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**Attitudes to the external realisation of
knowledge management tasks: reconsidering the
Not-Invented-Here (NIH) syndrome holistically**

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Attitudes to the external realisation of knowledge management tasks: reconsidering the Not-Invented-Here (NIH) syndrome holistically

Abstract

Companies may realise all major knowledge management tasks, i.e. knowledge acquisition, accumulation and exploitation, not only internally but also externally. Therefore, we propose the integrate-or-relate decision in knowledge accumulation as a complement to the well-known make-or-buy and keep-or-sell decisions in knowledge acquisition and exploitation. A key factor for taking adequate decisions, for building up appropriate organisational capabilities and for realising a firm's knowledge potentials are unbiased attitudes to the knowledge management tasks. While past research has focused on the NIH syndrome as a negative attitude to external knowledge acquisition, a more holistic view is adopted in this article by extending prior research on two dimensions. Firstly, we consider all major knowledge management tasks and do not limit our analysis to knowledge acquisition; secondly, we take into account that apart from too negative attitudes also overly positive attitudes to the external realisation of knowledge management tasks may exist. Building on prior research, we identify the following six syndromes: 'not-invented-here' vs. 'buy-in' in knowledge acquisition, 'all-stored-here' vs. 'relate-out' in knowledge accumulation and 'only-use-here' vs. 'sell-out' in knowledge exploitation. After briefly reviewing research into NIH and developing a knowledge management framework, the syndromes are defined, and possible antecedents, consequences and managerial actions are described.

1. Introduction

Along with the overall trend towards the knowledge-based economy (Harris, 2001), corporate competition has increasingly focussed on knowledge since the 1980s (Amesse and Cohendet, 2001; Lane and Lubatkin, 1998). Many companies have started strategic knowledge management initiatives and try to actively manage their knowledge assets (Nonaka and Takeuchi, 1995; Staples *et al.*, 2001; Teece, 2000). Research into corporate strategy has contributed to this trend by developing theories that acknowledge the fundamental role of knowledge in today's economy (Granstrand, 1998; Nelson and Winter, 1982; Teece *et al.*, 1997; Wernerfelt, 1984) or that even adopt a distinctly knowledge-based perspective (Grant, 1996; Spender, 1996). Moreover, various concepts and frameworks have been developed to support companies in particular knowledge management tasks, such as knowledge creation, or in knowledge management in general (Hansen *et al.*, 1999; Nonaka and Takeuchi, 1995; Probst *et al.*, 2000).

In addition to the focus on internal knowledge, there has been a considerable increase in the external acquisition and external exploitation of knowledge by which companies attempt to complement and capitalise their knowledge base (Granstrand, 2000; Kurokawa, 1997; Rivette and Kline, 2000b). Therefore, firms do not only have to guarantee an appropriate knowledge management inside their boundaries but also have to adequately manage their knowledge transactions with the environment, which are much more difficult and complex than transactions on markets for products or services (Arora *et al.*, 2001; Bidault and Fischer, 1994; Teece, 1981). In some industries, the entire knowledge creation and knowledge exploitation processes have evolved from a closed innovation model to an "era of open innovation" (Chesbrough, 2003a, p. 35), where the boundaries between a firm and its environment are rather porous. Often, external knowledge transactions do not constitute an option but a requirement and may represent an important source of competitive advantage (Amesse and Cohendet, 2001; Dyer and Singh, 1998).

To realise the opportunities that the increasing importance of knowledge in general and knowledge transactions in particular offers, companies should establish an integrated knowledge management approach, which includes the internal management of the firm's knowledge as well as the knowledge transactions with other organisations (Amesse and Cohendet, 2001; Lane and Lubatkin, 1998). Due to the growing interdependence with the environment, companies have to establish organisational processes and structures that facilitate knowledge transactions in order to cope with the new challenges. These developments do not only require new operating routines and dynamic capabilities (Zollo and

Winter, 2002) but also involve considerable changes in a company's vision, strategy and culture (Kanter, 1983). Particularly, sufficient openness of the individual employees and of the company as a whole regarding knowledge transactions is crucial for making adequate use of possible interactions with the environment. Often, specific attitudes, which were developed over years, have to be overcome because they inhibit the firm's adaptation to the new situation and lead to an underutilisation of its potentials.

For the external acquisition of knowledge, such an attitude has been described in rather detail. The expression 'not-invented-here' (NIH) syndrome (Clagett, 1967; Katz and Allen, 1982) refers to a negative attitude to knowledge that originates from a source outside of the own institution. The use of the term 'syndrome' already indicates such an attitude's negative connotation and its potential negative consequences, which above all include the rejection of external ideas, the underutilisation of the external knowledge acquisition and the resulting negative effects on performance (Katz and Allen, 1982; Mehrwald, 1999). While nearly all works in past research suppose either an ideal or a negative attitude to external knowledge, Laden (1996) describes that also too positive attitudes to the external knowledge acquisition may exist, which may have detrimental effects as well. Thus, a detailed analysis of the attitudes to external knowledge should take into account both positive and negative biases.

Apart from considering all possible attitudes to the external acquisition of knowledge, a comprehensive study of the biases regarding external knowledge should include all major knowledge management tasks, which comprise knowledge acquisition, knowledge accumulation and knowledge exploitation (Brockhoff, 1999; Garud and Nayyar, 1994; Grant, 1996; Nonaka and Takeuchi, 1995; Probst *et al.*, 2000; Spender, 1996). Therefore, the NIH syndrome is reconsidered holistically in this article differentiating between the three main knowledge management tasks on the one hand and between overly positive or negative attitudes on the other. This broad approach leads to the identification of six attitudes which differ from the ideal positions and may have negative consequences for the firm. The framework to be developed may be applied in research and practice in a descriptive and normative way because it may help to explain observed behaviour and may also be used as a basis for actively influencing the attitudes of individuals and of whole organisations. It may provide insights that help to avoid systematic mistakes in knowledge management by demonstrating non-ideal tendencies, indicating corrective actions and developing an adequate approach to the external realisation of knowledge management tasks against the background of increasing interorganisational knowledge transactions.

The remainder of the paper is structured as follows. In the next section, we present important findings of prior research into the attitudes to knowledge, particularly into the NIH syndrome. Afterwards, we develop a holistic approach to knowledge management with a special focus on the opportunities and decisions to carry out the knowledge management tasks internally or externally. Based on this knowledge management approach, we differentiate between six non-ideal attitudes and describe their antecedents, consequences and potential corrective actions. Subsequently, implications for research and practice are discussed. The final section concludes and shows directions for future research.

2. Past research

The NIH syndrome has been used in numerous works in the academic and managerial literature to describe the detrimental consequences that an overemphasis on internal knowledge may have (e.g. Brockhoff, 1997; Clagett, 1967; Cohen and Levinthal, 1990; Dodgson, 1993; Katz and Allen, 1982; Leonard-Barton, 1995; Michailova and Husted, 2003). While many of the works in which the NIH syndrome is mentioned only refer to the theoretical concept and to the negative effects of such an attitude, the number of works that specifically address the NIH syndrome as well as empirical evidence for this attitude are rather limited (Mehrwald, 1999). Nevertheless, the NIH syndrome has become a broadly established concept, and its relevance has been acknowledged by both research and practice (Mehrwald, 1999). In the following, we will specify the term 'NIH syndrome', give a brief review of the major studies on this topic and present extensions that have been made to the concept.

From the literature on the NIH syndrome, no clear insights can be derived why this attitude is specifically termed 'syndrome'. However, already Clagett (1967) states that the NIH attitude is "often spoken of as if it were a disease" (Clagett, 1967, p. II, cited in Mehrwald, 1999, p. 42) underlining its negative connotation. In their seminal work, Katz and Allen (1982) introduce the exact term 'NIH syndrome' into the literature. The use of the term 'syndrome' in the acquisition of knowledge seems to be appropriate only for situations in which a particular attitude differs from an ideal attitude, which would be based on purely rational economic considerations. Moreover, the term 'syndrome' implies that the actions that are taken as a result of the 'disease' do not occur due to serendipity but systematically, i.e. in comparable situations specific behaviours are repeated in a similar way (Mehrwald, 1999). The term 'not invented here' as opposed to 'invented here' might be used in a very narrow definition only in settings where actual inventive activities take place (Mehrwald, 1999). In a

broader approach, however, the term may generally be applied to all individuals, groups and institutions that are confronted with external knowledge and its potential acquisition. Thus, an NIH syndrome may also exist if knowledge is developed inside the own firm but e.g. by a different business or functional unit (from the perspective of a particular business or functional unit) or even by other persons in the same business unit (from the perspective of a project team).

To our knowledge, there are five major studies in prior research that specifically address the NIH syndrome (Mehrwald, 1999). The first is the master thesis of Clagett (1967), who analysed eight case studies based on the force field concept (Lewin, 1947) in order to identify reasons for the existence of the NIH phenomenon. The first work to use the exact term 'NIH syndrome' and probably the most often cited work on NIH is by Katz and Allen (1982), who refer to the NIH syndrome to explain the curvilinear relation between tenure and performance of 50 R&D project groups. De Pay (1989 & 1995a & 1995b) uses the NIH syndrome in both empirical and theoretical analyses as a factor to explain different innovation periods between firms. Boyens (1998) refers to the NIH syndrome in simulation analyses in order to identify situations in which the external commercialisation of knowledge is particularly attractive. The by far most detailed and comprehensive work on the NIH syndrome is the Ph.D. thesis of Mehrwald (1999), who carried out a questionnaire-based study directed specifically at the NIH syndrome among 51 R&D managers and 89 scientists in 53 large German companies. Table 1 gives an overview on the research design and of the definition, antecedents, consequences and possibilities to reduce the NIH syndrome that have been identified in the studies mentioned above.

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Tab. 1: Overview on major studies into the NIH syndrome in prior research (systematisation based on Mehrwald (1999), p. 42f.)

Mehrwald (1999) also represents the only work that conceptualises and operationalises the NIH syndrome in detail. In his study, the NIH syndrome is considered a multidimensional and not directly observable construct. Based on separate factor analyses of the data for the R&D managers on the one hand and the scientists on the other, the following constructs emerge. The (possibly negative) attitude of the R&D managers to external technology comprises the following four factors: a) the degree of trust in the own technological competence; b) the possibility to check potential exclusive rights of use of external technology; c) the impact of external technology on competitiveness; d) the relative performance of external technology. For the attitude of the scientists to external technology, the following five factors emerge: a)

the relative performance of external technology; b) the scientists' degree of participation in the decision-making process and the possibility to make their mark through working with external technology; c) the impact of external technology on competitiveness; d) the impact of external technology on the firm's reputation and success on the markets; e) the estimation of the management's preferences (Mehrwald, 1999). In Mehrwald's (1999) study, for 17 of the 51 R&D managers (33%) and for 33 of the 89 scientists (37%) at least some warnings of being 'infected' by the NIH syndrome could be found. Further results of Mehrwald's (1999) work are also summarised in Table 1.

Regarding the range of the attitude to external knowledge, nearly all works in the literature on the NIH syndrome limit their analysis to the negative attitude to external knowledge. Above, we have stated that the term syndrome implies a systematic deviation from an ideal economic attitude. If we take the interval $[-1;0]$ as a representation of the degree of the NIH syndrome, the value $x = 0$ would represent the ideal attitude whereas $x = -1$ would indicate the highest degree of the NIH syndrome which would refer to a general and complete rejection of any type of external knowledge. However, Laden (1996) describes that also an attitude to external knowledge may exist that systematically differs from an ideal attitude in a positive way. "[L]ess attention is directed to the other side of the coin ... When certain people in management show more interest in what is going on elsewhere than in their own laboratories. To them, 'the other person's dessert always looks better'" (Laden, 1996, p. 10).

These insights lead to a more holistic view on the NIH phenomenon and show that there is also a positive syndrome in the interval $[0;1]$ with $x = 0$ still being the ideal attitude, whereas $x = 1$ would represent a pure focus on external knowledge and the assumption that external knowledge is always superior to internal knowledge. An overly positive attitude to external knowledge has been termed 'buy-in' (BI) syndrome by Boyens (1998) as the complement to the NIH syndrome in the positive range of the interval $[-1;1]$. $X = 0$ as the ideal attitude refers to an attitude which is not biased at all and which leads to rational and well-considered decisions based on the advantages and disadvantages of internal and external knowledge acquisition in specific situations.

Apart from influencing decisions on knowledge acquisition, attitudes to knowledge may also bias decisions on the internal or external realisation of other knowledge management tasks. To our knowledge, Boyens (1998) is the only work in which the concept of the NIH syndrome is extended beyond knowledge acquisition by developing an equivalent concept for the external exploitation of knowledge. While negative attitudes to the external exploitation option were already mentioned in early works (Ford, 1985; Ford and Ryan, 1981), Boyens

(1998) coined the expression 'only-use-here' (OUH) syndrome, which refers to an attitude to the external knowledge commercialisation that is more negative than an ideal attitude would be. In analogy to the distinction between NIH and BI syndrome, the OUH syndrome is complemented by the 'sell-out' (SO) syndrome that describes an overly positive attitude to the external exploitation of knowledge (Boyens, 1998).

To sum up prior research into attitudes to the external realisation of knowledge management tasks, it has to be stated that nearly all works focus on the NIH syndrome as the negative attitude to external knowledge acquisition. Thus, they do not only neglect overly positive attitudes to external knowledge and their potential detrimental consequences but also do not consider biases regarding the realisation of other knowledge management tasks, such as knowledge exploitation. Therefore, a holistic approach to the major knowledge management tasks and to the decisions on their internal or external realisation is developed in the following section before adopting a syndrome view in section 4.

3. Holistic approach to knowledge management

Regarding the tasks and processes of corporate knowledge management, various authors make a distinction between knowledge production or generation on the one hand and knowledge application or exploitation on the other, sometimes explicitly mentioning the requirement to store relevant knowledge (Brockhoff, 1999; Garud and Nayyar, 1994; Grant, 1996; Kogut and Zander, 1992; Nonaka and Takeuchi, 1995; Probst *et al.*, 2000; Spender, 1996; Zahra and George, 2002). For example, Grant (1996b) divides knowledge production further into the generation of new knowledge, the acquisition of existing knowledge and the storage of knowledge, drawing the attention to both internal aspects of knowledge management and knowledge transactions with the firm's environment. Comparable insights may be derived from the literature on intellectual property and intellectual capital (Granstrand, 2000; Teece, 2000).

Due to the increasing importance of interorganisational knowledge transactions, a more comprehensive approach to knowledge management should take into account simultaneously internal and external knowledge management activities. In addition, such a view should incorporate all tasks of knowledge generation, knowledge storage and knowledge application. Regarding technological knowledge, Brockhoff (1999) differentiates between the acquisition, accumulation and exploitation of knowledge, which can all be realised either in an internal or external way (Fig. 1). While the internal knowledge acquisition refers to the creation of new knowledge inside the company, e.g. an invention in corporate research, the external

knowledge acquisition comprises the activities of transferring existing external knowledge into the firm. The internal knowledge accumulation refers to the storage and maintenance of knowledge inside the firm over time. In this article, we suggest that the external knowledge accumulation describes the company's knowledge resources that are embedded in its interorganisational relations, e.g. its alliances. The internal knowledge exploitation concerns the firm's activities of innovation, i.e. the application of knowledge in own products and/or services, which are then commercialised. The external knowledge exploitation describes the direct commercialisation of disembodied knowledge, e.g. licensing out specific know-how.

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Fig. 1: Major tasks and decisions in knowledge management (systematisation based on Brockhoff (1999), p. 153)

As a result of the possibility to carry out the knowledge management activities internally or externally, a company generally has a choice between two options in the realisation of each knowledge management task. While in some situations, actual 'either-or' decisions may have to be taken, it must be emphasised that especially for knowledge exploitation the internal and external modes often do not exclude each other (Ford, 1988). If a company level view is adopted, which implies a multi-project perspective, the complementary character of internal and external realisation has been confirmed also for knowledge acquisition (Veugelers and Cassiman, 1999). Nevertheless, a company always has to decide whether to develop particular competencies and carry out knowledge tasks internally or to build up different capabilities to be able to adequately manage the external realisation of certain knowledge tasks. Although a decision on single-project level may be influenced by factors that are inherent to a specific situation, a company should establish an overall knowledge strategy to address the key issues of its knowledge management activities (Ford, 1988; Grant, 1996). An example is the issue in which areas to build up knowledge internally and in which areas to acquire external knowledge, which may lead to a certain degree of dependence on external knowledge sources. Apart from the decision on which knowledge areas to base the firm's competitive advantage, the following three major decisions in knowledge management may be distinguished according to the framework developed above: make-or-buy, integrate-or-relate and keep-or-sell.

The make-or-buy decision in knowledge acquisition refers to the question whether to develop knowledge in-house or whether to acquire it from external knowledge suppliers. While internal R&D has traditionally been viewed as an important source of knowledge acquisition, an increasing inward transfer of knowledge may be observed in most companies since the

1980s (Veugelers, 1997). This has led to both a more thorough analysis of the make-or-buy issue in many companies and to renewed scientific interest in this field of research (Brockhoff, 1995; Kurokawa, 1997; Pisano, 1990; Veugelers, 1997; Veugelers and Cassiman, 1999).

The integrate-or-relate decision, which is how we term the equivalent to make-or-buy in knowledge accumulation, concerns the issue of either integrating knowledge into the firm's internal knowledge base or using interorganisational relations as an external mode of knowledge accumulation. To cope with the need of maintaining knowledge over time, companies usually focus on storing knowledge internally. This internal knowledge storage has attracted much attention of researchers (Bontis, 2001; Staples et al., 2001). However, the increase in relations with external partners, e.g. strategic alliances or virtual enterprises (Gulati, 1998; Weisenfeld et al., 2001), opens up new possibilities of knowledge accumulation, which have long been neglected. Following the insights of Dyer and Singh (1998), Gulati et al. (2000) and Grant and Baden-Fuller (2004), who describe in detail that critical resources of a firm may span its boundaries, we propose that interorganisational relations could be regarded as an external mode of knowledge accumulation. Accordingly, companies do not have to immediately absorb the knowledge of their partners, but they may set up an alliance agreement to guarantee privileged access to the partner's knowledge. This knowledge will be transferred to the firm's internal knowledge base at a later point of time, e.g. when the knowledge is actually needed in the internal processes of the company or when it has been further developed by the partner to be ready for use. While obviously not all alliance agreements may be regarded primarily as external modes of knowledge accumulation, some types of agreements in particular industries will often follow this new logic, e.g. agreements between large pharmaceutical companies and biotechnology start-up companies (Chesbrough, 2003a; Grant and Baden-Fuller, 2004).

The keep-or-sell decision in knowledge exploitation refers to the question whether knowledge should be applied in the firm's own products and services or whether it is commercialised, additionally or exclusively, in disembodied form. Although the focus of traditional business strategies has been on the internal use of knowledge, the external mode of knowledge commercialisation, e.g. through licensing-out activities, was also used to a limited degree in the past. In recent years, however, a considerable trend towards a more active use of the external knowledge exploitation could be observed (Rivette and Kline, 2000b). While many companies are still quite reluctant with regard to commercialising knowledge externally, some pioneering firms, such as IBM, already realise enormous strategic and monetary benefits from

the external exploitation mode (Kline, 2003). As this development is a trend from practice rather than a movement initiated by academic research, scientific interest in the external exploitation of knowledge and in the resulting keep-or-sell issue has grown only recently (Granstrand, 2004; Koruna, 2004; Tschirky *et al.*, 2000).

With regard to the decisions on carrying out the three major knowledge management tasks internally or externally, individuals will have attitudes that might favour a particular realisation mode and will thus be different from an ideal economic attitude. Similarly, a company as a whole may tend to realise some knowledge management tasks in a way that differs from the realisation mode to be chosen based on purely rational considerations. As past research has largely focused on negative attitudes to external knowledge acquisition representing the NIH syndrome, a more comprehensive view is adopted in the following section to include all major knowledge management tasks as well as both positive and negative attitudes to external knowledge.

4. Reframing and extending NIH

The view that is developed in this section may be applied to knowledge management decisions on the level of individuals, groups, business units, firms and even on interorganisational level, e.g. to joint ventures. For individuals, business units and firms generally all three knowledge management tasks, i.e. knowledge acquisition, accumulation and exploitation, are important which is why all attitudes to the external realisation of knowledge management tasks may become relevant depending on the situation. Project groups, such as the R&D project groups in the work of Katz and Allen (1982), however, are usually occupied with a well defined task, e.g. R&D project groups concentrate on knowledge acquisition. The same is true for a large part of interorganisational relations, which are often limited to specific activities. In these cases, only the attitudes that refer to the knowledge management task in question will be relevant.

Based on the differentiation between overly positive and overly negative attitudes on the one hand (see section 2) and between three major knowledge management tasks on the other (see section 3), we have identified the following six syndromes as an extension of prior research into the NIH syndrome: 'not-invented-here' vs. 'buy-in' in knowledge acquisition, 'all-stored-here' vs. 'relate-out' in knowledge accumulation and 'only-use-here' vs. 'sell-out' in knowledge exploitation (Fig. 2). In the following, each syndrome is defined, and its possible antecedents and consequences are described. Finally, potential managerial actions to reduce the negative consequences are presented. These managerial actions are not necessarily aimed

at influencing and changing the attitudes to external knowledge, they rather constitute means to diminish their negative effects. As it is hardly possible to cover all aspects exhaustively, our analysis, which is based on existing findings from different fields of research, focuses on the factors that are most important for management in practice.

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Fig. 2: Major positive and negative attitudes to the external realisation of knowledge management tasks

Based on the work of Katz and Allen (1982), Boyens (1998) and Mehrwald (1999), the '**not-invented-here**' (NIH) syndrome is defined as an attitude to the external acquisition of knowledge that is more negative than an ideal economic attitude would be. The NIH syndrome often arises due to a lack of experience or due to negative experience with external knowledge acquisition, which results in resistance to external knowledge (Mehrwald, 1999). Moreover, it may be influenced by the social environment of an individual or of a group of persons, e.g. by the attitudes of colleagues (Mehrwald, 1999). Also incentive systems that reward internal inventive activities and do not take into account a successful acquisition of external knowledge may support NIH tendencies (de Pay, 1989; de Pay, 1995a; de Pay, 1995b; Mehrwald, 1999).

Regarding its consequences, the NIH syndrome may result in the underutilisation of external knowledge, which may lead to inflexibility and may prevent the realisation of potentials that are based on a combination of internally and externally acquired knowledge. Furthermore, the NIH syndrome may lead to inappropriate generalisations and evaluations of external knowledge and to delays or complete failures in the innovation process (Mehrwald, 1999). To avoid these negative consequences, an appropriate information and communication inside the company is required to convince all persons that are involved in the application of the external knowledge of its advantages (Clagett, 1967; de Pay, 1989). Furthermore, adequate organisational structures and incentive systems as well as the existence of informal gatekeepers and promoters, who support the external knowledge acquisition, constitute appropriate managerial actions to reduce the NIH syndrome (Cohen and Levinthal, 1990). Although gatekeepers and promoters may hardly be managed directly due to their informal roles, their emergence may contribute considerably to a more open approach to external knowledge acquisition. Finally, management may attempt to directly influence the attitude of individuals by increasing their experience with external knowledge or by communicating other persons' positive experiences (Mehrwald, 1999).

Following the works of Boyens (1998) and Laden (1996), the **'buy-in'** (BI) syndrome is defined as an attitude to the external acquisition of knowledge that is more positive than an ideal economic attitude would be. The BI syndrome may be the result of a lack of confidence in the company's own capabilities combined with an overestimation of the potential of external knowledge, which may be caused by an exaggerated presentation of the positive characteristics of the external knowledge by the potential knowledge supplier (Boyens, 1998). Other reasons may be the aim to reduce complexity by purchasing external knowledge, whose functioning may have already been proven (Laden, 1996). In these situations, the difficulties inherent to knowledge transfer and absorption are often underestimated (Boyens, 1998). Other antecedents could be the positive experience with externally acquired knowledge and a good technological reputation of the potential knowledge supplier.

Possible negative consequences of the BI syndrome are inappropriate assessments of external knowledge, which result in a too frequent use of external knowledge acquisition and in a lack of differentiation from competitors. Moreover, difficulties in coordinating the contributions of numerous knowledge suppliers in the innovation process may emerge. In the long term, the BI syndrome may lead to dependence on external knowledge and, following the absorptive capacity concept (Cohen and Levinthal, 1990), to a lack of prior knowledge that is necessary to successfully recognise and absorb external knowledge. Neglecting internal inventive activities may finally result in the failure to build up a strong intellectual property portfolio which will negatively affect particularly the firm's external knowledge commercialisation potential (Rivette and Kline, 2000b). To avoid these negative effects, it is necessary to carry out a detailed assessment of the external knowledge, of its potential imperfections and of the difficulties of transferring and applying the knowledge inside the company. Interface problems and increasing coordination requirements should receive particular attention. Moreover, champions and promoters that support internal inventive activities may help to overcome BI tendencies and to avoid disadvantageous dependencies on external partners (Hauschildt and Kirchmann, 2001).

The **'all-stored-here'** (ASH) syndrome is defined as an attitude to the external accumulation of knowledge that is more negative than an ideal economic attitude would be. Apart from the traditional focus on internal knowledge accumulation and difficulties in regarding interorganisational relations as external mode of knowledge accumulation, negative experiences with such relations will favour the ASH syndrome. Further antecedents may be an overemphasis on the problems of managing these relations and a disregard of the learning effects that may be realised in managing various collaborations over time (Gulati, 1999; Kale

et al., 2002). Additional aspects could be confidentiality considerations and a lack of trust in current or potential partners.

The ASH syndrome will usually lead to a suboptimal use of interorganisational relations as a means to extend the firm's internal knowledge base, which will limit its strategic flexibility. Due to the need of storing all knowledge internally, more attention has to be paid to internal knowledge management to avoid problems in this field. Moreover, the ASH syndrome may result in the failure to identify new business ideas, which may arise from an appropriate combination of internally and externally accumulated knowledge. Similar to the NIH syndrome, gatekeepers and promoters may help to overcome the traditional focus on internal knowledge storage and to support this new approach to interorganizational relations. In addition, appropriate organisational structures, e.g. a dedicated alliance unit (Dyer et al., 2001), and a stronger coordination and integration of a firm's internal and extended knowledge base may help to diminish the ASH syndrome.

The '**relate-out**' (RO) syndrome is defined as an attitude to the external accumulation of knowledge that is more positive than an ideal economic attitude would be. The RO syndrome could arise due to a strong focus on core competencies and an overemphasis on strategic flexibility, which might lead to a relatively small internal knowledge base. To cope with the growing knowledge convergence and knowledge fusion (Kodama, 1992; Levinthal, 1998), a company may establish a large number of interorganisational relations which might be particularly beneficial in situations of high technological complexity and insecurity. Further factors leading to the RO syndrome could be an underestimation of the interface problems inherent to these collaborations and insufficient assessments of interorganisational relations, particularly regarding their costs.

As a consequence of the RO syndrome, a company may fail to build up a strong and broad internal knowledge base, which may lead to dependencies on external partners. In the long term, such a failure may result in a lack of prior knowledge required for the identification of external knowledge, of potential knowledge sources and of new business opportunities (Cohen and Levinthal, 1990). Furthermore, the RO syndrome and the resulting large number of external linkages will usually lead to higher interface problems and coordination requirements because apart from the direct relations between the company and its partners both positive and negative synergies between the relations may exist as research into networks and alliance portfolios shows (Lichtenthaler and Lichtenthaler, 2004). In addition, cultural problems and difficulties regarding the identity of the firm may emerge as a result of the lacking large internal knowledge base and its integrative function. To overcome the RO

syndrome, companies should carry out tough and detailed assessments of all interorganisational relations (Brockhoff and Teichert, 1995). Furthermore, a centralised control and management approach to the external linkages may help to diminish the potential negative effects (Dyer et al., 2001). Based on the definition of its competitive advantage and of its core capabilities, a company should also define critical knowledge areas, where knowledge should be accumulated internally to gain and sustain competitive advantage and to avoid detrimental dependencies on external knowledge.

Building on the work of Boyens (1998), the 'only-use-here' (OUH) syndrome is defined as an attitude to the external exploitation of knowledge that is more negative than an ideal economic attitude would be. Apart from the traditional focus on internal knowledge exploitation and a lack of experience with external knowledge exploitation, the fear of strengthening competitors and negatively affecting the company's core competencies is the main reason for the OUH syndrome (Boyens, 1998). Additional reasons could be the supposed legal and organisational difficulties of commercialising disembodied knowledge (Boyens, 1998) and the influence of other persons in an individual's social environment. Similar to the NIH syndrome, inadequate incentive systems that reward only internal innovations may favour the development of OUH tendencies.

Severe consequences of the OUH syndrome are the incomplete exploitation of a firm's knowledge base and the underutilisation of the monetary and strategic potentials inherent to the external commercialisation of knowledge. An example of the inability to use the strategic benefits of the external knowledge exploitation could be the failure to establish industry standards based on the company's own technologies. Moreover, firms that resist to commercialise disembodied knowledge may have difficulties with gaining access to external knowledge, which is sometimes possible only through bi-directional knowledge transfers, e.g. cross-licensing agreements. To avoid these negative consequences, companies might establish appropriate incentive systems that take into account both monetary and strategic aspects of the external knowledge exploitation. In the long run, this may help to change both behaviours and even corporate culture to consider external commercialisation as a rule rather than as an exception. Furthermore, management may communicate the great benefits that pioneering firms realise by commercialising disembodied knowledge. Finally, firms may use external knowledge exploitation gatekeepers and promoters to support the external exploitation mode and may set up dedicated organisational units to institutionalise the external knowledge exploitation process.

Following the definition of Boyens (1998), the 'sell-out' (SO) syndrome is defined as an attitude to the external exploitation of knowledge that is more positive than an ideal economic attitude would be. Main reasons of the SO syndrome are an overvaluation of the monetary and strategic potentials of the external knowledge exploitation and an undervaluation of the potential negative consequences for the internal knowledge exploitation. Moreover, financial pressure on R&D and intellectual property departments as a result of value-based management approaches as well as companies' aim to follow the pioneering firms in the external knowledge commercialisation may favour the emergence of an SO syndrome. The probably most important factor, however, are misjudgements of the managerial difficulties in the external knowledge exploitation process, particularly regarding the identification of exploitation opportunities and of potential partners (Sullivan and Fox, 1996).

Major negative consequences of the SO syndrome may be seen in its potentially detrimental effects on the firm's core business, i.e. the commercialisation of its products and/or services, caused by a deterioration of the firm's position relative to its competitors in particular knowledge areas. Furthermore, an overemphasis on the external exploitation mode may result in a failure to develop a deep understanding of specific markets for products and/or services and, in the long term, to difficulties with building up new business areas (Boyens, 1998). To avoid these negative consequences, companies should define exactly their key capabilities and broadly communicate this understanding inside the firm. Furthermore, they may carry out a strict control of all external knowledge commercialisation activities which is usually facilitated by a centralised organisational approach. Finally, a stronger focus on the development of new internal businesses and a closer coordination between the internal and external exploitation activities to guarantee an optimisation of the overall results for the company will help to reduce the detrimental effects of an SO syndrome.

--- (Tab. 2 about here) ---

Tab. 2: Overview on the attitudes to the external realisation of knowledge management tasks

The discussion of the six syndromes, their possible antecedents, consequences and appropriate managerial reactions (Table 2) has shown that there is a mutual dependence between the attitudes to external knowledge and the experience of an individual or a company with the underlying knowledge management task. As a focus of corporate business strategies on the internal or external realisation of particular knowledge management tasks results in learning effects in these tasks (Cohen and Levinthal, 1990; Zahra and George, 2002), a firm's prior use of an internal or external realisation option will affect its competence level in this

activity. Moreover, it will also influence employees' familiarity with this task and their opinion regarding the viability of the particular option against the background of corporate strategy. Due to this interdependence, there will usually be path-dependencies in the development of organisational capabilities in the respective knowledge management tasks as well as in the attitudes to the external realisation of these tasks.

For the NIH syndrome, this observation was already made by Clagett (1967), who states that "N.I.H. is made not born" (Clagett, 1967, p. 29, cited in Mehrwald, 1999, p. 42). If, for example, a company intensely used the external acquisition of knowledge in the past, it will have acquired at least partially positive experiences and will have built up sufficient absorptive capacity as a dynamic organisational capability of recognising and absorbing external knowledge (Cohen and Levinthal, 1990; Zahra and George, 2002). This will normally influence corporate culture and the attitudes of the employees towards a more open approach to external knowledge acquisition which will reduce the probability of an NIH syndrome.

Regarding the potential consequences of the syndromes, their effects depend a lot on the specific knowledge management task. However, common characteristics are the resulting misvaluations of benefits and costs of the internal and external realisation modes, which lead to systematically irrational behaviour and systematically wrong decisions. Although the actual effects will vary considerably, this irrational behaviour may often result in severe problems in the long term. Due to the fact that these attitudes usually constitute elements of the subconscious of individuals, the different syndromes may remain unnoticed for a long time. Moreover, in a group of people with similar attitudes existing tendencies may often increase which may be aggravated by prior routines and corporate culture (Mehrwald, 1999). Against the background of a growing importance of the external realisation of knowledge management tasks, an active management of a company's overall attitudes to knowledge seems inevitable. At the same time, an adequate approach to this issue may provide an important source of competitive advantage.

Similar to the potential consequences of the knowledge syndromes, appropriate managerial responses are quite diverse. However, some general reactions may be identified. One means are adequate incentive systems that reward the successful realisation of both internal and external knowledge management tasks. Moreover, appropriate organisational structures may help to diminish the negative effects of the syndromes. These organisational factors include many different aspects, such as dedicated organisational units. Despite their informal roles (Ernst and Lechler, 2003), champions and gatekeepers may contribute considerably to more

balanced attitudes to the external realisation of knowledge management tasks. Finally, a holistic management approach that explicitly takes into account both the different options to realise the knowledge management tasks and potential biases regarding their use will reduce the risks of the syndromes simply by facilitating a higher awareness of the managerial challenges. Furthermore, a holistic management approach will usually lead to a closer coordination of the internal and external realisation options on the one hand and of the three major knowledge management tasks on the other.

Regarding the effectiveness of these managerial actions, no general statements may be derived because the effectiveness will differ considerably from situation to situation. If a company, for example, has carried out hardly any external knowledge acquisition in the past, the existence of an NIH syndrome is rather likely. However, reducing the NIH syndrome will probably be relatively easy in such a situation because by carrying out a small number of successful external knowledge acquisition projects, the negative attitude is likely to change rather quickly. If a company, however, was actively acquiring large amounts of external knowledge in the past, it will be much more difficult to 'cure' a possible NIH syndrome due to the different prior experiences and the path-dependent cultural and subconscious character of such an attitude. Therefore, corporate initiatives to change existing attitudes or at least the resulting behaviours have to be designed to address the specific situation considering particularly the dynamic path-dependent aspects of the attitudes to externally realising the knowledge management tasks.

5. Discussion

The approach developed in this paper advances prior research by developing a holistic perspective on the attitudes to external knowledge. By taking into account the internal and external mode of realising all major knowledge management tasks, a realistic view on performing these activities in today's knowledge-intensive companies has been adopted (Chesbrough, 2003a). For making adequate use of the new opportunities that result from an increasing flexibility between markets and hierarchical forms of coordinating knowledge management activities, companies have to develop appropriate organisational capabilities to carry out these knowledge management tasks. Due to the interdependence between such capabilities and the attitudes to knowledge, companies have to be aware of the consequences of inadequate attitudes, which may prevent the development of appropriate organisational capabilities. Building on the insights of research into the NIH syndrome, a more

comprehensive view has been developed which may help to discover inappropriate attitudes, to avoid systematic mismanagement and to initiate corrective actions.

Above, it has been stated that following research into the NIH syndrome the view on the attitudes to external knowledge may be applied to different organisational levels, such as individuals, project teams, business units, etc. Thus, it is necessary to underline that internal knowledge from a firm level perspective may constitute external knowledge for a particular business unit or project group because it has been developed by a different business unit or project group. Accordingly, the syndromes may occur between organisational units of one single company.

However, it is the existence of syndromes on the company level that seems to be most critical. Similar to research into success factors of new product development on the project level, analyses of the attitudes to external knowledge on the project level may miss important antecedents and consequences of the attitudes on the company level (Cooper and Kleinschmidt, 1995; Ernst, 2002). While irrational behaviour of individuals or project teams may be identified by internal comparisons and benchmark analyses, syndromes that cover large parts of a company and thus may be inherent to corporate culture may often only be identified through developments in the environment of the firm. For example, a main reason why many firms started to carry out proactive external knowledge commercialisation activities, with which they try to overcome the overemphasis on internal knowledge exploitation and the underlying OUH syndrome, are the examples of pioneering companies in this area (Chesbrough, 2003b; Koruna, 2004). Therefore, future research should explicitly take into account the company-wide cultural aspects of the syndromes and the potential reinforcing effects that may arise in situations where various subjects with similar attitudes collaborate. Particular attention should be paid to the dynamic character and path-dependencies in the development of the attitudes to external knowledge.

Regarding the process-spanning view that takes into account knowledge acquisition, accumulation and exploitation, the attitudes to external knowledge do not necessarily have to be consistent along the whole process. While in the past, most companies followed a “closed innovation model” (Chesbrough, 2003a, p. 36) limiting their knowledge management activities to the internal modes, a trend towards the “era of open innovation” (Chesbrough, 2003a, p. 35) may be recognised. However, this trend has not equally affected all knowledge management activities. Since the 1980s, a growing tendency to acquire knowledge externally may be observed (Pisano, 1990; Veugelers, 1997), but only since the 1990s the external exploitation of knowledge has become a broader trend (Koruna, 2004; Rivette and Kline,

2000a). The view of considering interorganisational relations as an external mode of knowledge accumulation and the resulting integrate-or-relate issue has been developed in this paper and has been adopted in practice only in some well-defined industries.

The fact that knowledge acquisition was often the first knowledge management task to be carried out externally may help to explain the attention that the NIH syndrome has received in the existing literature, whereas the other syndromes have largely been neglected. Due to the awareness of the NIH syndrome and the growing external knowledge acquisition, many companies will have moved from a rather negative to a more neutral attitude to external knowledge acquisition. Regarding knowledge exploitation, a similar tendency may be observed with a considerable time lag which is why at the moment many companies try to overcome the OUH syndrome in order to realise the benefits that an external exploitation of knowledge offers (Kline, 2003). Concerning knowledge accumulation, there seems to be still a rather strong focus on the internal realisation mode; interorganisational relations are often still regarded as means to directly acquire or transfer knowledge. In a process-spanning view, most companies will therefore still tend to negative attitudes rather than overly positive attitudes to the external realisation of knowledge management tasks on firm level. This may also be due to the fact that the negative consequences of overly positive attitudes, such as the SO syndrome, are often more visible than the negative effects of the overly negative attitudes, such as the OUH syndrome.

Nevertheless, there are various examples of companies that seem to have both positive and negative attitudes to the external realisation of knowledge management tasks depending on the particular task. For example, Xerox as a research-driven company focused mainly on the internal knowledge acquisition in the past which might indicate an NIH syndrome. It also stored nearly all relevant knowledge internally, which may indicate an ASH syndrome, but it failed to build up promising new internal businesses by relying too much on external knowledge exploitation through spin-off companies, which could indicate an SO syndrome (Chesbrough, 2002). However, not all aspects of this behaviour may be traced back to the underlying syndromes. Due to the interdependence between the attitudes to external knowledge and the organisational capabilities to realise the knowledge management tasks, multiple factors have to be considered, particularly corporate strategy. Xerox' focus on internal knowledge acquisition, for example, was a deliberate action based on general strategic decisions (Chesbrough, 2002). Also its external knowledge exploitation activities were based on a series of corporate initiatives. Nevertheless, it seems that they have led to lost opportunities by resulting in a failure to build up new internal business areas (Chesbrough,

2002) which may be regarded as an indication of an overemphasis on external knowledge exploitation.

Due to the interdependence between the knowledge syndromes, organisational capabilities and corporate strategy, it is difficult to define exact objectives for the values of the different syndromes. An ideal economic attitude to external knowledge will not only be hard to achieve in practice, it will even be difficult to define and operationalise. Thus, a firm might determine adequate ranges in which the attitudes should be situated. The deviations from the ideal neutral attitude that may be tolerated will largely depend on corporate knowledge strategy, which itself may be influenced by various factors, such as the technological environment in a particular industry. However, also considerable intra-industry differences may be observed. While Lucent Technologies, for example, devoted enormous resources to internal knowledge acquisition, Cisco Systems acquired major parts of its knowledge from outside sources, usually by investing in or partnering with start-up companies (Chesbrough, 2003a). Lucent's strategy would probably have been successful also with a certain degree of NIH syndrome, whereas already relatively weak NIH tendencies would have caused severe problems at Cisco. Accordingly, it has to be stated that attitudes that considerably differ from the ideal attitude will normally also have considerable negative consequences for the firm which is why in these cases managerial action should be taken. Minor tendencies, however, do not necessarily have to lead to detrimental effects, particularly if they correspond to the firm's corporate strategy and organisational capabilities.

6. Conclusion

As competition is becoming increasingly knowledge-based, companies have to develop organisational capabilities to adequately carry out the major knowledge management tasks, i.e. knowledge acquisition, accumulation and exploitation. Due to the possibility to realise these tasks internally or externally, appropriate attitudes to their external realisation are required to benefit from the opportunities that the external options offer. The six syndromes that have been identified as overly positive or negative attitudes to the external realisation of the three knowledge management tasks may be applied in both research and practice. They may be used in a descriptive way to explain observed behaviour but also in a normative way to indicate the need to change some of a firm's attitudes. Accordingly, possible antecedents, consequences and managerial actions have been identified.

While attitudes originally refer to individuals, we followed existing research into the NIH syndrome which allowed us to apply the syndromes also to different levels, such as project

teams. In this context, it has been shown that syndromes on the corporate level may probably cause the most severe difficulties. Concerning the degree of the syndromes, it is not possible to make general statements regarding the issue which levels may be tolerated and which levels require corrective actions. This is particularly due to the fact that there are strong interdependencies between the potential syndromes and a firm's corporate strategy and organisational capabilities. However, the general relevance of the attitudes to the external realisation of the knowledge management tasks will continue to grow as the importance of the external realisation options increases. The approach developed in this article seems to provide an appropriate framework in order to avoid systematic mismanagement and to facilitate the realisation of a firm's overall knowledge potentials.

A particularly promising path for future research may be seen in a more thorough analysis of the interdependencies between a firm's corporate strategy, organisational capabilities and attitudes to external knowledge. Moreover, large-scale empirical studies that focus on individual syndromes, such as the work of Mehrwald (1999) on the NIH syndrome, or that take into account all possible attitudes may lead to interesting insights that are valuable for both research and practice.

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Tab. 1: Overview on major studies on the NIH syndrome in prior research (systematisation based on Mehrwald (1999), p. 42f.)

Author(s)	Research design	Definition of NIH	Antecedents of NIH	Consequences of NIH	Reduction of NIH
Clagett (1987)	Based on interview data, 8 case studies of successful and unsuccessful implementations of process innovations developed in the central R&D unit of a large US-based firm at different production sites	"Not Invented Here (N.I.H.) has been used among technical organizations as a shorthand to describe the attitude (often spoken of as if it were a disease) of technical organizations who resist adoption of an innovation proposed from a source outside of the organization." (Clagett, 1987, p. ii, cited in Mehrwald, 1999, p. 42)	<ul style="list-style-type: none"> Resistance to external technology due to violation of the identity of the own organisational unit Resistance to any change of the familiar working situation "N.I.H. is made not born" (Clagett, 1987, p. 29, cited in Mehrwald, 1999, p. 42) 	<ul style="list-style-type: none"> Ultimate failure of the implementation of external technologies 	<ul style="list-style-type: none"> All persons involved in the implementation of external technologies should be integrated into the decision-making process and informed as early as possible Use of technological gatekeepers Use of champions/promoters
Katz/Allen (1982)	Survey among N=345 R&D professionals in 50 project groups of a large US-based corporate R&D facility	"The Not Invented Here Syndrome is defined as the tendency of a project group of stable composition to believe it possesses a monopoly of knowledge of its field, which leads it to reject new ideas from outsiders to the likely detriment of its performance." (Katz/Allen, 1982, p. 7)	<ul style="list-style-type: none"> The aim to reduce stress and insecurity in the working environment leads to routines and relatively rigid notes in stable project teams The confrontation with external knowledge sources disturbs the intended routines 	<ul style="list-style-type: none"> Forms of communication that are critical for project performance are used less often in teams that collaborate in stable composition longer than 2.5 years in average The project performance of teams that collaborate in stable composition longer than 5 years in average diminishes 	<ul style="list-style-type: none"> Mean tenure of project team members should be about 3 years The standard deviation of the tenure should be moderate (tenure between 1.5 and 5 years)
De Pay (1989 & 1995a & 1995b)	<ul style="list-style-type: none"> Comparison of the innovation processes of 9 German and 6 US firms using questionnaire-based interview data Simulation analyses 	Following largely the definition of Katz/Allen (1982)	<ul style="list-style-type: none"> Problems in intraorganisational communication Reward and incentive systems in Germany and in the US reinforce the culture-based individualist attitude 	<ul style="list-style-type: none"> Project delays as a result of longer time intervals needed for the acquisition of external knowledge 	<ul style="list-style-type: none"> All persons involved in the innovation process should be integrated and informed as early as possible Use of gatekeepers, etc.
Boyens (1986)	Simulation analyses based on static and dynamic models with one and two firms	Following largely the definitions of Katz/Allen (1982) and Kanter (1983): "... organization units want to do things their own way and are reluctant to adopt somebody else's solution." (Kanter, 1983, p. 268)	<ul style="list-style-type: none"> Following largely the insights of Katz/Allen (1982) Cultural aspects based on the works of de Pay 	<ul style="list-style-type: none"> Different consequences depending on the type of model used for the simulation analysis 	<ul style="list-style-type: none"> No specific concepts are proposed but identification of situations in which a reduction of the NIH syndrome is particularly beneficial
Mehrwald (1999)	Questionnaire-based study among 51 R&D managers and 89 scientists in 53 large German companies; conceptualisation and operationalisation of the NIH syndrome	An NIH syndrome represents a negatively biased, invalid, generalising and rigid attitude of individuals or groups to externally developed technology, which may lead to an economically detrimental neglect or suboptimal use of external technology (translated from Mehrwald, 1999, p. 50 by the author)	<ul style="list-style-type: none"> Striving for cognitive organisation and reduction of insecurity Striving for positive individual and social identity Negative experiences with external technologies No experience at all with external technologies Motivation and incentive systems that focus on internal technology development Set of beliefs that supports negative attitudes to external knowledge Social environment of an individual 	<ul style="list-style-type: none"> Wrong evaluations of external technology Neglect or suboptimal use of external technology Generalisation about different external technologies Accentuation of the generalised differences between internal and external technologies 	<ul style="list-style-type: none"> Gaining experience with external technology through confrontation with external technology and its application Persuasive communication: communicating other persons' positive experiences with external technology to the person in question Adequate incentive systems, which may not lead to a change of attitudes but at least to a change of behaviour

Fig. 1: Major tasks and decisions in knowledge management (systematisation based on Brockhoff (1999), p. 153)

	Knowledge acquisition	Knowledge accumulation	Knowledge exploitation
Internal	Make	Integrate	Keep
	— or —	— or —	— or —
External	Buy	Relate	Sell

Fig. 2: Major positive and negative attitudes to the external realisation of knowledge management tasks

	Knowledge acquisition	Knowledge accumulation	Knowledge exploitation
Internal	NIH	ASH	OUH
External	BI	RO	SO

The table illustrates the relationship between internal and external attitudes for three knowledge management tasks. In the 'Knowledge acquisition' column, the internal attitude is NIH (Negative Internal Hostility) and the external attitude is BI (Business Incentive), with a double-headed arrow between them. In the 'Knowledge accumulation' column, the internal attitude is ASH (Ambivalent Self-Help) and the external attitude is RO (Resource Orientation), with a double-headed arrow between them. In the 'Knowledge exploitation' column, the internal attitude is OUH (Organizational Unhealthy) and the external attitude is SO (Social Orientation), with a double-headed arrow between them.

Tab. 2: Overview on the attitudes to the external realisation of knowledge management tasks

Syn-drome	Definition	Possible antecedents	Potential consequences	Potential managerial actions
Not-invented-here (NIH)	The NIH syndrome is defined as an attitude to the external acquisition of knowledge that is more negative than an ideal economic attitude would be.	<ul style="list-style-type: none"> No or negative experience with external technology acquisition (Mehrwald, 1999) Inadequate incentive systems (De Pay, 1989; Mehrwald, 1999) Influence of social environment (Mehrwald, 1999) Aim to reduce insecurity (Katz/Allen, 1982; Mehrwald, 1999) 	<ul style="list-style-type: none"> No or suboptimal use of external technology resulting in inflexibility and preventing the realisation of the firm's potentials (Mehrwald, 1999) Failure to implement external technologies (Clagett, 1982; De Pay, 1989) Failures or delays in the innovation process (Katz/Allen, 1982; De Pay, 1989) Inappropriate evaluations of external technology (Mehrwald, 1999) Generalisation about different external technologies (Mehrwald, 1999) Failure to identify new business ideas, which may result from a combination of internal and external knowledge 	<ul style="list-style-type: none"> Adequate information and integration of all persons involved in the implementation of external technologies (Clagett, 1987; De Pay, 1989) Appropriate incentive systems (Mehrwald, 1999) Adequate organisational structures considering individual attitudes and interpersonal effects, e.g. composition of project teams (Katz/Allen, 1982) Use of technological gatekeepers, champions and promoters (Clagett, 1987; De Pay, 1989) Influencing the attitude of individuals through increasing their experience with external technology or through communicating other persons' positive experiences (Mehrwald, 1999)
Buy-in (BI)	The BI syndrome is defined as an attitude to the external acquisition of knowledge that is more positive than an ideal economic attitude would be.	<ul style="list-style-type: none"> Lack of confidence in the company's own capabilities in a particular knowledge area (Boyens, 1998) Underestimation of the difficulties inherent to knowledge transfer (Boyens, 1998) Overestimation of the potential of external knowledge maybe due to an overly positive presentation by the knowledge source (Boyens, 1998) The feasibility of external technology may have already been proven (Laden, 1996) Positive experience with external knowledge acquisition Aim to reduce complexity Reputation of the knowledge source 	<ul style="list-style-type: none"> Too frequent use of external knowledge acquisition resulting in lack of differentiation from competitors Difficulties in coordinating the contributions of numerous knowledge suppliers in the innovation process Underestimation of the importance of internal R&D for both internal developments and the absorption of external knowledge (absorptive capacity) Inappropriate evaluations of external knowledge Failure to build up a strong intellectual property portfolio, which will negatively affect the external knowledge commercialisation potential Dependence on external knowledge suppliers 	<ul style="list-style-type: none"> More detailed evaluation of external knowledge and its potential imperfections (Laden, 1996) Specifying the difficulties of knowledge transfer Analysing in detail interface problems and coordination requirements Use of champions and promoters
All-stored-here (ASH)	The ASH syndrome is defined as an attitude to the external accumulation of knowledge that is more negative than an ideal economic attitude would be.	<ul style="list-style-type: none"> Traditional focus on internal knowledge accumulation No or negative experience with interorganisational relations Overemphasis on problems in managing interorganisational relations Lack of trust in (potential) partners Confidentiality considerations 	<ul style="list-style-type: none"> No or suboptimal use of interorganisational relations for external knowledge accumulation resulting in inflexibility Limitation of the firm's knowledge to its internal knowledge base Increasing difficulties with internal knowledge management Failure to identify new business ideas, which may result from an adequate combination of internally and externally accumulated knowledge 	<ul style="list-style-type: none"> New approach to interorganisational relations based on a knowledge accumulation perspective Stronger coordination and integration of a firm's internal and extended knowledge base Adequate organisational structures, e.g. dedicated alliance unit Use of gatekeepers, champions and promoters

Tab. 2: Overview on the attitudes to the external realisation of knowledge management tasks (continued)

Syn-drome	Definition	Possible antecedents	Potential consequences	Potential managerial actions
<p>Relate-out (RO)</p>	<p>The RO syndrome is defined as an attitude to the external accumulation of knowledge that is more positive than an ideal economic attitude would be.</p>	<ul style="list-style-type: none"> ▪ Strong focus on core competencies ▪ Overemphasis on flexibility ▪ Underestimation of interface problems ▪ Lack of detailed assessment of interorganisational relations, particularly regarding their costs ▪ High technological complexity and insecurity 	<ul style="list-style-type: none"> ▪ Failure to build up a strong and broad internal knowledge base ▪ Lack of prior knowledge required for the identification of external opportunities ▪ Increasing coordination and interface problems ▪ Cultural problems ▪ Dependence on external partners 	<ul style="list-style-type: none"> ▪ Tough and detailed assessment of all interorganisational relations ▪ Centralised management and control of interorganisational relations ▪ Based on core competencies, definition of critical knowledge areas where knowledge should be built up internally
<p>Only-use-here (OUH)</p>	<p>The OUH syndrome is defined as an attitude to the external exploitation of knowledge that is more negative than an ideal economic attitude would be.</p>	<ul style="list-style-type: none"> ▪ Overemphasis on strengthening competitors and negatively affecting core competencies (Boyens, 1998) ▪ Supposed legal and organisational difficulties of commercialising disembodied knowledge (Boyens, 1998) ▪ Traditional focus on internal knowledge exploitation ▪ No or little experience with external knowledge commercialisation ▪ Inadequate incentive systems ▪ Influence of social environment 	<ul style="list-style-type: none"> ▪ Underutilisation of the monetary and strategic potentials inherent to the external knowledge commercialisation ▪ Underutilisation of the intellectual property portfolio ▪ Failure to establish own technologies as industry standards ▪ Difficulties to gain access to external knowledge (bi-directional knowledge transfers) 	<ul style="list-style-type: none"> ▪ Appropriate incentive systems ▪ Use of external knowledge commercialisation gatekeepers, champions and promoters ▪ Communicating the enormous benefits realised by pioneering firms ▪ Establishing adequate organisational structures, e.g. dedicated licensing-out unit ▪ Attempting to change corporate culture: external commercialisation as a rule rather than as an exception
<p>Self-out (SO)</p>	<p>The SO syndrome is defined as an attitude to the external exploitation of knowledge that is more positive than an ideal economic attitude would be.</p>	<ul style="list-style-type: none"> ▪ Neglecting the managerial difficulties in the external knowledge commercialisation ▪ Overvaluation of the external exploitation potentials and undervaluation of the potential negative consequences for the internal knowledge exploitation ▪ Aim to follow pioneering firms in the external knowledge exploitation ▪ Financial pressure on R&D and intellectual property departments 	<ul style="list-style-type: none"> ▪ Negative impact on the firm's core business, i.e. the commercialisation of products/services (Boyens, 1998) ▪ Failure to build up new business areas (Boyens, 1998) ▪ Failure to develop a deep understanding of particular markets for products/services ▪ Negative impact on the firm's relative position in certain knowledge areas 	<ul style="list-style-type: none"> ▪ Exact definition and internal communication of the company's core competencies ▪ Strict control of all external knowledge commercialisation activities ▪ Closer coordination between internal and external knowledge commercialisation activities ▪ Stronger focus on the development of new internal businesses

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