SOME EXPERIENCES AND THE MAIN PROBLEMS FOR KNOWLEDGE IDENTIFICATION AND TRANSMISSION IN THE METAL SMES

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INDEX

INTRODUCTION

The progressive **ageing** of the working population, the **difficulty to transmit** professional knowledge and the continuous **transformation of the companies** (together with the introduction of new technologies) are some of the elements that have made knowledge management become increasingly important in our society.

The general ageing of the employees together with the scarce qualified and experienced people constitute a brake for the companies' development. It is expected that by 2025, the people elder than 60 will be about one third of the population in countries such as Spain 31.4%, Netherlands 29.4%, France 28.7%[1]. In Bulgaria, the population between 35 and 64 years of age is over 40% (2006).

On the other hand, the experienced workers concentrate a wide amount of knowledge, both formal and informal (not officially recognised), which means "power" for them; this makes them often show a "passive resistance" to transmit their knowledge, as they understand that their knowledge is a way to keep and ensure their employment.

Finally, the economic globalisation processes make industry in Europe get placed in the market sectors with the greatest added value. This is a key for innovation and the correct knowledge and experience transmission inside the companies.

All this makes necessary the identification and transmission of this learning to encourage the elderly workers to leave their defensive position and enhance their professional development, while increasing employability and favouring the

[1] Source: NN.UU., 2001

integration of the person newly working in the company. The knowledge transmission is an important question for the survival and development of the companies in the present changing context and to reach a learning culture.

The report we present below is framed within KIMET project, aimed at encouraging and developing the identification, capitalisation and transmission of knowledge, to improve the participation of the experienced workers in the evolution of the Metal SMEs, thus improving their employability and favouring the integration of the new workers.

KIMET, leaded by Federación Vizcaína de Empresas del Metal, is financed by the European Commission in the framework of Leonardo da Vinci program, in order to "*support the improvement of quality and innovation of the systems, institutions and practice in education and vocational training*". It is being developed during 2008-2010 in a coordinated manner among Spain, Netherlands, France and Bulgaria.

CONTEXT

In the knowledge economy or information economy, knowledge and information are increasingly important, as a resource and also as a product. This makes the companies become increasingly worried of how they use these resources and also for what happens when some people leave the organisation, for example as a result of re-engineering programs, retirement of reduction of personnel. It is then when suddenly, the companies realise that some people they considered as dispensable, in fact, have some knowledge that is vital for the organisation. The worry about this aspect makes considering the need of all the knowledge capital remaining inside this organisation.

Grant (1991) and Schoemaker (1992) suggest the suitable use of information and, especially, **knowledge** as the main source of difference in an increasingly competitive and global market. For these authors, from the resources each organisation has, we should distinguish between the tangible resources – capital, manpower and land – and the intangible resources or capacities – a mixture of skills and knowledge the organisation has. In fact, some researches suggest that the main organisational advantage comes from the creation, gaining, storage and spreading of the knowledge[2].

Therefore, if an organisation is willing to be competitive in a sustainable manner along time, it should **identify, create, store, transmit and use** efficiently its workers' individual and collective **knowledge**, in order to solve problems, improve processes or services and, mainly, to take advantage of new business opportunities.

[2] Nahapiet and Ghoshal, 1998

Knowledge, as it is understood at present, is a resource that not only allows us interpreting our environment, but also gives us the opportunity to act. It is a resource that lies on the people and the objects – physical or not – these people use, but also on the organisations they belong to, on the processes and the context of these organisations. Knowledge management consists in optimising the use of this resource through the creation of the necessary conditions for the knowledge fluxes to flow better.

Knowledge creation and transmission

In the **knowledge management**, there are two basic processes:

- The knowledge creation
- The knowledge transmission

The **transmission** may occur from many points of view and in many ways, even in distance and time. When we try to make our knowledge explicit in a data base, what we are doing, basically, is to put it there so that after some time, someone might get it; to some extent, thus, we are transmitting it in time. And when we are using communication tools what we are doing is to try to transmit knowledge in distance.

Besides, these two processes that can be thought separately are also completely interrelated, as the knowledge creation is not something we do starting from nothing, but to create knowledge we use the knowledge we receive from other people or other places – there has been a previous transmission process. They are very interrelated processes which together make knowledge in the organisations improve and be used.

The knowledge transmission, thus involves the group of practices used by an organisation to identify, create, collect, store, organise and distribute knowledge for its use and evolution.

Explicit knowledge and tacit knowledge

Nonaka[3] distinguishes two kinds of knowledge:

- Explicit knowledge: the one that can be structured, stored and distributed
- Implicit or tacit knowledge: the one that belongs to each person's personal learning experiences and that, therefore, is extremely difficult, if not impossible to structure, store and distribute.

According to this classification, information and communication technologies would only allow storing and distributing explicit knowledge. It is also important to be aware that the IT have helped widening the range of what can be considered as explicit knowledge: some ways of knowledge that used to be regarded as tacit knowledge have become explicit knowledge thanks to the possibilities of the communication networks, multimedia files and audiovisual technologies.

Regarding explicit knowledge, it is therefore clear that it is possible and convenient to store it in data bases, documental bases, internet/extranet and and EIS (*Executive Information Systems*)[4]. Nevertheless, as we have already mentioned, it is not feasible to structure and store tacit knowledge, so the best strategy to manage it is to encourage the creation of collaboration networks among the people composing the organisation (*sharing networks*) and even with people outside it; and the elaboration of a knowledge map, accessible to everyone, specifying the knowledge of each member of the organisation. Once

[3] (1995)
[4] Roldán, J.L., 2000

localised, the tacit knowledge will be more valuable if its incorporation to the organisation's productive process is greater.

OBJECTIVE AND METHODOLOGY

The objective of this report is, in the initial stage of the project, to favour the industrial SMEs' use of simple tools for knowledge transmission and to provide practical examples of how to put into practice the knowledge management.

For this purpose, we carry out three activities:

1) First, there is a **collection of the techniques and instruments** that the companies in general have adopted in order to favour the **identification and transmission of knowledge.**

The methodology followed has been a documental analysis, a collection of different techniques and tools used by the companies to formalise and transmit the knowledge.

2) Second, we explain **some experiences of industrial SMEs** (more concretely the metal ones) to **manage the knowledge identification and transmission**.

To carry out this second task, we have proceeded to research and analyse the SMES who develop practices and use concrete tools for the knowledge transmission in the different European countries taking part in KIMET project (Spain, Netherlands, Bulgaria and France).

We have selected an industrial (metal) company in each country and we have proceeded to an exhaustive analysis, through deep interviews with key

informants: managers, HR managers... In these interviews, we have got information about the following matters:

- On one hand, general information about the company:
  - Name and products/services it offers
  - History and target market/clients
  - Staff and training policy
  - Person to contact with

- On the other hand, the information about the practice they use to formalise and transmit knowledge:
  - Name and description (when it was implemented, why, the problems that appeared...)
  - Instruments / tools it uses
  - Methodology
  - Results got

3) Third, we describe the importance of **knowledge identification and transmission** for the SMEs and the **main problems** industrial SMEs find when formalising and managing the **knowledge transmission**.

To find this information, we have used the same interviews as in the previous stage, identifying through them the most relevant interests and problems, to suggest, later, a group of points the SMEs should take into account, which contribute to help them when managing the knowledge transmission.

RESULTS

1.- Collection of **techniques and tools** the companies adopt to favour the **knowledge identification and transmission**..

In the following chart, there is a brief description of the different techniques:

TECHNIQUE	DESCRIPTIÓN
Action Review	Based on a U.S. Army learning strategy, action reviews are used to transfer knowledge in the moment—during a break in a day-long sales meeting, for example. Each member of a team states what was supposed to happen, compares that with what did happen, from their perspective, and discusses what could be done better next time. *(Source: Businessweek.com)*
Blogs	More and more employees use blogs to pursue their personal interests, but Web logs can also be used to share work experiences or discuss new industry trends with fellow colleagues. Plus, they provide new workers with a semi-permanent, searchable database of expertise. In 2005, *IBM* (IBM) began to encourage employee blogging; now, many technical workers use them to discuss development projects, and senior-level consultants use them to record client problems and resolutions. *(Source: Businessweek.com)*
Communities of Practice	A term coined by anthropologists in the 1980s, communities of practice (CoP) bring together workers of different experience and age levels who share a common practice or discipline in the company. It's important for these communities to meet face-to-face, but nowadays they also congregate via teleconferences, e-mail chains, and Web site discussion forums. By keeping their membership voluntary and their motivation at least partly social, CoPs are more likely to engage younger employees. (*Source: Businessweek.com)* The communities of practices are groups of people who in an informal way sharing experiences and passion in a company. Although it can also be people from different companies. Some functions: problems are resolved quickly, the best practices are transferred, professional skills are developed, they help companies to retain and recruit talent.

	WENGER & SNYDER (2000)
Knowledge Capture	For skills that can be transferred onto paper, knowledge capture is an effective way for companies to hold onto them for good. Capturing knowledge involves interviewing the individuals and teams with relevant experience and distilling their responses into a book or Web site that is tailored to those who will eventually need to learn from it. For new workers, that means creating bite-size nuggets of information that are easily searchable. *(Source: Businessweek.com)*
Company internal training	Company example: About 50% of all persons that are recruited have a qualification level of preparatory vocational education. About half of these workers reach the educational level of secondary vocational education through internal company training. This internal training system consists of modules. Within this system the company registers and steers on the (development of) competences of their employees. Participation is compulsory for certain functions in the company. For certain functions in the company it is even obligatory to finish one or more modules with success. For workers with a temporary labour agreement, not finishing a module could have consequences for continuation of their work at the company. The company also has a programme to actively work on an attractive working environment for all groups of employees. The program focuses on: improvement of working conditions, enhancing safety and health and supporting the personal development of employees. By several measures the company tries to achieve a positive working climate, in which the employees can work in a suitable job, now and in the future. *(Source: "Good-practice-report of qualification and personnel development concepts to avoid/reduce the shortage of skilled workers in the producing sector" from 2008, written in the Leonardo da Vinci project SOS: "Shortage of Skilled Workers").*
Different actions in the	The field of action of further training and personnel development offers various opportunities to qualify externally

field of personnel development	recruited employees for the specific needs of the corporate production fields, to keep the employed skilled workers on a skills level adequate for the respective requirements and to qualify them for future developments. In individual cases also unskilled employees can be "upgraded" to tackle skilled workers' tasks. The conducted case studies already hinted at some instruments adequate to attain these objectives. For example, the application and the use of a skills or competence matrix can be named. With the aid of this instrument, the qualification status of each skilled worker is documented and the document is used to derive and to control a need for training. Another instrument is the development of targeted in-house seminars conducted by in-firm specialists. This aims at a more efficient access if the need arises and a better adaptation to a company specific need for training. Furthermore a computer-aided administration of the competences of skilled workers and their further training measures are already carried through, e.g. with the aid of SAP as well as e-learning. *(Source: "Summary Sector Report - A Comparison of the European Metal Industry and Electrical Industry" from July 2008, written in the Leonardo da Vinci project SOS: "Shortage of Skilled Workers")*
Mentoring	Mentoring is one of the few forms of knowledge transfer. Mentors can often demonstrate real-world skills that don't translate into a training manual. a) A pilot program (2008) at *American Express* gives soon-to-be retirees less work and more time to pass along their expertise to younger generations. American Express realizes that a huge number of employees become eligible for retirement in the next five to 10 years and the company had done little to retain the wealth of institutional knowledge they would be taking with them: from the intricacies of key client relationships to mainframe computer languages no longer being taught in school, many experienced workers possessed critical know-how that, if lost, would be costly—if not impossible—for the company to replace. Therefore, rather than retiring and leaving the company at once, participants in the program gradually give up their day-to-day responsibilities, while replacing some of their free time with activities like

	mentoring and teaching master classes to their successors. In addition, they get more time out of the office doing whatever they want—be it planning for life in retirement or doing charity work. The phased retiree continues to receive a portion of his previous salary, benefits as usual, and the company in turn gets to hold on to some of its most valuable employees a year or more past traditional retirement age. b) During a recent sales trip to Rio de Janeiro, for example, a *Black & Veatch* senior vice-president brought along two junior staffers so they could observe how he negotiated a compromise, and how he dealt with clients and competitors of different nationalities. One new trend at some companies is reverse-mentoring, an opportunity for younger workers to teach mentors their own skills, frequently, those related to technology. The 59-year-old executive had done something that will probably prove even more valuable for the company in coming years, after his retirement: he instilled some of his specialized negotiating skills in his would-be successors. *(Source: Businessweek.com)*
Peer Assist	Why reinvent the wheel? When an unfamiliar business problem arises, a solution or plan of attack may have already been discovered by an employee or team still with the company. Experts can be found through word-of-mouth, or by posting a brief description of the challenge on a company discussion board or intranet. Then, during a peer-assist meeting, pioneers of the solution can explain what worked and what didn't work when they faced the same issue. *(Source: Businessweek.com)*
Storytelling	Many times, the knowledge that sticks with you most is the personal story told over a morning cup of coffee, or shared in an airport lounge. Stories are a way for experienced employees to bring the history of the company and their own legacy into vivid detail. And sometimes, companies make records of the best stories: *NASA* publishes an internal journal called Academy Sharing Knowledge every few months, made up of employees' real-life experiences and practical wisdom. *Procter & Gamble* (PG) employs a designated "corporate storyteller," who has collected some 100 company stories over

	the past decade. *(Source: Businessweek.com)*
Activity analysis, cognition et construction of the situations of learning: the case of the drives of tower crane	Reading and writing skills become more and more required to succeed professional examination, or to work with complex system, where security of men is engaged. However, the lacks of these skills could generate some difficulties for illiterate experimented workers who are “experts” for action at work, but fail to process written paper about theoretical professional knowledge. French crane drivers are concerned with such a problem. In order to help them, we have conducted, in this paper, an empirical research, with some applications, adopting a “cognitive ergonomic approach of training”. The three main steps of e such conception of learning situations are developed. First of all, we proceed to a cognitive work analysis for ten crane drivers. The results show the nature of functional representations of work skills and tacit knowledge. Second, we test several modalities of written representations of theoretical concepts. Finally, we discuss the opportunity of the manipulation of different training situations, focusing on the construction of a specific simulator. *- Activity analysis of the drives of tower cran Source: (Led by Jean-Michel BOUCHEIX and Alexandre CHANTECLERC Article appeared dans Education Permanente n°139 «Apprendre des situations»)* *- Physiotherapists activity Source: (Led par Paul OLRY, Nathalie LANG and Marie-Thérèse FROISSART. Article appeared at the Association Française pour la Recherche et l’Evaluation en Kinésithérapie)*
Physiotherapists activity	

Source: Own elaboration.

2.- Experiences of the (metal) **industrial companies** in the **knowledge identification and transmission management**.

Below, we present the experiences collected in the different countries. Each file gathers the information from one company. The files have been designed following a common pattern for all the companies, pointing out the most relevant data of interest for our survey.

DESCRIPTION OF THE TOOL:

The objective of this methodology is to be able to make concrete (active) decisions to manage knowledge efficaciously

MANAGEMENT OF CRITICAL KNOWLEDGE

Data – information – knowledge – performance (decision making)

COMPANY IDENTIFICATION	TECHNIQUE FOR KNOWLEDGE TRANSMISSION
Name: **ABB (Asea Brow Boveri, S.A.)**	**Name:** **MANAGEMENT OF CRITICAL KNOWLEDGE**
Activity: ABB is a global world leader company in teh field of the energy and automation. ABB (Galindo plant) manufactures power transformers.	**Description:** Traditionally, an important part of knowledge was transmitted orally, which was not enough for the Quality standards pursuit at present. Since 2005, with some particular characteristics in the company: retirements, knowledge flight... there is a cultural change in the organisation and it is decided to manage knowledge as another asset.
History: Former General Electric, in 1986 was taken over by the merger of the Swiss BBC Brown Boveri and the Sweden ASEA.	**Instruments / tools used:** **Deep interviews:** questions that correspond to the information to include in a grid (competence matrix). In this matrix, the general and specific competences identified inside the selected key processes are described. From each general and specific competence, the interviewed person is asked to answer to the following questions: - Kind of knowledge they have: high / medium /low - Priority they give to this competence: Key/Imp./Trivial - Experts: who they think the expert person/people is/are at the development of this competence - Self-evaluation / which level of competence they have: high / basic / medium / superior.
Market: Exports are a very important market at present and in the future for the company and a relevant part of the transformers manufactured in Galindo are destined to the foreign market (approx. 50%).	

In the national market (to which about 50% of its production is allocated), apart from the traditional sectors and clients, such as electrical companies, engineering, etc, ABB factory in Galindo is taking active part in the development of renewable energies, supplying transformers for a high number of wind power parks, as well as for rail electrification.	- Where this knowledge lies on: in which physical place it is They are also asked about: - How they have got this knowledge - Documental management: documental bases used, means of knowledge transmission and preservation systems. The person in charge, apart from answering to some questions more than the workers, should "filter", evaluate the competence level of the workers under his/her responsibility. This way, the self-evaluation carried out by the worker is compared with the evaluation the person in charge of him/her carries out about how he/she develops each competence. **Observation:** it is carried out at the working place
Staff: ABB Galindo has around 300 workers; 190 of them in production. The workers' average age is 40 years. Nowadays, the number of people over 50 is 84.	**Methodology:** Stages: 1) Determine the key process/es and the critical knowledge 2) Selection of key processes 3) Disaggregate the processes into tasks and general and specific competences 4) Inventory of knowledge with the person in charge of the process (this is a kind of check list gathering the basic competences) 5) Determine the workers who are going to take part (only the workers belonging to the key process take part) 6) Elaboration of the schedule of interview and grid (competence matrix) to collect the results. 7) Carry out the personal interview with every worker with more than 5-year experience in the processes identified as key. 8) Analysis of results: which the present description is; the risks or problems perceived and the
Training: There is a diagnosing on competence needs every year. The training needs are expected by the management and HR, mainly taking into account the Strategic Plan. Management is based on the competences to	

recruit, train, evaluate, promote... and other policies, such as payment and talent management Management and HR renew it every year taking into account the analysis of needs and the result of the project of MANAGEMENT OF CRITICAL KNOWLEDGE.	(concrete) performance plans proposed to solve these problems (ex. Specific training, make people polyvalent, tutelage by a senior to a junior, identification of knowledge on paper...) 9) Elaboration of the knowledge map by processes in the company.
Contact person: MRS. Maria Esther Ayesta Yuste (Responsible of HH.RR.) www.abb.com/transformers Barrio Galindo S/N, 48510 - Trápaga Vizcaya, (Spain)	**Results (benefits):** Specially improvements in the Quality and in the development of workers competences. Each worker in the company knows where, how and who can provide the information they need, through a Knowledge Map. - Make implicit knowledge become explicit - Prevent the flight of knowledge - All the people should have access to the necessary information and knowledge to carry out their work correctly - Increase of productivity.

Source: Own Elaboration.

DESCRIPTION OF THE TOOL:

The aim is to describe, from the company point of view, the profits it can get from its use and application, to be as close as possible to the needed skills required by the job and to capitalize implicit knowledge.

TRAINING STRATEGY

COMPANY IDENTIFICATION	TECHNIQUE FOR KNOWLEDGE TRANSMISSION
Name: **ARCELORMITTAL** **Fos sur Mer factory (France)**	**Name**: **TRAINING STRATEGY** -analysing working situations -identifying the needs -implementing training modules -assessment on experimentation site --> introduction of tutelage
Activity: Iron and steel Industry.	**Description:** Knowledge -> trainings → operating skills → performance. Knowledge is essential but not enough. Know-how acquiring is essential. This procedure is devoted to production workers but it's planned to extent it to include maintenance workers. The 4 methods are used according to the situations whoever the profiles of qualification may be: **-Occasional lesson:** Working on a situation problem badly managed in order to teach the production

History: FOS sur MER area built in 1973. MITTAL and ARCELOR merged in 2005.	worker how to do and why in order to prevent that an error does not happen again. **-Technical training in classroom**: Theoretical training – presentation of engineering change or new equipment **-Technical training on installation:** Often this training follows a technical training in classroom. **-Technical training on simulator:** Use of a simulator in order to acquire new technical skills. ”Fellowship” has always existed. The technical trainings have been taught for a long time and during every technical change. The occasional lessons have been taught for approximately 5 years as well as the technical trainings on the tool. **-Introduction of tutelage :** Since 2007, Fos sur mer factory set up tutelage. The idea is to have a person recognized by his(her) peers being expert. The tutor accompanies the teams in the day and trains them in working situation, it allows a rebalancing of the skills in the teams and a homogenization of the practices. At the blast furnace, which is the area we are studying, the tutor has just appointed. Difficulties: Tutors’ availability who are experts in their jobs. They have to be removed from production teams. They don’t do only tutelage and have other tasks as making tests, maintenance... About occasionnel lesson, the questions are “who is writing occasional lessons”, “how to capitalize, to disseminate, to update…….”.

Market: 80% of the production is shipped to the Mediterranean countries (Spain, Italy, Turkey……) High tech steel. Mass retirements of experienced workers on the core skills: production and maintenance.	**Instruments / tools used:** **Occasional lesson:** Writing of a standard teaching document from the production worker concerned - possible photographs **Technical training in classroom**: A class room – video projector – paperboard –technical documents. **Technical training on installation:** Documentation and movement on the installations. **Technical training on simulator:** Room – video projector - paperboard - technical documents – simulator.
Staff: ARCELOR MITTAL at Fos sur Mer (France) has around 2800 people. At the blast furnace around 240 people - 30 people in Commercial/ administration área - 147 people in several levels: production workers, foremen, operation and production managers, head of department managers, department managers….) The average age is 36years. About manufacturing workers 53 in 147 are over 50 years.	**Methodology:** **Occasional lesson:** To describe how to use the method in the company context. Advise to implement the method. Activities to carry out. Stages/ Assessments included. **Technical training in classroom**: Presentation board, documentary remittance – writing of process. **Technical training on installation:** The trainer with the trainees moves on the equipment concerned. **Technical training on simulator:** Presentation board – documentary remittance - training of the simulator, solving of problems suggested by the simulator.

Training:

There is a training plan in the company. The operation/production manager has influence on the content.

It is re-examined every 3 months as well as during the individual professional interview.

Most of the trainings deal with the job - Integrated skills training.

Production and maintenance employees are the kind of employees that are beneficiary by training.

Contact person:

Gérard BONAVIA – training department

Christelle ADOR SARR

Fos sur Mer factory – tel : 04.42.47.33.33

Results (benefits):

In general terms:

-Natural expansion of intervention field of the individuals, the task is seen in a total process.

-The polyvalence allows making team management easier and strengthening it.

-Increase in the level skills, the recruitment level follows.

- Improvement of the skills development on level, in number and concerning the application field.

- Transferable skills in a horizontal way.

- Increase in the feedbacks, solutions – Ability to deal with the problem.

- Increased competitiveness of the department.

Occasional lesson: Training targeting an operator on a situation problem, expansion to other production workers. Reactivity in front of the occurred problems – to securitize the process and the method – increase in skills.

Technical training in classroom: Speech, common core syllabus about the topic. Acquirement of new skills in order to work better. A same speech for every body, a common core syllabus- a significant saving in time thanks to a global meeting.

Technical training on installation: Acquirement of skills in actual situation on the material used. The production workers are operationally and closely trained. Reliability of the process and the method. Training targeted, on the company, in situation and on the equipment used. Acquirement of targeted skills allowing being immediately operational.

Technical training on simulator: To acquire skills starting from situations close to the reality without taking risk human/equipment. Even if the simulator does not reflect exactly reality, the results are positive because the production workers have been already confronted with some situations problems. Allows to the production workers to confront themselves with situations problems without danger for humans and equipment.

	Introduction of tutelage : today, it is too much early to speak about contributions.

Source: Own Elaboration.

DESCRIPTION OF THE TOOL:

SETTLING IN NEW WORKERS

COMPANY IDENTIFICATION	TECHNIQUE FOR KNOWLEDGE TRANSMISSION
Name: **Mokveld Valves** **Gouda - The Netherlands** www.mokveld.com	**Name**: **Settling in new workers**
Activity: Mokveld Valves produces high pressure industrial valves for the oil- and gasindustry	**Description:** Mokveld's HR-department has for each job a job description. Applicants for jobs in the company must be willing to participate in training programmes. During the application procedure a portfolio of the applicant is made and each worker has a personal education program. The acquisition of new workers is done by the HR-dept. Required skills are identified by the shop managers. The different subjects of training are done in the company: technical skills, management skills and language courses (English, German and French) for all people. For some jobs certain training programs are obligatory for job-transmission or promotion. Performance interviews are standard procedure.
History: Mokveld was founded in 1922 as a small machine repairshop in Gouda/The Netherlands. In the mid-fifties they started making valves for the oil- and gasindustry. After the discovery of the big Groninger natural gas fields they started making	

<table>
<tr><td>valves for the production of billions cubic meters of natural gas. Mokveld is specialist in high-pressure customer-built valves. (there is no standard program).</td><td rowspan="4">Instruments / tools used:
Job descriptions, portfolio’s, personal education/training programmes, performance interviews.
Intranet is accessible for each member of the personnel.
The HR-deptment is responsible for maintaining and monitoring the procedures.</td></tr>
<tr><td>Market:
The company has a world-wide market and offices in 10 countries in Europe, USA and Asia.</td></tr>
<tr><td>Staff:
Worldwide 350 p.; 280 p. in the Gouda-location</td></tr>
<tr><td>Training:
There is a training plan in the company: each worker has a personal training program.</td></tr>
<tr><td>Contact person:
Mr. Peter Kolwijk

Mr. Kolwijk is responsible for the company’s technical training activities</td><td>Methodology:
The company introduced their approach of knowledge transmission 25 years ago and this approach is permanently adapted to the present and future demands of the company.

Results (benefits):
Highly specialised personnel in metal removing, mechanics and servicing.</td></tr>
</table>

Source: Own Elaboration.

DESCRIPTION OF THE TOOL:

The objective of this methodology is to improve the competences and knowledge transmission

CROSSED CONFRONTATION - EXPLANATION BY THE TUTOR - EXCHANGE OF PRACTICES

COMPANY IDENTIFICATION	TECHNIQUE FOR KNOWLEDGE TRANSMISSION
Name: **STEELMET AD** **Sofia,www.steelmet.bg**	**Name:** **Crossed confrontation** **Explanation by the tutor** **Exchange of practices** between operators via: - Observation - Job rotation
Activity: Production and trade in non-ferrous metal products - aluminium, copper, brass rolled and extruded products, conductors, ferrous metals. The production range of Steelmet AD includes: • ETEM aluminium architectural systems • standard and building sections • special sections and sections by customer drawing	**Description:** The above mentioned knowledge transmission practices are applied from the very beginning of the Company, but the process of knowledge transmission is not professionally managed. It is based on the traditions of knowledge transmission, as a part of the obligations of the supervisors and experienced workers, the requirements of the production development process and assumption of new workers. **Crossed confrontation**- it is the most used and spread tool for knowledge transmission **Explanation by the tutor**- each new worker is instructed by a tutor, supervisor at the beginning of a new job, the same is done when a new product line or technology is introduced. **Exchange of practices** between operators via: - Observation –in the process of production each worker has the possibility to acquire new skills

In addition Steelmet AD offers:

- ETALBOND - aluminium composite panel
- consumables for double glazed windows
- aluminium rolling-shutters and lamellas for garage doors
- RAL-painted aluminium plates, bands, foil
- copper and brass pipes, bars, strips, plates and bands
- cables and enamelled copper conductors
- glass doors and accessories, machines for aluminium Emmegi

through observation and periodical instructions.

- Job rotation – it is a tool used inside a production line as well as for different production lines, because always there must be at least one substitute for the definite production operation. Job rotation is one of the most popular forms of work structure. Job rotation has several variations.
  - One of them, called on the job training, involves moving employees from one job position to the other within the same company. The purpose of this is to increase interest and motivation of workers.
  - The second important variation of job rotation is to enable some employees to undergo training outside the company without causing any problems with work process. So the employees are substituted by a job seekers who carry on the tasks.

History:

Year of foundation: 1998

Privatised in 1998 by a Greek investor.

Steelmet AD Company exercises its production activity in Sofia. Its central administration office is also situated in Sofia. The Company has a chain of 12 distribution trade centers in almost all the big cities in Bulgaria.

Instruments / tools used:

Occasional training: instructions made by the tutor.

Technical training in classrooms: video and power point presentation of new technologies.

Technical training during the production process: documentation and movement on the installations.

Technical training :exchange of practices.

Market:

The representation of the company is national and international

Main orientations of the company for the next 2-5 years:

Introduction of new products and services. The production range is continuously expanding to meet the needs of the market.

The plant operates the only line for **electrostatic dust painting in Bulgaria**, built in accordance with the QUALICOAT norms.

Steelmet AD is a representative for Bulgaria of the Italian companies for accessories for aluminium millwork LAVAAL, PRODUCTA, FAPIM, COMMUNELLO.

Staff:

ABB Galindo has around 421workers; 229 of them in production, 147 are Commercial staff and 45 in Administration.

Methodology:

Occasional training: in classrooms training by specialist on different production processes; explanation by tutors; video film and power point presentations;

Crossed confrontation: get the knowledge directly through the production process;

Exchange of practices: observation, job rotation;

Job Rotation:

- Consultancy service: Survey and analysis of the working environment in which the processes will be developed.
- Design of training plans, tailor made for the identified jobs. The methodology used for the identification of training needs and the subsequent design of the training plans will be the MANAGEMENT BY COMPETENCES. This modern analysis and diagnose method means the possibility to give a great flexibility when assigning tasks and functions, putting apart the traditional pair work-person to get to think in terms of process-professional competences.
- Participant selection (substitute workers and workers to be retrained in NTIC). The selection is made by means of personal interviews, selecting the most suitable people in terms of learning potentiality and technical skills. In the selection attitude aspects (willingness towards the program) and aptitude aspects are combined.
- Development of the training process for the substitute workers.

The training actions will meet the competence model, as the ensemble of knowledge, skills and aptitude required to exert certain job and to be able to solve the professional problems in a flexible and autonomous way.

Results (benefits):

The knowledge transmission facilitates the efforts of the Company's management what regards training; helps for the maintaining of good quality of the products, the further growth of the company and its competitiveness; part of the employer responsibilities for training and up- grading of the qualification are

The workers' average age is 35-45 years and about 30 % of them are over 50 years.

Training:

There is an annual training plan in the company, which is regularly followed but also it is a flexible instrument according to the development trends within the sector and the real needs occurred. The training programme is an object of vertical and horizontal match-making. The company spends usually 1,5% from the labour fund for training of the personnel.

For the last 3 years about 50% of the working staff visited different trainings funded by own sources. Usually these are short time trainings – 1-2 days. The training is done for: **a)** the managing staff and commercial staff and **b)** workers involved in production.

46% from the staff passes through basic training courses and about 48% mainly from the production sector passes courses for pre-qualification what regards new products or technology.

The training experience influences the carrier development of the workers.

transmitted to the employees themselves. Also:

- improve of knowledge;
- improve of skills;
- improve of product quality;
- growth of competitiveness of the company;

The knowledge transmission can contribute a lot to the development of the workers' competence. The knowledge transmission from the experienced workers to the new ones is a fundamental process because helps for the transmission of the **practice experience and improves the practical skills of the workers**. It is a knowledge which could not be acquired only by training and pre-qualification.

The knowledge transmission can contribute to the SMEs performance and competitiveness due to the following:

- The employees are part of the strategic development concept of the company due to the introduced instruments of mutual exchange and transmission of knowledge for each of the products provided to the customers.
- The workers are not only aware of their single job efforts and part of the production line but about the entire policy concept and strategy and of each of the other employees' contribution and the significance of each and everyone's role in the competitiveness of the company.
- The SME can benefit a lot; it does not need to devote extra efforts for introducing new employees or to explain the flexibility necessary according to the market requirements. These efforts are made by more experienced workers within the production process and the production supervisors.

Contact person:	
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Source: Own Elaboration.

3.- Importance of **knowledge identification and transmission and problems** identified by the metal SMES

In this report, we have thought about the importance of **knowledge** as an intangible asset able to generate competitive advantage for the organisations in the new economy. We have insisted on the importance of the processes linked to localisation, generation, structuring, storage, transmission, spread and use of these assets being suitably managed.

The companies, in this regard, consider that the knowledge transmission favours and encourages the evolution, competitiveness, professionalism and permanent adaptation of HR in the company. It contributes to the development of the workers' competences, mainly those regarding the practical skills that cannot be got only through training. Knowledge is essential, but not enough. The acquired know-how is basic.

Besides, they think that the knowledge transmission contributes to the performance and competitiveness of the SMEs. The economic globalisation processes force the industry in Europe to get placed in the market segments with the highest added value. For this purpose, innovation and the correct knowledge and experience transmission in the companies are key questions.

The SMEs state that the workers are a part of the strategic development in the company; they are not only directly linked to their particular works or with a part of the productive process, the interrelation among them also affects the company's competitiveness globally. The company's development is impossible without the development of its workers' competences and skills. For all these reasons, they state that the knowledge transmission is an important matter for the survival and development of the companies in the present changing context.

Nevertheless, the results of the research in companies in the metal sector in the countries taking part in the project show that most of the SMEs still lack the systems and tools aimed at the identification and transmission of knowledge, although they all show the need and great interest in knowing and operating some techniques and tools helping them in this regard.

Usually, and regarding the research carried out, the knowledge transmission takes place in an informal manner, without following any formalised system or method; that is, the transmission is carried out to face punctual problems or particular situations in each company: the incorporation of new workers, new demands or changes in production...

Many times, we have seen that the company (for being small and not having enough resources) cannot develop and operate "*ad hoc*" tools to allow the knowledge transmission, so it contracts specialists, leaving at external people's hands the knowledge transmission. The added problem to this practice is that even if there is knowledge transmission, the know-how, this implicit knowledge generated every day through experience, is lost.

Other problems the companies have shown through the research are:

- Worry for failure: every innovation process entails the concept of experimentation, with certain degree of risk of failure if the expected results or outputs are not achieved.
- How to distinguish the key knowledge from the one that is not.
- How to evaluate intellectual knowledge: difficulty to give a value to the works with strong intellectual contents, such as theoretical research (R&D).
- Determine the necessary time for the transmission of certain knowledge.

- The idea that knowledge is power: difficulty to leave the spread idea that "knowledge is the basic source of power in the organisations" and that, therefore, the best thing is to keep it.

- Put the organisation's strategies and objectives in line with those of its workers.

- Lack of motivation in some experienced workers, who could adopt the role of mentors in the organisation.

- The added cost it represents for the company

- Difficulty to select the correct person in charge of the knowledge transmission. Not all the people have the skills, abilities or techniques required to transmit their know-how to others.

To contribute to the solution of some of these problems, we suggest a series of basic points the companies should take into account when practising a pattern of knowledge identification and transmission:

1. Identify and select the critical knowledge in the organisation: those its survival and competitiveness depend on; those that are key ones for its productiveness. It is advisable to start selecting one or two processes to practise one of the techniques to transmit knowledge and, once we have checked the result and how it works, continue expanding the methodology to the rest of the company gradually.

   What processes should be selected? They can be those the specific needs of the business are focused on. Another option is focusing on the specific business units in the company, where the technical knowledge transmission is easier to deal with.

2. Create a knowledge map (implicit and explicit) existing in the organisation (who knows what).

3. Put in order and store information, through physical and virtual spaces. An information system allowing getting significant information coming both from external sources (Internet, data bases, statistic sources, etc.) and from internal sources (intranet, networks, documental bases...)

4. Favour a collaborating environment. A collaboration network (*sharing network*) allowing communication and exchange of ideas and experiences among the members of the organisation, mentoring... (See the above mentioned practices).

To cope with some workers' resistance to share their knowledge, the organisation should recognise its workers' contribution to the efficient achievement of its objectives, both in terms of quantity and of quality, motivating them. They should see themselves rewarded and never see the "person under mentoring" or the person they transmit their knowledge to as their competitor.

In addition, the company should consider a decrease of the working charge of these workers, so that it is inversely proportional to the amount of tasks they assume regarding the knowledge transmission.

5. The most important of all: an organisational culture favouring the knowledge exchange and continuing training, depending on the needs of knowledge the company has.

CONCLUSIONS

People leaving the organisations take with themselves key knowledge for the future of the company they retire from. No matter the kind of knowledge we are talking about. It might be their relation with a client, the computing language nobody uses any more, or simply, where some files are stored in the company's server. The organisations have tacit knowledge (experience, expertise, culture, etc.) and explicit knowledge (formal technical knowledge, procedures, learnt lessons, etc.)

In front of this situation, the companies have started taking measures to recover this critical information before it goes out through the door. But work does not end here, as they also have to **transmit** this know-how to the new generations of workers.

To transmit this knowledge different initiatives can be used. They require a culture, the support of the managers and the involvement of the employees and administration and the suitable means. Among the most common initiatives, as we have seen, are the capitalisation of knowledge (the best practices, learnt lesson or expert knowledge); development of knowledge bases; documental management; development of collaboration communities (practice, learning or interest communities); e-learning; and creation of experts directories, among others. Thus, **the knowledge transmission or exchange is always present, to a greater or lower extent and in a better or worse organised manner**.

Nevertheless, for the SMEs, integrating in their work this kind of initiatives systematically is not easy, as they involve quite a lot of changes (new ways of working, new roles...) and, meanwhile, they do not perceive they have the tools favouring taking this way at their hand.

On the other hand, as the organisations become increasingly complex (and with more and more resources), the knowledge management also gets more complex and great inefficiencies occur. The knowledge transmission cannot be established from one day to another or gets implemented with the application of one simple tool, but it is a long and expensive process. The most typical examples are the difficulty to share; that is, in the organisation, not everybody knows what they know, or share or use their knowledge. There are usually some “underground stores” that prevent knowledge from being used in other areas, generating endless re-inventions of what others already know. There is also much over-information or disinformation, the flight of knowledge because of personnel rotation, lack of availability of the knowledge required to implement new initiatives and achieve the generation of new knowledge, among other problems.

In spite of all, **the suitable management of knowledge produces some advantages.** Among others, let us mention the reduction of costs and of operational risk; the increase of the workers’ competences, as they are better prepared for change and the improvement of the relations with clients, creating new business opportunities, the higher consistence, agility and visibility of the organisation. All this influences the improvement of the innovation and quality potential and the operational excellence.

Maybe, the first challenge of many companies before thinking of implementing their strategy for knowledge transmission should be the quantification and classification of the knowledge their workers have and the localisation of the real intellectual capital in the company, because their competitive capacity depends on it.

Therefore, and to favour the knowledge transmission, the first step should be to identify the talent of the people in the company and to know each worker’s individual aptitude, understanding this, as the performance they are able to offer starting from an equivalent training level, as it is impossible to transmit what one doesn´t know.