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Quality control and knowledge management at the maintenance of printing industry – a company's example

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Abstract

The increasing value of technical knowledge has particular importance in the printing industry, especially technical knowledge related to maintenance. Since designing quality management systems is aimed at building the future of companies, managing maintenance know-how becomes the very essence and focus of the effort. The two most important capital tools for a maintenance business are: customers' trust in the service and technical knowledge delivered by devoted and well-trained staff. Such a business may define becoming a knowledge-based company as the fundamental strategic objective. Our quality targets on this field can be systematically articulated and evaluated in a framework of a measurement system. Performance indicators can be set which describe qualification, professional awareness, and the attitude toward learning and which provide information primarily on change and scale or direction of developments.

1. Introduction – Aim: to become a knowledge company

For any maintenance company, two essential assets are the trust of customers and the knowledge embodying in committed and professionally prepared associates.
The most important aim of such an enterprise should be to become a real knowledge company, because

- it means a cutting edge in competition,
- the maintenance market appreciates expertise. Everyone is willing to pay for quick and professional repair services,
- constraints caused by competition can be mitigated in this manner, and thus it is less likely that others could emulate the company's activities,
- the pressure on wages induced by our EU accession can be handled better.

Obviously, it is also important to put a background of modern infrastructure in place, yet it has smaller overall significance and influence on sales revenues (Dull, 1966).

2. Methodology of research

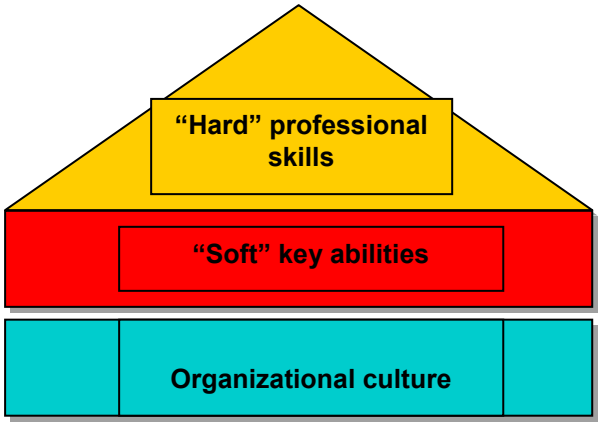
When we were framing our integrated maintenance model, we considered all those means and abilities that were needed for the betterment of maintenance, expected to allow the implementation of efficient foresighted maintenance management in printing industry, and at the same time comprised the elements of the structuring of our maintenance model.

Some of these elements belong to *hard means* or *hard skills* as they are called in Anglo-Saxon technical literature. They cover all those knowledge, professional contents, abilities that are needed for the performance of foresighted maintenance. They include tangible means such as professional and time planning, the performance of operating and stewardship tasks, condition monitoring, failure analysis, servicing know-how and so on. (Tsang, 2002)

Key abilities or in English terminology "soft skills" are not associated with the given profession, but rather successful work. On the other hand, there are so-called "intangible" characteristics, behavioural patterns and practices; long-term plans, short-term goals, personal management, communication and cooperation, problem solving and the assumption of responsibilities, learning skills and capabilities, team work, performance and evaluation skills.

Graph 1 shows how the pyramid of "hard" skills is built upon the foundation formed by the "soft" key abilities. Nevertheless, the deep foundation of both these types of skills is in fact the organizational culture. In the light of this attitude, the structuring of the corporate culture should

unavoidably be associated with the development of a maintenance model.



Graph 1: The pyramid of means and abilities stands on a foundation formed by organizational culture

It has been examined how the reliability-centered culture can be incorporated into the work processes of the improvement of maintenance organization, how it is based on this maintenance organization model. (Thomas, 2005)

The interpretation of the reliability-centered attitude is demonstrated via ways of behaviour matched up and described in *Graph 2* and *3*.

Technical – culture of mechanics	
Mechanic	*Technician*
Alone wolf	Works in teams
lubrication (if there is sufficient time)	Demanding in technical issues
Review (if there is sufficient time)	Diagnostic and foresightful
Troubleshooting panic	Works along time plans
Recurring failures	Specialist of the given field
Permanent stress, but not a challenge	Perceives work as a challenge, and not stress

Graph 2: Repair-oriented and reliability-centered culture of technical mechanics

Today, the execution of maintenance tasks calls for a technician of independent and synthesized thinking rather than a repair-oriented workfellow who tends to lean back and regard himself to be a hero after any successful troubleshooting.

Technical organizational culture	
Repair servicing administrator	Technical manager
Do the repair when it is instructed	Why has it broken down?
Likes doing something	What has caused work?
How much does it cost?	What has caused costs?
Inflexible in the face of budget constraints	To review the investment and planning
When will something break again?	Can it be prevented?
To survive the following week.	How can efficiency be improved?

Graph 3: Repair-oriented and reliability-centered the technical organizational culture

Similarly, completely different mentality and requirements are valid for a manager who plans maintenance with respect to reliability in comparison with a leader always waiting for the following day to come.
In the processes of maintenance organization, proper attention should be paid to supporting the forms of behaviour described in the right columns. (Hair, 2002)

3. Evaluation of the school qualifications and skills of the employees

Nyomda-Technika Kft's core activities include assembly, repair services and maintenance in printing industry. Having been operated for 23 years now, the company is regarded to be an important market actor in this field of domestic printing industry. It is often involved in works abroad, and therefore the company is frequently required to prove its capabilities in market competition. The company has been working with the ISO 9001-2000 quality management system for 12 years.

In order to develop the service quality continuously, their work focuses on the improvement of their professional skills. Towards this end, an evaluation scorecard system has been established and operated for the proper assessment of the skills of the associates and evaluation of their development. (Gaál, 1999)

This system of appraisal assigns different scores to the various forms of the following skills and qualifications:

- specialized qualifications,
- complementary qualifications in mechanical engineering,
- complementary qualifications in economics,
- quality management, other management-type qualifications (TÜV),
- language skills,
- qualifications attained at training courses.

The system prefers altogether 34 distinct types of qualifications, and evaluates them in a scale of 1–9 points. By summing up these scores, the level of qualifications and skills can be determined for any associate, and the same is true for the characteristics of groups of employees and associates.

Graph 4 shows the development of the average level of professional qualifications at the company. For proper comparability, the scoring values of certain important qualifications have also been provided in the table.

Year	Level of qualifications	Deve-lopment	Rate of graduates
2002	8.04		8.7%
2007	9.40	16.5	10.9%
2012	12.06	28.8	15.22%

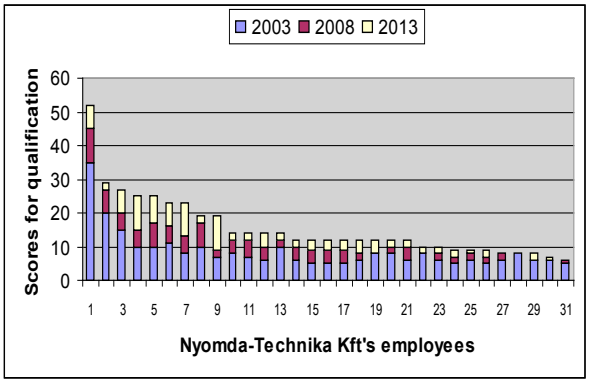
Scores for key qualifications:

- vocational training school qualification 5 points
- general certificate of secondary education 1 points
- technician certificate 2 points
- college degree 7 points
- complementary qualifications from the National List of Public Education (OKJ) 2 points

Graph 4: Development of the level of qualifications of associates at Nyomda-Technika Kft.

The company has consistently been using this system, and evaluating the associates for 10 years. The scores have also proved to be motivating for associates to attain new qualifications and skills, which the employer always supports. This evaluation has been integrated in the quality management system, and is in fact a part of the annual individual appraisal.

Obviously, average scores also have a *"beneficial" hiding effect. Graph 5 shows* the trends and progress for all the employees of Nyomda-Technika Kft. Certainly, the past 10 years have witnessed changes in the personnel. In this case, the scores of the associate who used to occupy the given position have been taken into account.



Graph 5: Changes in the qualifications and skills of associates at Nyomda-Technika Kft.

It is apparent that this company also has a bottom one-third that can be "less motivated". Nevertheless, the image of the company is determined by the dynamic upper two-thirds who demand, and also act for the attainment of knowledge. The first seven columns reflect the scores of the associates holding higher education qualifications. They tend to be the most active in learning. Yet, behind these scores, there also exist quality replacements.

4. Professional self-appraisal

The above-described evaluation pertains only to the professional knowledge as certified with documents. However, it is only one very important tool for work, and therefore it is rather an essential issue how the employees exploit the attained knowledge in their actual work.

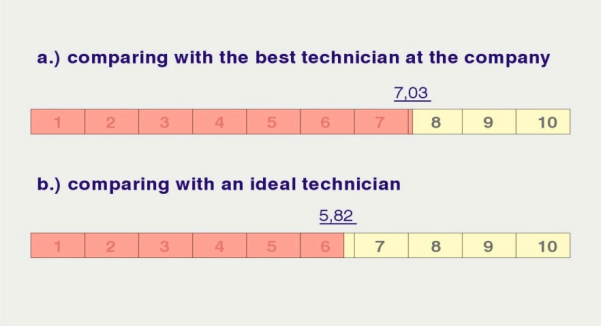
A part of Nyomda-Technika Kft's quality management system is the annual self-appraisal that is designed to assess the efficiency of "application".

Individual appraisal is a kind of rating system that is performed jointly by the employee and his/her superior with respect to the following 7 groups of criteria:

- professional skills,
- efficiency of activities,
- faultless activities,
- observance of quality requirements,
- initiative,
- ability to work in teams,
- willingness to help.

Each of these groups of criteria consists of four additional aspects of appraisal. The individual aspects are weighted in a scale of 3–5 points. Therefore, a scale of 100 points at the maximum determines the rating.
In 2009, the average rating of Nyomda-Technika Kft's employees corresponded to 70.5 points. Each year, the knowledge management block of the quality management system involves the completion of a questionnaire that is to drive "consultations" with the associates in view of professional self-appraisal and willingness to learn.

Graph 6 shows how associates evaluated their own activities in a scale of 10 points.



Graph 6: Self-appraisal scales of the technicians at Nyomda-Technika company (2013)

It can be seen that the appraisal performed by the superiors and comparison with the most skilled colleague tend to arrive at similar results. Associates appraise themselves very realistically, which facilitates managerial activities a lot.

According to the responses given to the other questions, half of the superiors and 2/3 of the subordinates think that their qualifications and skills are just sufficient for performance in the given positions. Others admit that from time to time they find themselves in situation when the given tasks go beyond their existing knowledge.

55% of the superiors regard their subordinates to be sufficiently prepared. Others think that the lack of proper skills often leads to difficulties. Two colleagues in managerial positions are declaredly concerned about the insufficiency of professional preparedness.

As a consequence, a number of associates at Nyomda-Technika Kft. feel the need for further learning and the attainment of additional qualifications.

5. Willingness to learn

On the basis of the relevant responses, the following overall evaluation can be given.

- 15% of the associates plan to attend studies in higher education, and additionally 60% is considering the option to attain additional qualifications.
- 70% thinks that it would be good to learn languages, yet nearly all of them refer to the lack of sufficient time in this respect.
- Almost everyone accepts that from time to time they should attend retraining sessions in order to attain novel knowledge.
- Only 10% is willing to expend own financial resources on learning, while the large majority looks to the support of the company.
- 3/4 of all the associates see the necessity to and accept the employment of associates with higher qualifications towards the proper growth of the company even if quality replacements should be made in this respect.

The responses serve as points of reference for the management of the company. The company is to expend on the training of the associates who – fortunately, the majority of them – tend to shoulder the related hardships towards supporting the company in market competition.

6. Conclusion

In summary it can be claimed that at companies required to work innovatively the professional knowledge and skills of associates can and should be managed, and they indeed act as partners in the process as our example has been showing.

7. References

Dull, S. (1996): Emberi tényezők, vezetési módszerek, biztonságos munkavégzés és karbantartás (Human Factors, Management Methods, Safe Work and Maintenance), Gépgyártástechnológia, 36. 4. (1996) pp. 10–13 (in Hungarian)

Gaál, Z. (1999): Emberi tőke – szervezeti kultúra (Human Capital – Organizational Culture), HARVARD BUSINESS Manager 1/1999. pp. 69–74 (in Hungarian)

Hair, T. (2002): Improving Maintenance through operators, PIRA International Conference Proceedings, Best Practice Maintenance, Manchester, Paper 7, p. 1-7

Thomas S. T. (2005): Improving Maintenance Reliability Through Cultural Change, Industrial Press, NY, p. 356

TSANG H.C.A.: Strategic dimension of maintenance management, Journal of Quality in Maintenance Engineering, Vol 8. No. 1, 2002, pp. 7-39