



KNOWLEDGE MANAGEMENT AND LOGISTICS: WHERE WE ARE AND WHERE WE MIGHT GO TO

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ABSTRACT. By the commonly accepted theory, today's logistics processes and systems are characterized by an increasing complexity and by the need for global networking to cope with the growing diversity of logistics problems; because of this, knowledge is becoming more and more a strategic resource in logistics.

But some questions remain unanswered: How far has implementation of knowledge management methods gone in the logistics practice? To what degree does the supposed (theoretical) relevance of investments into knowledge and knowledge management match the actual priority of several knowledge management activities as shown by the respective investment volume? How do knowledge-related investments change a company's logistics performance?

In order to answer those questions, a survey was run with German and Portuguese logistics companies on the relevance of knowledge and knowledge management for executing logistics processes, on the need of investment into knowledge and knowledge management activities in logistics, and on the eventually existent relationship between knowledge and logistics performance. To analyze the impact of knowledge management on a company's logistics performance a model has been developed which contributes to an economic assessment of knowledge management and the analysis of its potentials.

As a result, a qualitative determination of the state-of-the-art in implementing and applying knowledge management in the logistics practice was produced. Specifically, severe differences between the German and Portuguese reality turned out, although it has been quite challenging to derive statistical benchmarks for an optimal use of knowledge in logistics from the small amount of responses received.

The paper will present conclusions drawn from the use of the methodology and a list of recommended actions derived from this respectively.

Key words: knowledge management, investments into knowledge, knowledge management activities.

KNOWLEDGE MANAGEMENT: AN INTRODUCTION

In the last decade, as a logical consequence of the changing organizational structures and of the changing relations within and between companies, the new roles for managers and employees, and the new international division of labour, knowledge has been seen as a new strategic resource. This development finds its expression in the numerous projects and research activities on how to deal with the knowledge resource and how to gain, retain and distribute it, as well as on requirements, potentials and concepts for running a company in a knowledge-oriented way - all of this summarized by use of the term knowledge management. Therefore, knowledge management describes the conscious, systematic and strategically anchored handling of knowledge considering people, organization and technology in order to encourage individual, social and organizational learning processes in the end leading to a learning and knowledge-based organization (Reinmann-Rothmeier et al. 2001).

Initially, companies had high expectations on all activities aiming to manage knowledge:

- Efforts to be spent on finding certain knowledge should decrease.
- The re-use of existent knowledge was expected to increase.
- More time should be available for creating ideas and innovation.
- Internal and external communication should improve.

New employees should more easily and in shorter times be integrated into the company environment and tasks.

This led to significant investments, mainly targeted towards the introduction of technical solutions like e.g. knowledge banks. But in practice, the intended economic success was not achieved within short terms and many of those projects or initiatives for knowledge management implementation into a specific company setting have significantly been reduced or even completely cancelled. Here, the fact that knowledge management requires a holistic approach including all three of its dimensions (i.e. people, technology and organization) and eventually initiates change processes usually showing effects in medium to long terms has erroneously been ignored. Therefore (and as it is typical for practically implementing technical innovations and concepts), a phase of excessive expectations from knowledge management was followed by a phase of strong disillusionment on its power. Further introduction of knowledge management methods and approaches into company practice as well as further identification of new application areas were slowed down or even prevented.

LOGISTICS: APPLICATION AREA FOR KNOWLEDGE MANAGEMENT CONCEPTS

The same hesitant implementation of knowledge management in a company's practice as described above can also be found in the logistics business area. Here, knowledge has been widely recognized and accepted as strategic resource, too:

- Whether or not a supply chain operates successfully does not only depend on the intensity and quality of material and information flows in a supplier-customer relation. As generally recognized, the success of a supply chain is also heavily affected by the kind and quality of the collaboration between human resources involved on both sides of the partnership. This collaboration is based on knowledge, understanding and trust.
- The number and variety of methods and software tools available to support logistics planning is permanently increasing. Unfortunately, those tools quite often dominate the planning person and prevent him/her from creative problem solving instead of purposefully giving personalized support (Neumann 2003).
- Team building to master complex problems in logistics planning and operation can only be successful if the team consists of the right mix of knowledge, experience and competence stakeholders, that is adequate to the problem to be solved. Within those well-balanced teams, a range of individual strengths is combined to overcome a range of individual weaknesses in order to better perform jointly at a higher level (Neumann 2001).
- Logistics is a quite young and very dynamic field of knowledge and science. Resulting from this, contents, methods, tools as well as way and time frame of modern logistics education and training oriented towards future needs and requirements are significantly being changed (Neumann et al. 2001).

Consequently, knowledge management is expected to provide a tremendous contribution to the improvement of logistics planning and performance. To learn from previous experience, to know about valuable experts, their location and expertise for getting them involved in running projects or new tasks, to better understand pre-conditions, settings and decisions from the past and with relevance to today's activities, to easily identify and get access to the right knowledge exactly when it is needed -

these are some important sources for increasing a person's, a team's or an organization's logistics competence and performance and to let them become more knowledgeable consumers, well acquainted supervisors or enthusiastic developers of logistics services, systems and processes.

The biggest challenge for properly handling logistics knowledge by applying knowledge management methods and tools to the planning of logistics systems and processes and to the operation of logistics services consists in providing the right knowledge of the right quality and with the right costs at the right place and time. In other words, it is essential not to focus on the introduction of knowledge management technology and integration of software tools for storing and retrieving knowledge and information into a company's setting only (Gudehus 2003), but to put the human resources driving the company's performance back into the center of gravity and to try to give them that kind and amount of support which is needed in a particular situation.

In fact, the quality of the logistics services and the success of the logistics activities strongly depend on the knowledge, skills and abilities (i.e. the competence) of the people that design or operate the logistics systems and processes. Therefore, knowledge management can be expected to be an essential method, tool, and principle for improving the people's performance in logistics, and consequently, for improving the outcome, i.e. the quality of logistics systems, processes and services. Preconditions of the knowledge management success are sophisticated knowledge management systems tailor-made to the specific needs of a particular company, supply chain collaboration or even network of companies, and also a knowledge-friendly environment in this frame.

Despite of this common understanding, knowledge management has not yet been implemented in logistics companies or logistics departments of big companies in large scale. Although (Baumgarten and Thoms 2002) were able to identify logistics knowledge management champions (with special focus on those companies involved in supply chain networks), they also had to recognize severe challenges in implementing knowledge management and running it in the daily logistics business. Major problems were seen in financial limitations, time restrictions, insufficient structuring and presentation of knowledge, as well as methodical misconceptions. Other problems are related to indicators and impact measurement: indicators characterize the suitability and appropriateness of knowledge management tools and systems like the amount of knowledge units stored or access rates and response times. The latter aspect is represented by categories such as trust or intelligibility and so, it is very difficult to be measured. Probably, this missing economic measurement is another reason for acceptance problems and the slack implementation of knowledge management into logistics services planning, operation and management.

KNOWLEDGE MANAGEMENT AND LOGISTICS: SETUP OF AN EMPIRICAL IMPACT STUDY

Aims and setting

Taking into consideration the current situation of the introduction of knowledge management into the logistics field of business, a study was run to compare the high expectations on what knowledge management could do with today's reality. In particular it aimed:

- To gain a clear picture on what is knowledge management practice in a certain business sector,
- To develop a domain-specific approach for measuring the impact of knowledge management on a company's performance,
- To understand the impact of knowledge management on the logistics performance taking cultural specifics and organizational diversity into consideration and
- To identify existing potential for improving a company's performance by means of knowledge management.

Specifically, we expected to obtain descriptions of knowledge investments, needs for investments in knowledge and impacts related to knowledge in the logistics sector. For this, we designed a sectorial impact study rather than a case study (Neumann and Tomé 2005). With this, we differ from other studies that already have been run in the field. Those studies did not focus on understanding the impact of knowledge management on a company's performance as well as related needs and investments, but aimed, for example, to identify the relevance of certain knowledge management methods in today's supply chains (Strubelt and Neumann 2006), the state-of-the-art in knowledge management implementation and in using knowledge management tools in companies and organizations (Fraunhofer 2005), or the success factors of computer-mediated knowledge systems in an international technical consulting firm (Reihlen and Ringberg 2006).

The study has purposefully been designed as a three-stage process. After having gained first results and general feedback from a limited sample of logistics companies in Germany by use of a prototype questionnaire (stage 1 - Neumann and Tomé 2005), an improved questionnaire was sent by mail or e-mail to 389 companies in Germany and 62 companies in Portugal attaching themselves to the logistics sector (stage 2). Those companies were either logistics service providers of various kinds or, for example, big companies such as car manufacturers with a specific logistics department. In order to ensure a useful number of responses, they have been approached in different ways and even pre-contacted by phone before sending off the questionnaire (Figure 1). In order to eventually detect cultural influences, the study was less focused on global players, and more centered on German and Portuguese companies with a strong orientation towards regional and national markets; in addition, the questionnaire was provided in the respective local languages. In future, stage 3 of the project will aim to extend the investigation to further countries across Europe.

| | | contact before delivering | |
|------------------------|------------------------|---------------------------|-----------------------|
| | | none | by phone |
| questionnaire delivery | by e-mail | 110 comp. (Germany) | 11 comp. (Germany) |
| | 62 comp. (Portugal) | | |
| | by mail | 255 comp. (Germany) | 13 comp. (Germany) |

Fig. 1. Methods of approaching companies
 Rys. 1. Metody pozyskiwania danych z przedsiębiorstw

Questionnaire

To originate the intended insights, the questionnaire comprised five groups of questions addressed to different responsible managers in a company:

- The first group aimed at specifying the main company characteristics. Furthermore, in order to account for the dynamic of the firm, we asked if the company had recently incurred in some substantial change. These questions were to be answered by the top manager of the unit to which the data were related.
- The second group should give a clue on the logistics manager's opinion about the role of knowledge in the company. Questions specifically dealt with the importance and dynamics of knowledge, the role of knowledge management with regard to the logistics processes or services, and whether or not Intellectual Capital (IC) Reports are produced.
- The third group asked the human resources (HR) manager to qualitatively assess specific investments into knowledge made in 2004 fully relying on the good faith of the respondents. We

used a detailed grid of 16 items describing different ways of investing into knowledge, but deliberately not considering investments into knowledge management systems and Information Technology (IT) infrastructure, because - as already pointed out - successful knowledge management can never be based on technology only.

- The fourth group used the same grid and scaling as before to ask for the HR manager's opinion about the importance of providing employees with access to the 16 types of investments into knowledge in 2005.
- The fifth group was based on a grid of 32 company performance indicators related to economic factors, human relations within the company, customer relationship, operations within the company, personnel, production process, and strategy. To define the evolution of the company from before the investment into knowledge (2003) to after the investment (2005), we asked the unit's top manager for classifying the respective company situations.

Through its special design, this questionnaire was expected not only to provide a snapshot of the company's current way of handling knowledge, but also, and more importantly, to allow concluding on cultural changes and developments related to knowledge management. For this, all responses, no matter if they were positive or negative ones, have been treated carefully in both ways question-by-question and as subject of an interrelated analysis.

KNOWLEDGE MANAGEMENT AND LOGISTICS: CURRENT SITUATION AS APPEARING IN THE STUDY

Response rate

As previously explained 389 German and 62 Portuguese companies received the questionnaire in electronic or printed versions. The overall response rates (in terms of completed questionnaires) of 4.6% in Germany (equally distributed between small, medium-sized and large companies) and 4.8% in Portugal were slightly disappointing and do not allow drawing any statistically significant conclusions. Nevertheless, some qualitative results and general findings can be derived from this:

- There were several reasons why companies did not answer the questionnaire. They ranged from objection to contribute to studies on principle and too much effort or time required via the respective contact person is currently not available and no relationship to knowledge management to too sensitive data requested. One company refused because they had just completed a very similar questionnaire - which in fact did not show too many similarities. Furthermore, a number of companies did not exist anymore or had changed their addresses. Among the Portuguese companies not answering to the questionnaire, usually transportation companies were found, in which the driving capability (and no specific knowledge-intensive competence) seemed to be the most wanted skill to qualify the average employee.
- Sending electronic questionnaires by e-mail is an inappropriate questioning method, because nearly no response was gained from those. Reasons for this might be seen in the missing anonymity of responses, an eventual e-mail overload, and a traditional posture of logistics companies.
- Pre-contacting companies before sending off the questionnaire seems to increase the response rate. In Germany, 12.5% of the previously informed companies did return a completed questionnaire.

On the other hand, companies, which responded to the questionnaire, showed a strong interest in learning about results and outcomes of the study and welcomed some benchmarking of their own knowledge management activities and eventually existing further potential. In Germany, this is

particularly true for small to medium-sized consulting companies with a high percentage of well-educated employees (university degree).

The role of knowledge in the company

Nearly all respondents declared knowledge was a key resource for the company's performance: more than 75% of the responding companies (at least in the logistics managers' opinions) characterize knowledge management as supportive to all activities and helpful to better perform at the market; furthermore knowledge changes and improves all the time (in more than 60% of the cases) and/or develops with particular activities such as projects (in 50% of the cases). This one is a quite surprising and very positive view on knowledge, which also explains why those companies finally responded to the questionnaire.

On the other hand, nearly none of the companies confirmed the production of an intellectual capital report to monitor developments of the company's knowledge base. Those disagreeing with that statement describe to have only rudimental experience with this management instrument so far, that it often fails in the daily business, or even that the term "intellectual capital report" or "knowledge audit" is not yet established. This represents the other much less enthusiastic and much more hesitant attitude towards knowledge management detected in this study, and a probable explanation for the low participation rate.

Investments into knowledge management activities

On the scale from 0 (no investments) to 5 (very big investments) the average level of investment of companies per item was rated 2.69 in Germany and 2.06 in Portugal. From this finding we may conclude that in 2004, German logistics companies invested into knowledge management at a medium level, whereas Portuguese ones just reached a low level. However, two other findings help to clarify this average description of the situation (see Figure 2):

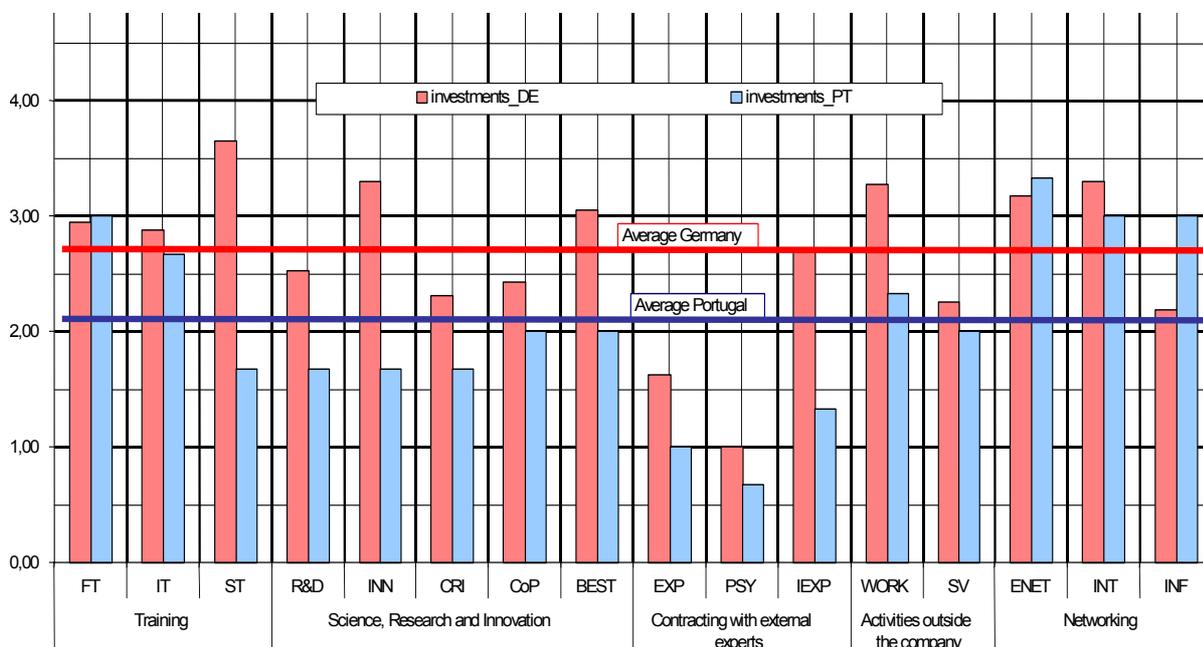


Fig. 2. Assessment of investments into knowledge management activities
 Rys. 2. Zaangażowanie w działania służące podwyższeniu wiedzy o zarządzaniu

- Significant differences were detected between each one of the 16 items used. Knowledge management activities like self-training, innovation practices, participation in conferences/workshops, participation in external knowledge-sharing networks or establishment of internal knowledge-sharing networks reached values between 3 and 3.5 (i.e. more than medium level of investment). On the contrary some other variables showed very small levels of investment: hiring of consultants in Human Resources Development (HRD), Intellectual Capital (IC), or knowledge management (with a value of 1.53 - i.e. low to very low investment level), and meetings with labour psychologists (0.94 - i.e. very low investment level).
- Important differences could also be detected amongst the companies: one company showed an average value of 3.69 per item, whereas the lowest had an average value of 0.625 only. All in all, the majority of the companies showed an average value between 2 and 3 (i.e. a low to medium level of investment into knowledge management activities).

Therefore, we may conclude that the investment in knowledge management activities is considerable even if not very substantial, and that the level of investment is not uniform in companies. Also, some knowledge management items receive far more attention from managers than others.

Priorities of accessing knowledge management activities

In contrast to the investment level and using the same scale, the Portuguese companies felt a higher priority for investing into knowledge management than German companies did (average of 3.67 and 2.87 respectively; see Figure 3). The difference may be explained because German logistics companies already made the investments the Portuguese still lack.

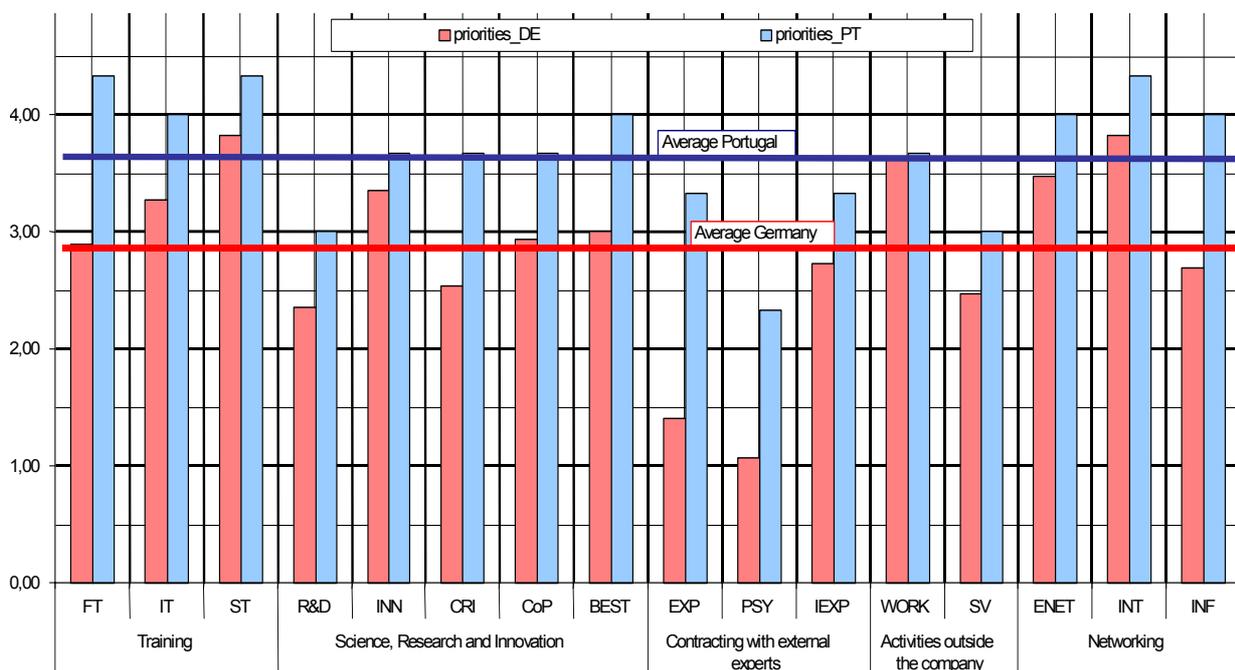


Fig. 3. Investments into knowledge management activities and priorities for accessing them
 Rys. 3. Inwestycje w działania służące podwyższeniu wiedzy o zarządzaniu i priorytety ich uzyskania

Per item, the average priority was 2.98 with heavily varying results for the different knowledge management activities: nine items showed an average priority above 3, with the highest values (between 3.5 and 4 - meaning nearly high priority) being registered for self-training, participation in conferences/workshops, participation in external knowledge-sharing networks or establishment of

internal knowledge-sharing networks. In contrast, hiring of consultants in HRD, IC, or knowledge management, and meetings with labour psychologists had very low values of less than 2 (i.e. low to very low importance).

Needs for knowledge management

This part of the study intends to help companies in identifying knowledge management areas in which they shall invest in the near future and may thus have a short run and important consequence. Based upon (Reinhardt 2003) we consider that the need for investment in knowledge is defined as difference between, on one hand, the priority for accessing knowledge in a certain way and, on the other hand, an indicator of access frequency. As an indicator of frequency we use the investments made. Crucially, we think it is much more interesting and correct to define "needs" - as we did - indirectly by asking for "frequencies" and "priorities" than naively asking a manager this question directly: needs are potentially infinite if we look at them directly.

A first impression on the companies' needs is given by Figure 4, which visualizes the shift in ratings for each category of knowledge management activities between 2004 and 2005. Here, any positive value indicates a higher priority than investment (meaning that urgent need for investment exists in these sub-areas), while any negative value shows that priorities do not justify investments made (and thus a reduction of investment might be recommended in these cases).

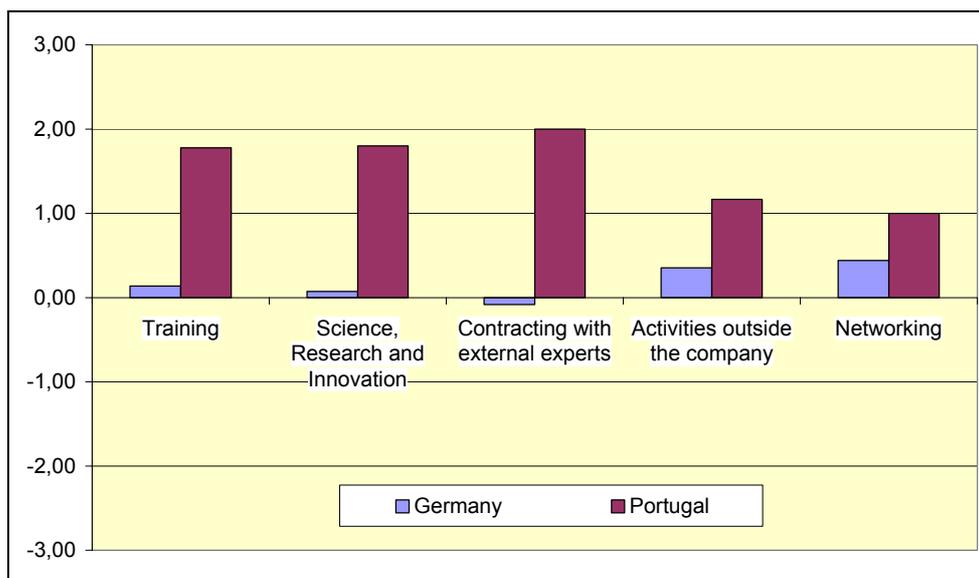


Fig. 4. Needs for knowledge management activities according to categories
Rys. 4. Zapotrzebowanie na działania służące podwyższeniu wiedzy według kategorii

More precisely, on a scale from -5 (over-investment, i.e. strong need for reducing investment) to +5 (urgent need for investing further) we found that the indirectly perceived average need for becoming active per knowledge management item is small even if it exists (+0.4), but that in Portugal (+1.6) this need is much higher than in Germany (+0.16). The difference between the two countries is probably explained by the different levels of economic development and by the different levels of implementation of knowledge management in their logistics sectors. Other details give more realism to that generic finding:

- On average all types of knowledge management activities had positive values pointing at needs for further investment rather than needs for reducing it. Here, the relatively strongest need for investing (although it still is pretty low) could be found for the development of internal knowledge sharing networks (+0.65), Communities of Practice (+0.59), development of informal networks (+0.55), and self training (+0.55). In contrast, there seems to be nearly no need for any change in the investment for hiring of HRD experts (+0.15), formal training (+0.14), and research and development (+0.05).
- Significantly high values of need for becoming active in either of the directions were demonstrated by companies as shown in Table 1: a very small number of companies seemed to have over-invested significantly (11 occurrences for 21 companies and 16 items, that is 3% of the cases), whereas a bigger number of other companies seemed to have strong investment needs to satisfy (12% of the cases). Quite interestingly, there was no specific knowledge management activity for which needs were perceived as much higher than those of the other items.
- When the over-investment and needs data of each company were put together, 14 companies presented positive values (pointing to a global unsatisfied need for investment into knowledge management) and four presented negative values (pointing to an over-investment into knowledge management). Three had 0 values (i.e. investments and priorities seemed to be well balanced). Very interestingly, the three Portuguese companies were among the four companies with higher needs, and the German company with more needs had a total value of needs equal to the Portuguese company with the smallest need.

Table 1. Number of companies with significant differences between investment and priority
 Tabela 1. Ilość przedsiębiorstw w których wystąpiły istotne rozbieżności między inwestycjami a priorytetami

| | | -4 | -2 | 2 | 3 | 4 | 5 | Total |
|------|---|----|----|----|---|---|---|-------|
| FT | Formal training | | | 2 | | | | 2 |
| IT | Informal training | | 1 | 3 | | | | 4 |
| ST | Self training | | | 2 | | 1 | | 3 |
| R&D | Research and Development | | 1 | | | 1 | | 2 |
| INN | Innovation practices | | 1 | | 1 | 1 | | 3 |
| CRI | Creativity linked activities | | 2 | 1 | 1 | 1 | | 5 |
| CoP | Communities of Practices | | | 1 | | 1 | 1 | 3 |
| BEST | Study of Best Practices | 1 | 1 | 2 | | 1 | | 5 |
| EXP | Hiring of HRD experts | 1 | 1 | | 1 | 1 | | 4 |
| PSY | Contact with labour psychologists | | | 1 | 1 | | | 2 |
| IEXP | Meeting with invited experts | | 1 | 2 | 1 | | | 4 |
| WORK | Participation in workshops and conferences | | | 2 | | | | 2 |
| SV | Study visits to companies or cultural sights | | 1 | 3 | 1 | | | 5 |
| ENET | Participation in external nets of knowledge sharing | | | 1 | 1 | | | 2 |
| INT | Establishment of internal formal network | | | 3 | 1 | | | 4 |
| INF | Development of internal informal network | | | 3 | | | | 3 |
| | TOTAL | 2 | 9 | 26 | 8 | 7 | 1 | |

Note n= 21. Scale from -5 to 5. Negative: Over-investment. Positive: Need for investment.

- But, the global situation hid some unbalances. Thus, the values shown in Table 1 did not distribute themselves evenly by all the companies, not at all. It is very curious to note the following occurrences:
 - The big negative values (sign of probable over-investment) were all detected in Germany,
 - In Portugal big absolute values were only positive (pointing to needs for further investment),
 - Seven German companies had only values ranging from -1 (small over-investment) to +1 (small investment need) simultaneously,
 - Three German companies only had big problems concerning over-investment,
 - One and the same Portuguese company showed all seven judgments of +4 (nearly urgent need for further investment) and 8 of the judgments of +2; another Portuguese company showed 3 values of +3 and 6 of +2,
 - Similar to the Portuguese ones, just two German companies were presenting investment needs problems only.

Therefore it is possible to conclude that even if on average the needs for investing into knowledge management are small, several situations of under-investment and of unsatisfied needs exist - the first being essentially located in Germany and the latter in Portugal.

KNOWLEDGE MANAGEMENT AND LOGISTICS: THE IMPACT

In recent years some very well known models have been developed to deal with the question of economically evaluating knowledge management and Intellectual Capital, the more important ones being the Skandia Navigator (Edvinsson and Malone 1997), the Intangible Assets Monitor (Sveiby 1997), and the Balanced Scorecard (Kaplan and Norton 1994). The main ideas behind those models are two: first to define the "intangible" assets and second to measure their implications - just because knowledge is intangible, this does not mean that its impact is (APQC 2004a). Those models assume the diversity and complexity of the notion of knowledge. Furthermore, they also assume the diversity and complexity of the consequences from using knowledge. It is assumed that those results may be positive in a number of perspectives like business processes, employee satisfaction, customer satisfaction, financial results, learning and growth (North and Hornung 2003). Applications of those models have been done for companies and organizations (Mertins et al. 2001; Kagelmann 2003; Kukko et al. 2003; North, Reinhardt and Schmidt 2004) but also for countries and regions (Bonfour and Edvinsson 2004). Also, and very interesting, some authors have tried to audit knowledge (Reinhardt 2003; Sabater et al. 2003). All those ideas are well known, and studied. What has to be done now is to apply them to relevant sectors, which in the present case is the logistics sector.

A very simple equation could be used to describe the presented study (Neumann and Tomé 2005):

$$Y = aX + bKM + e \quad (1)$$

Here, Y represents the outcomes, KM the investment variables (the tool), and X the controls. The controls would be related to sectors, quality of human capital and other relevant characteristics of the company. The impact of knowledge management would be defined by b. Finally, variable a represents a set of coefficients associated with controls and variable e corresponds to the statistical error and also to the non-observable variables. Very complex developments of this formula may be made (Heckman et al. 1999). Of course, one question could arise: is it the tool (KM) that fails, or is it people who do not know how to use it properly? But this is a secondary problem. The first one is to access somehow the impact of knowledge management on a company's logistics performance. For this, we applied the

equation by estimating regressions using the 32 company performance indicators as dependent variables and the 16 knowledge management activities as independent variables.

On this basis we were able to extract the following main conclusions:

- Self training (ST) had usually associated negative coefficients, whereas formal (FT) and informal training (IT) had positive ones.
- In the science and innovation block (INN, R&D, CRI, CoP, BEST), expenses in R&D, study of best practices, and creativity related activities seemed to have some positive influence, on the market value of employees, the informative content of services (R&D), consumer satisfaction, and the retention of costumers (BEST), the making of new products and risk analysis (CRI).
- Knowledge management activities linked with external experts (EXP, PSY, IEXP) showed few important results, the exception being a positive and significant relation between meetings with external experts and the number of costumers.
- The block on activities outside the company (WORK, SV) only provided a positive and significant relation between workshops and the market value of the personnel.
- Amongst those activities related to networking (ENET, INT, INF) internal networks (INT) were the most important one showing a positive and significant influence on attitudes towards change and the competence level of personnel. Informal networks (INF) had some positive and significant influences, too (on the time doing routine work and on redundancies).

Due to small sample of companies that responded to the questionnaire we understand these results as very preliminary ones. Nevertheless, from what we obtained we only can conclude that knowledge management has a small importance in defining a companies' economic evolution. But this finding is in quite some contradiction to theory on one hand and all enthusiastic expectations from practice on the other. So, what is the truth? Of course, we hope that a bigger sample, in a more advanced step of the study, will allow detecting some more meaningful relations between knowledge management and company performance. On the other hand we also have to take into consideration that the effects caused by introducing a knowledge-friendly culture and knowledge management methods into a particular company or even throughout the entire supply chain will mainly be brought out in longer terms. Consequently, this requires a corresponding setup of the study using our results achieved so far as first benchmark to be subject to further investigations repeated at regular intervals and continually analyzed according to impacts and sensitiveness between knowledge management items and logistics performance indicators.

KNOWLEDGE MANAGEMENT AND LOGISTICS: SOME PROSPECTS

In theory, knowledge management is expected to provide a tremendous contribution to the improvement of logistics planning and performance. The presented study aimed at comparing these high expectations with today's reality in business. The focus was set not just at analyzing and measuring what is happening, but also at developing a set of best practices and suggestions for effectively and efficiently integrating knowledge management into different types of logistics activities.

Due to the small number of respondents, and regretfully, the findings of this study cannot be considered very significant by now, but anyway, the paper contributes to the discussion about the use and importance of knowledge management in companies. Summarizing our findings, the main conclusion of the study is that knowledge management still seems to be just of little importance in the logistics sector in Germany and Portugal. We base this conclusion on the following observations:

- The response rate was extremely low - we obtained only 5% of answers and were able to validate only 3% of them.

- On a scale from 0 to 5 the detected investments into knowledge management activities showed an average of 2.6, which is even below a medium investment level.
- On a scale from -5 to +5 the average of the detected needs for investments into knowledge was +0.4, which not really indicates a need for further investments.
- Just a handful of significant and positive relations could be detected between 16 variables representing the companies' investments and 32 variables representing the companies' performance.

This conclusion is disappointing. But in contrast to this and quite interestingly, all of the responding companies considered knowledge extremely important. They also showed a strong interest in learning about and from the outcomes of the study. This indicates that despite of all the disillusionment that global empirical findings provoke, the role of knowledge and the fact that application of knowledge management can bring some good effects are indisputable. The problem simply seems to be a lack of knowledge and understanding with the companies on how to implement knowledge management methods in a customized way. The fact that, for example, intellectual capital reports are seldom produced or even unknown at all, serves as indicator of this statement. The way to overcome this problem is to provide companies with respective information and eventually lend them a hand in managing their human resources, selecting technology or changing the organization.

Furthermore, a number of cultural or much more economically influenced differences between the levels of knowledge management maturity in German and Portuguese logistics companies turned out: In Portugal the investment in knowledge still seems to be much smaller than in Germany, whereas providing employees with access to knowledge in one or the other way is felt much more important. Consequently, with the Portuguese companies a much stronger need for investments into knowledge and knowledge management activities could be detected than with the German ones. And even more, these needs are not just significantly higher in Portugal, but they also cover more or less all kinds of knowledge management activities we were asking for. In contrast to this, German companies showed the strongest needs (at much lower level than the Portuguese companies) with those activities related to individual initiatives of the human resources outside formal structures, like e. g. self-training or sharing of best practices in informal networks.

Looking a bit more in detail at the individual knowledge management activities, again some clear difference have been identified according to investment levels, priorities and needs for investments:

- Self-training, innovation practices, participation in conferences and workshops or external knowledge sharing networks, and establishment of internal knowledge sharing networks had the highest average investment per company.
- Self-training, participation in conferences and workshops or external knowledge-sharing networks, and establishment of internal knowledge-sharing networks showed the highest average level of priority with the companies.
- Establishment of internal knowledge sharing networks or informal networks, communities of practice, and self-training finally were the items with the strongest average needs.

Although the companies' individual levels of investment and needs per item were widely varying, these average results allow to derive suggestions for fields of activities the main focus should be put on or for knowledge management projects the companies should start with. To generalize, the companies require and favour their employees' own initiatives for gaining, deepening, updating knowledge (which eventually would cost the company the least), but they also should be aware of their responsibility to provide their human resources with some freedom and time for the networking, best-practice sharing or learning activities they expect from them to the benefit of the company.

From the scientific point of view, the main message of the paper is that even if scholars consider that knowledge management and knowledge are of paramount importance in the world of today, this idea is far away from being put into common practice. That realization should bring out further studies on the use of knowledge management in society and on its implications. The biggest weakness of the study presented in this paper is the scarce number of responses. Therefore, further efforts will be spent

on extending the study to other European countries (stage 3 of the project) to achieve a bigger sample of companies insight the logistics sector. Finally, even the current results are still subject to an ongoing analysis to more clearly demonstrate similarities and differences between the German and Portuguese companies, but also to better understand the impact knowledge management has on a company's logistics performance. This might also open up the possibility to run a similar project within another business sector and to compare the results with those from the logistics sector.

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WIEDZA O ZARZĄDZANIU I LOGISTYCE: GDZIE JESTEŚMY I CO MOŻEMY OSIĄGNAĆ

STRESZCZENIE. Zgodnie z ogólnie przyjętą teorią, występujące dzisiaj procesy i systemy logistyczne charakteryzują się wzrastającą kompleksowością oraz biorąc pod uwagę efekt globalizacji, z rosnącą różnorodnością procesów logistycznych. Z tych też powodów, wiedza jest coraz bardziej strategicznym zasobem w logistyce.

Jednak niektóre pytania nadal pozostają bez odpowiedzi. Jakie jest zaawansowanie wdrożenia metod zarządzania w praktyce, w jakim stopniu poziom faktyczny inwestycji w specjalistyczną wiedzę odpowiada aktualnym priorytetów w tym zakresie, czy poczynione inwestycje w poszerzenie wiedzy o zarządzaniu wpływa na postępowanie firmy?

Aby odpowiedzieć na te pytania, przeprowadzono badania obejmujące niemieckie i portugalskie przedsiębiorstwa. Zakres tych badań obejmować zakres inwestycji w poszerzenie specjalistycznej wiedzy dotyczącej zarządzania logistycznej, potrzeby poszerzenia tej wiedzy oraz wpływ zdobytej wiedzy na sposób postępowania przedsiębiorstwa. Stworzono model uwzględniający zarządzanie poszerzaniem wiedzy oraz potencjał czynników podlegających analizie.

W rezultacie otrzymano ilościowe określenie stanu wdrożenia wiedzy o zarządzaniu w praktyce logistycznej. Wyszczególnione parę różnic pomiędzy realiami występującymi w Niemczech i Portugalii, choć stworzenie schematu uwzględniającego zastosowanie wiedzy w logistyce było trudne ze względu na małą liczbę danych.

Praca przedstawia wnioski z zastosowanej metodologii oraz listę rekomendowanych zasad, jakie zostały wypracowane w trakcie analizy.

Słowa kluczowe: zarządzanie wiedzą, inwestowanie w wiedzę, metody zarządzania wiedzą.

WISSENSMANAGEMENT UND LOGISTIK: WO WIR STEHEN UND WOHIN DIE ENTWICKLUNG GEHEN KÖNNTE

ZUSAMMENFASSUNG. Es ist eine allgemein akzeptierte Theorie, dass Logistikprozesse und -systeme heutzutage durch zunehmende Komplexität und die Notwendigkeit einer globalen Vernetzung charakterisiert sind, um die wachsende Vielfalt an logistischen Aufgaben bewältigen zu können. Aus diesem Grund wird auch in der Logistik das Wissen immer mehr zu einer wettbewerbsrelevanten strategischen Ressource. Allerdings sind in diesem Zusammenhang verschiedene Fragen noch unbeantwortet: Wie steht es um die Implementierung von Wissensmanagement-Methoden in die logistische Praxis? Inwieweit stimmt die vermeintliche (theoretische) Relevanz von Investitionen in Wissen und Wissensmanagement mit der tatsächlichen, in entsprechenden Investitionsvolumina gezeigten Priorität verschiedener Wissensmanagement-Aktivitäten überein? Wie verändert sich die (logistische) Unternehmensperformanz infolge wissensbezogener Investitionen?

Zur Beantwortung dieser Fragen ist in deutschen und portugiesischen Logistikunternehmen Befragung zur Bedeutung von Wissen und Wissensmanagement für die Realisierung der logistischen Leistungsprozesse, zum Investitionsbedarf in Wissen bzw. Wissensmanagementaktivitäten in der Logistik sowie zu der eventuell bestehenden Verbindung zwischen Wissen und Logistikleistung durchgeführt worden. Für die Analyse des Einflusses von Wissensmanagement auf die logistische Leistungsfähigkeit der Unternehmen ist ein Modell entwickelt worden, das zu einer betriebswirtschaftlichen Beurteilung und Potentialanalyse für das Wissensmanagement beiträgt.

Im Ergebnis ist eine qualitative Standortbestimmung zur Einführung und Nutzung von Wissensmanagement in der Logistikpraxis möglich geworden. Hierbei sind gravierende Unterschiede zwischen der deutschen und der portugiesischen

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Realität zutage getreten, auch wenn es schwierig war, aus der Auswertung der relativ wenigen Rückantworten statistisch gesicherte Benchmarks für den optimalen Einsatz von Wissen in der Logistik abzuleiten. Der Beitrag präsentiert die gewonnenen Schlussfolgerungen und leitet eine Reihe von Handlungsempfehlungen ab.

Codewörter: Wissensmanagement, wissensbezogene Investitionen, Wissensmanagement-Methoden.

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