even though I love fast cars, I don’t believe in fast food.”

Paolo Pininfarina
White book of knowledge management and innovation management) – set as a foundation and guideline in the company Gorenje for following activities (2002):

- Knowledge management – focused on knowledge based IT technologies and on technical knowledge (product/processes);
- Innovation management – focused on stimulating knowledge transfer for higher rate of innovation in company;
- Evaluation of intellectual capital – finding proper evaluation method for intellectual capital within industrial environment;
- Funding R&D and innovation processes – slovenian and EU funds (e.g. EUREKA, Framework Programme) to integrate and (financialy) stimulate innovative process;

Feasibility study made by 15th generation of Gorenje’s alumni managers – portal technology and application in existing company’s IT system (2004);

SAP introduction in company and SAP HR module with SAP KM portal – possibility to apply portal technology on unified database (2004-2005);
KMO 2006 – Application of KM Technology in development of new multifunctional products – case Gorenje

New product development

How to extract knowledge …

Knowledge Cycle

Environment

1. Information and Knowledge Acquisition
- Training
- Research
- Published or patented informations

Company

2. Knowledge Creations
- Evaluation and creation of knowledge
- Knowledge transfer
- Structuring/Saving knowledge
- Presenting good/bad cases

Results

3. Life Long Learning Company
- Knowledge Integration
- Team/Department
Some trends of white goods industry …

* Socio-ecology trends of washing machine development *

Continuous and rapid improvement of functional appliance features

<table>
<thead>
<tr>
<th>Year Range</th>
<th>Electricity %</th>
<th>Water %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975/1990</td>
<td>87</td>
<td>80</td>
</tr>
<tr>
<td>1990/2002</td>
<td>32</td>
<td>28</td>
</tr>
</tbody>
</table>

Why multifunctional materials …

Multifunctional materials – materials, where could be by structural change and by (micro or nano) additives substantially changed properties – e.g. polymer materials;

Polymer materials in household appliances (year 2000)

<table>
<thead>
<tr>
<th>Year</th>
<th>Weight Percentage</th>
<th>Household Appliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>
Focused implementation of GorKOP ...

GorKOP – Gorenje Knowledge Ontology Portal, has been initiated to discover and introduce opportunities of ontology based knowledge portals based in industrial environment;

case example – new product development of polymer (plastic) components in department MEKOM Plastika;

reference cases – 2 demonstrative semantic web:

 - SkiM – Swiss insurance company handles skills and knowledge of employees;
 - InWiss – Integrative Enterprise Knowledge Portals – developed by Uni Regensburg (Germany) for research purposes;

Applied ontology tool – Protege (available were also OntoStudio, OntoBroker, Jena);

How GorKOP (should) work ... product knowledge
How GorKOP (should) work … knowledge/skills map

1. K-Map of Boeing 747
2. 7 m long
3. 1.5 m tall

Talking about the (knowledge) map …
Main features of GorKOP for the beginning …

- Clustering employees' knowledge and skills on knowledge map built with third party software (e.g. MindManager);
- Standardized knowledge and skills (reclassified to existing classification standards);
- Unified employee classification (using one of the standard classifications) regardless on their technical and topic field;
- Effective search engines to elicit appropriate knowledge or knowledge holder (employee);
- Introduction of new professions in the company - knowledge workers and knowledge engineers as well as content managers, which would act as a backbone of the knowledge management process, connecting „IT“ and „content“ areas;
- Career and training planning, based on the knowledge and/or skills profile of employees as well as company’s demand for technological development;
- Online practical help desk – tacit (experience) knowledge of employees would be converted into the explicit knowledge in the form of lessons-learned material (i.e. „good and bad practices“ in the company);
- Enable possibility for personalized portal access and clustering of important documents;
- Evaluation of existing IT environment in company and requirements (technical and/or organizational) to fully implement knowledge portals based on ontology;

Some thoughts about the semantic web …

**Strengths**

- Simple connection of different and physically divided ontologies in single one;
- Simple knowledge base creation;
- Search results could be distinguished and explained;

**Opportunities**

- Semantic web technologies enable to the information also a meaning;
- New knowledge creation based on logical conclusions;
- Almost simple integration of structural and unstructural data;

**Weaknesses**

- Search engines for ontology are not standardized and commercially widespread;
- Lack of support for the programming languages;
- Only available academic types of semantic web are available;

**Threats**

- Accuracy of conclusion is very much depending on operator (knowledge worker);
- Accuracy of search results;
- Great similarity to relational databases;
KMO 2006 – Application of KM Technology in development of new multifunctional products – case Gorenje

Semantic web … quo vadis ?!

Authors

1. mag. Peter BALOH
   Faculty of Economics, University of Ljubljana, Slovenia,
   peter.baloh@ef.uni-lj.si

2. mag. Vasilije VASIČ
   Innovation centre of Gorenje group, Gorenje d.d., Velenje, Slovenia,
   vaso.vasic@gorenje.si

3. Kevin C. DESOUZA
   Information School, University of Washington, Seattle, Washington, USA,
   kev.desouza@gmail.com

4. Ambrož STROPNIK
   Faculty of Electrical Engineering and Computational Science, University of Maribor, Slovenia, ambroz.stropnik@uni-mb.si
Comments ... Suggestions ....

Thank You!

gorenje