Knowledge Management Success Factors – Proposal of an Empirical Research

Franz Lehner and Nicolas Haas
University of Passau, Germany
Franz.Lehner@uni-passau.de
Nicolas-Haas@gmx.net

Abstract: It is widely accepted that knowledge management is a critical success factor for enterprises. Not yet known sufficiently are the factors, which influence the success of knowledge management in order to measure the effectiveness of knowledge management. This paper sets out a quantitative study to investigate these factors. Firstly, an overview of empirical work undertaken and the potential success factors is given. After this, the methodology of the study is described. Thereby the basics of structure equation modelling (SEM) are shown. The difference between structure and measurement model is depicted and different validity measures are described. Also two common and possible methods to evaluate a SEM, the co-variance analysis and the variance analysis are displayed. Thirdly a specific model is presented to use SEM in the context of knowledge management success. The model is based on the theory of planned behaviour and is adapted to the context of knowledge management success. Thereby knowledge management success is seen on an individual level, which means that successful knowledge management leads to a satisfying knowledge supply of the organisation member. Finally limitations of the work are discussed.

Keywords: KM success, critical success factors, structural equation model, PLS, LISREL

1. Introduction

Although positive experiences have already been made with knowledge management and it is being practiced by 80 % of the biggest companies world wide (KPMG 2000), there has been no sufficient examination of the success factors of knowledge management until now. Thereby, there is no question, that the success validation of knowledge management should be granted the same status as the success measuring of any other company function (Tambyrajah and Al-Shawabkeh 2007). The basic validations, which exist up to now, still point to great shortcomings. On the one hand, the application is very complex and on the other hand, it is often not appropriate to the needs of the company.

Efforts have already been made to compare the results of previous studies on KM success factors (North 2002; Holsapple and Joshi 2000) respectively to integrate them in a frame of reference (Helm, Meckl and Sodeik 2007). At the same time, it seems that the number of extensive, widely designed and meaningful studies is very small. All the more it is astonishing to realize that in most cases the same influential variables are named for the success of knowledge management. This underlines the assumption that independently from the size and location of a company, general valid success factors exist.

For this reason, important evidence is provided, that through further empirical research, and at least a partial standardised success factors catalogue could be developed, which would bring the validation of knowledge management one step further. Therefore the practicability of the developed research model is to support further research in the field of the knowledge management success factors. The use of the model is mainly to support scientific studies. Practitioners will benefit indirectly because the validated success factors could then be used to organize knowledge management in a better way.

2. Success factors of knowledge management

The concept of critical success factors imply that in each branch and in each area, a limited number of factors exist which definitely determine the success of companies (Klotz and Strauch 1990). If critical success factors could be determined; an important step would be taken in the direction of a generally relevant validation of knowledge management.

Helm, Meckl and Sodeik (2007) examined 39 studies, dealing with the success factors of knowledge management. In doing so, the authors realized that not only there was a different understanding of knowledge management but the examined matter was diverse. Likewise, neither was a structuring of possible success factors undertaken nor were possible dependences of success factors with each other examined or their potential success in knowledge management. Lehner et al. (2008) also came

Reference this paper as
Lehner, F and Haas, N. (2010)"Knowledge Management Success Factors – Proposal of an Empirical Research"
Electronic Journal of Knowledge Management Volume 8 Issue 1 (pp79 - 90), available online at www.ejkm com

to a similar conclusion after checking over 60 studies based on the work of Helm, Meckl and Sodeik (2007).

In the background of the available broadness of the studies, it is therefore astonishing that some factors can be relocated and can even be aggregated under only a few dimensions (Lehner et al. 2008; Helm, Meckl and Sodeik 2007). These factors can be assigned to the dimensions: human beings, organisation and technology. On the one hand, these were often called aggregated levels in the examined studies and on the other hand, in the organisational theory, these dimensions were seen as important influences on the efficiency of the organisation, which influence one another and which must be organisationally adjusted to each other (Bea and Göbel 2002). This approach can be transmitted on knowledge management by regarding them as areas of influence.

Under the dimension "human being" is the individual attitude of each staff member facing knowledge management also that of the leadership, which means the support of knowledge management through the executive staff. The dimension "organisation" subsumes the factors which are operated and designed by the organisation itself. To name them, at this point, personnel development, meta-communication about knowledge management, the goals of knowledge management, the responsibility for knowledge management, available stimulation system, existing social net and a knowledge promoting corporate culture.

The dimension "technology" includes factors, which are related to the goods and arrangement of the supporting knowledge management systems. Figure 1 lists the potential success factors named in previous studies and arranges them according to the respective dimensions.

	Potential Success Factors	Description
	Dimension Human Being	
1	Top management	The Top management is the initiator, sponsor and promoter of KM. It provides enough financial resources and time.
2	Personality	Emotional barriers must be taken away to secure the success of KM. The staff members must be open to KM and have the desire to promote it themselves.
	Dimension Organisation	
3	Personnel Development	The staff members must be sufficiently qualified through training and coaching to secure KM. This includes interaction with KM as well as with different KM techniques (e.g. debriefing)
4	Meta-communication of Knowledge Management	The goals of KM will be made transparent and the applied strategy communicated with the stake holders through open communication and internal marketing.
5	Goal system of Knowledge Management	The goal of KM must be in accord with the company goals and must also be measurable as well as communicable.
6	Process of Knowledge Management	KM must be integrated in the present organisational operations. The process of KM must be clearly defined and be integrated in existing processes, e.g. to save time for the staff members.
7	Delegation/ Participation	Responsibility and competence must be clearly defined, e.g. CKO, knowledge manager or Subject-Matter-Specialist. The executive staff carries the responsibility for KM, the areas dealing with KM, for those where staff members are experts but everyone should stay in their own area of competence.
8	Staff Member Motivation	Through stimulating systems, staff members should be motivated to participate, both through award systems e.g. to raise knowledge transfer and indirectly through KM itself e.g. problems have better and faster solutions.
9	Social nets/ Relationships	There has to be direct communication and contacts should be provided to find common solution to problems. Furthermore, networks have to be set up for regular Face to Face meetings e.g. to encourage knowledge exchange.
10	Knowledge encouraging	The dominating corporate culture should never be in

	corporate culture	contradiction with KM. The staff members must be willing to share their knowledge. Furthermore, there must be trust between the co-workers to secure the acceptance of the available knowledge.
	Potential Success Factors	Description
Dimension Technique		
11	IKT/Application system	A supporting system raises the success of KM. The system cannot be independent but must be integrated in the available IT-infrastructure.
12	System	The usability of the systems must be guaranteed, which means that it must be easy to use and have the necessary functions.
13	KMS - Content	The guide lines for the content of the system must be clearly defined. There must be standardized definitions and a clear system available for the setting up of the contributions. A verification process of the quality and actuality of the available knowledge must also be existing.

Figure 1: Potential success factors in knowledge management

The question is now and this should be cleared empirically, if the success factors known until now really influence the success of knowledge management.

3. Development and analysis of a SEM

Quantitative cross-section analyses collect data among several individuals about a specific topic at one time. Although the results are just based on a sample, they should allow drawing conclusions, valid for the population (Wilde and Hess 2007). In studies like this one the analysis of complex cause-effect-connections is among the main focus. For the statistical verification of these complex models, the structural equation modelling (SEM) approach is one of the most popular methods in the social sciences (Homburg and Pflesser 2000).

Within the SEM approach two different methods exist, namely the covariance analysis (LISREL) and the variance analysis (PLS). Although both methods are consistent with the formal considerations of SEM, there are differences concerning the estimation methods and the applicable measurement models for the latent variables (Ringle 2004).

Basically SEM tests theoretical established hypotheses. Within the covariance analysis one wants to test „that the relationships you have hypothesized among the latent variables and between the latent variables and the manifest indicators are indeed consistent with the empirical data at hand“(Diamantopoulos and Singuaw 2000: 4). Therefore it's parameter-oriented. In contrast the variance analysis determines the prediction relevance of latent variables; this means how well a specific construct value can be predicted by another construct value (Jöreskog and Wold 1982). Therefore PLS is prediction-oriented.

Because SEM belongs to the hypotheses-testing statistical methods, it has a confirmative character. In contrast to the linear regression analysis, SEM can simultaneously test the complex effect-connections on the one hand and consider the indicators of the constructs and their measurement errors on the other. Hence every SEM is divided in a structural model and a measurement model (Diamantopoulos and Singuaw 2000; Jöreskog 1982).

The structural model indicates the postulated connections of the constructs in a path diagram, whereas the measurement model indicates the direct observable manifest variables (indicators) and therefore operationalises the latent constructs. Figure 1 shows a simple SEM, in which K1 and K2 are the exogenous, thus independent variables and K3 is the endogenous, thus dependent variable, which is influenced by K1 and K2 (Jahn 2007).

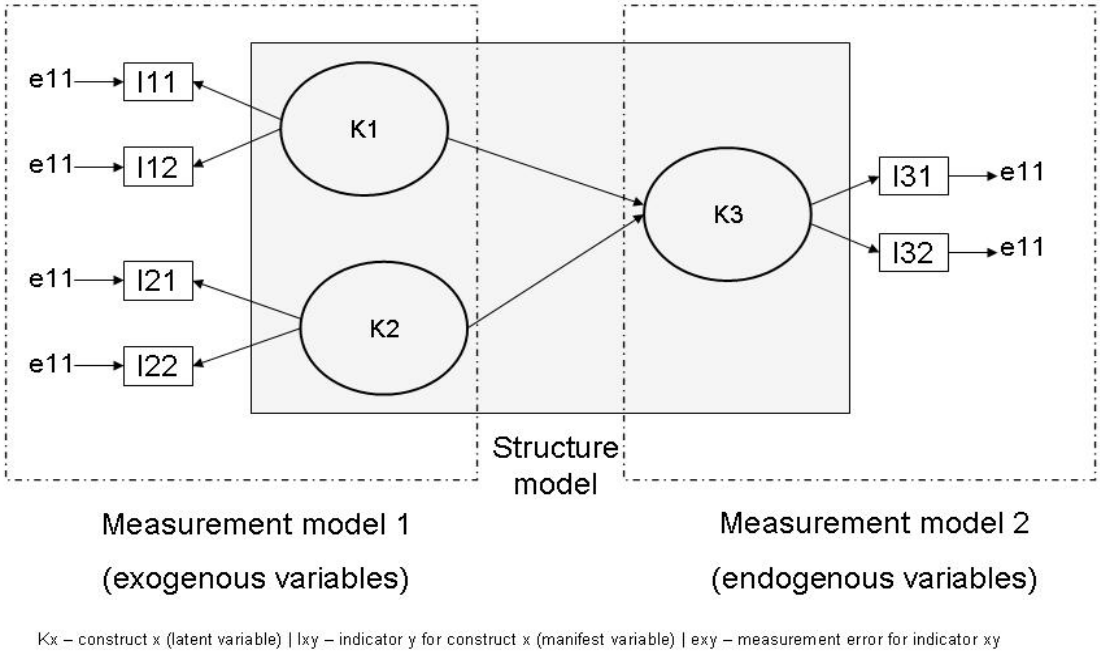

Figure 2: Simple structural equation model (based on Jahn 2007)

Structural model

In the structural model the actual relations between the variables are shown with the help of the path diagram. The proposed hypotheses are shown in form of causal relations, which is graphically clarified by arrows. Thereby several arrows can come from one variable and also point at that variable. The efficacy, the so-called path coefficient, can have a value of -1 to 1. A value of 1 signalises a perfect positive correlation. This means, that a variation of an independent construct leads to the identical variation of the respective dependent construct. Thereby one can assume that both constructs are identical and so the identical construct is measured two times. So values higher than 0.4 are seen as very strong. In contrast a value of -1 indicates an opposed correlation, which means that an increase of an exogenous variable leads to the identical decrease of the respective endogenous variable. As previously values lower then -0.4 are seen as very strong. A path coefficient of 0 states, that the exogenous variable has no influence on the respective endogenous variable (Jahn 2007). Path coefficients lower than 0.1 respectively higher than -0.1 are regarded as not significant (Huber et al. 2007).

Alongside the direct relations, the indirect or total effects can be calculated. The indirect effect calculates the correlation between two not directly respective variables, this means between the two variables a third variable is inserted. The total effect is the summation of the direct effect and all indirect effects (Jahn 2007).

Measurement model

The measurement model visualises the latent variables and their corresponding indicators. There are two base types: reflective and formative models (Albers and Hildebrandt 2006; Jarvis, MacKenzie and Podsakoff 2003).

In a reflective model the indicators are determined by the construct value, this means the direction of the causality shows from the latent variable to the indicator (see Figure 3)

So the value of the indicators will change, if the construct value changes. Consequently the requirement of internal consistency is fulfilled. This also causes the effect that the indicators are interchangeable and the elimination of a single indicator won't change the construct. To increase the validity of the measurement model, lowly correlating indicators should be eliminated, because these diverge in substance (Fassott and Eggert 2005; Bollen and Lennox 1991). Figure 4 shows a compendium of evaluation methods for reflective models.

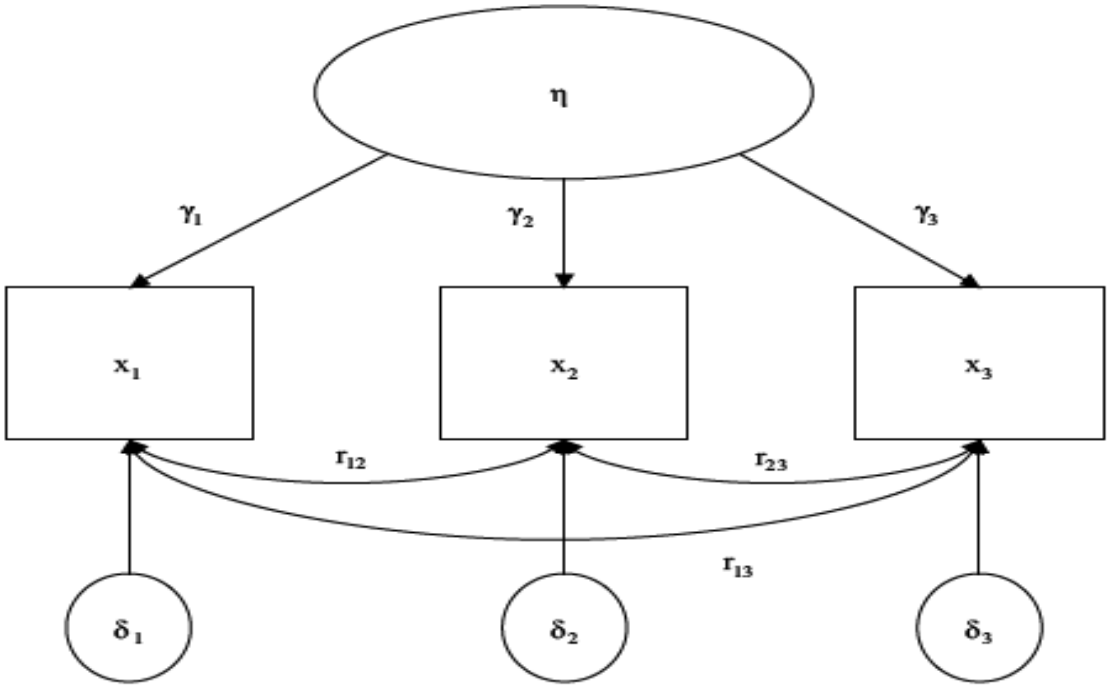

Figure 3: Reflective model (based on Fassott und Eggert 2005)

Type of quality	Definition	Methods (criteria)
Content validity	The extent to which a measure represents all facets of the given construct	Explorative factor analysis to test the dimension (one-factorial structure of the factor)
Indicator reliability	Degree of explanation of the indicator variance through the construct	Generally more than 50% of the variance of the indicator should be determined by the construct, this means loadings $\lambda > 0,7$ Elimination of indicators with loadings $\lambda < 0,4$
Composite reliability (construct reliability)	Degree of explanation of the fit of the measurement of the construct and its respective indicators	Testing of the „internal consistency“ Given if $p_c>0,6$
Discriminance validity	Degree to which the measurement of different constructs diverges with one measure	The average variance extracted (AVE) should be higher than the squared correlation of the latent variable with the other latent variable

Figure 4: Assessment of reflective models (based on Krafft et al. 2005)

On the other hand in a formative measurement model, the indicators aren't influenced by the construct value, but they determine the construct value (see figure 5).

There the indicators represent different facets of the construct in regard to content. For this reason, in contrast to the reflective model, the indicators don't have to correlate stringently in the formative model. If not-correlating indicators were eliminated, central components of the construct could get lost. The pursuit of internal consistency is contradictory to the premises of a formative measurement model (Fassott and Eggert 2005; Bollen and Lennox 1991). Figure 6 shows a compendium of evaluation methods for formative constructs.

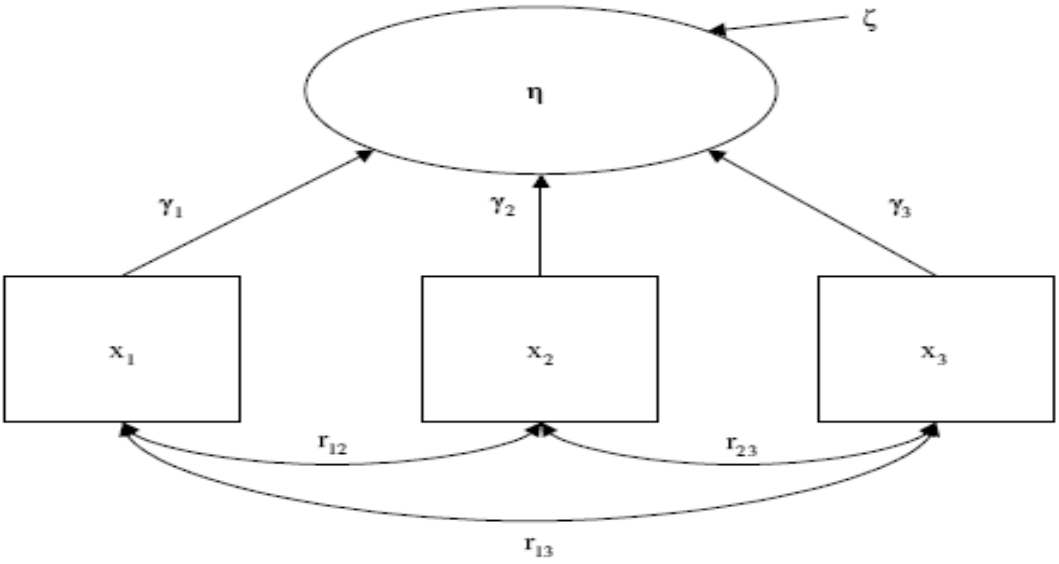

Figure 5: Formative measurement model (based on Fassott and Eggert 2005)

Type of quality	Definition	Methods (criteria))
Substantive validity	Degree to which the a priori assigned indicators match the actual assignment	Within a pretest the proportion of substantive agreement and the substantive-validity coefficient is calculated
Indicator relevance	The extend to which the indicators contribute to the construct	Interpretation of the weights Testing multi-collinearity per e.g. correlation matrix or variance inflation factor
External validity	Evaluation of the validity of the construct measurement	Redundant reflective operationalisation (MIMIC-model or two-construct-model) and testing of the validity by the strength, way and significance of the of the connection

Figure 6: Assessment of formative measurement models (based on Krafft, Götz and Liehr-Gobbers 2005)

The distinction in formative and reflective measurement models isn't new; anyhow this discussion was intensified in recent years. Involving that in several studies the specification of the measurement models is false, particularly formative models are specified as reflective models (Petter, Straub and Rai 2007; Albers and Hildebrandt 2006, Jarvis, MacKenzie and Podsakoff 2003). In the worst case a misspecification of measurement models induces that models will be refused although they are true or models will be accepted although they are false. Often a misspecification doesn't lead to false results, but to a strong limited model, with a tighter semantic content for the construct, if a formative construct is operationalised as a reflective construct (Albers und Hildebrandt 2006; Jarvis, MacKenzie and Podsakoff. 2003).

To facilitate the differentiation between formative and reflective measurement models, the list of questions in figure 7 can be used (Fassott 2006; Jarvis, MacKenzie and Podsakoff 2003):

Characteristics	Type of measurement model	
	Reflective	Formative
Are the indicators defining characteristics or manifestations of the construct?	Manifestations	Defining characteristics
Would changes in the indicators cause changes in the construct or not?	No	Yes
Would changes in the construct cause changes in the indicators?	Yes	No
Should the indicators have the same or similar content or do the indicators share a common theme?	Yes	Unnecessary

Characteristics	Type of measurement model	
	Reflective	Formative
Would dropping one of the indicators alter the conceptual domain of the construct?	No	Maybe
Should a change in one of the indicators be associated with changes in the other indicators?	Yes	Unnecessary
Are the indicators expected to have the same antecedents and consequences?	Yes	Unnecessary

Figure 7: Reflective or formative construct (based on Fassott 2006; Jarvis, MacKenzie and Podsakoff 2003)

This checklist doesn't necessarily lead to clear results. Herrman et al. (2006) show that it depends on the causality between the indicator and the latent variable; often this can't be answered clearly.

Methods to analyse SEM

As already mentioned there are two different methods to analyse SEM: the co-variance analysis (e.g. the software LISREL) and the variance analysis (PLS-method). Often both methods are seen as rivals. This supposed rivalry is only limited existent (Scholderer and Balderjahn 2005). As mentioned the aim of both methods differ: the co-variance analysis is more parameter-oriented, whereas PLS determines the prediction relevance, which means PLS optimises locally the prediction of each dependent variable.

The co-variance analysis is the most commonly used method to evaluate SEM. Hereby it is possible, with the help of the manifest variables, to determine the relations between the latent variables. For the evaluation of the validity of the model, thus the comparison between the assumed and the actually observable correlations, different measures are available. This evaluation is an important goal of the co-variance analysis. As well it is possible compare different variants of the examined model (Jahn 2007; Jöreskog and Wold 1982).

PLS, as representative of the variance analysis, is more and more used for quantitative-empirical studies. PLS should be preferred to the co-variance analysis, if one or more of the following conditions are fulfilled (Chin and Newsted 1999):

- Predictions should be made.
- The cause of the investigation is new, and approved measures aren't at hand.
- The model is complex and has many indicators.
- A multivariate normal distribution is not given.
- The sample is relatively small.

One disadvantage of PLS compared to the co-variance analysis is the measure of the validity of the whole model. Until now, criteria for validity of the whole model are missing, which means there are no convincing goodness-of-fit-indices for the combined examination of structure and measurement model. The reason for this lies in the little restrictive distribution assumptions. So one big advantage of PLS leads simultaneously to one big disadvantage. Therefore help procedures must be used to test the structure model (Krafft, Götz and Liehr-Gobbers 2005).

4. Research design for the empirical study

To investigate the success factors of knowledge management, the assumed connections of a SEM must be represented. The necessary questions for the evaluation of the SEM data will be collected with the help of a standardised questionnaire.

By the development of the structural model, the exogenous and the endogenous will be defined in a construct and their potential relationship to each other will be postulated.

As already explained, in the setting of literary research, the identified success factors of knowledge management have been collected (Lehner et al. 2008) and condensed into 13 factors. These factors make up the exogenous construct.

To define the endogenous construct and to be able to represent the block chart, the Theory of Planned Behavior (TPB) will be of help (Ajzen 1991). The TPB is a further development of the Theory of Reasoned Action (TRA), which is an influential theory of human behaviour (Venkatesh et al. 2003). There are many studies which could, with the help of TPB determine human behaviour or also user acceptance of information systems (see the studies of Venkatesh et al. 2003).

The TPB is made up of five components. The desired behaviour is determined by the individual intention to actually perform the behaviour. The intentions will be, in turn, determined through three factors: The *Attitude Toward the Behavior* comprises the position respectively also the negative feelings which an individual has during the performance of the desired behaviour. The peer pressure, that an individual respectively a certain deed feels, will be measured through the component *Subjective Norm*. The last component is the *Perceived Behavioral Control*, which defines, how difficult it is for an individual to carry out the desired behaviour. The Perceived Behavioral Control has a special position, which is that, it affects the intention toward the behaviour and also directly the behavior that is actually carried out (Ajzen 1991).

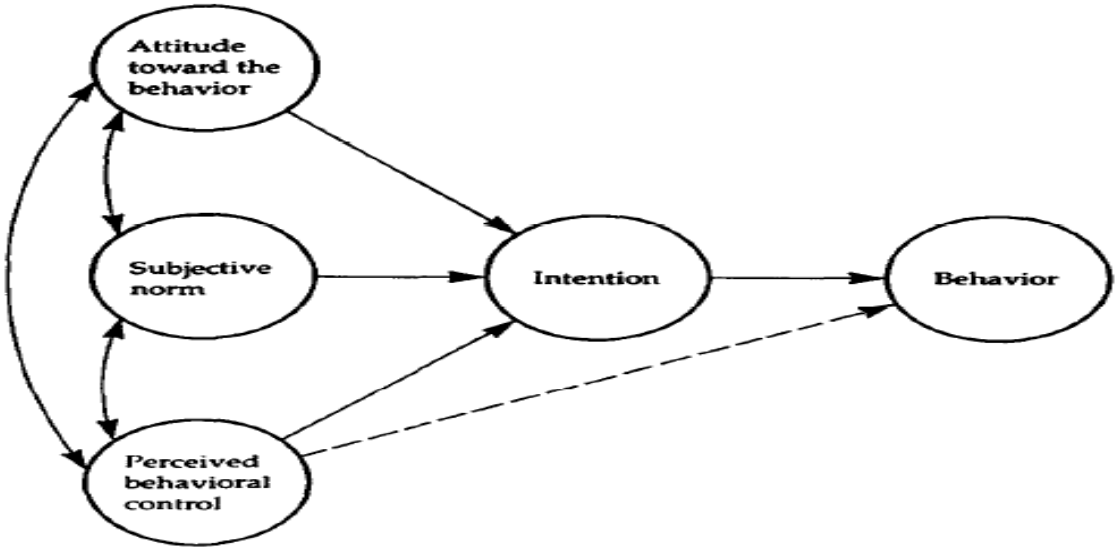

Figure 8: Theory of planned behavior (based on Ajzen 1991)

For the adaptation of TPB, the components Intention and Perceived Behavioral Control will be used, which will be identified as willingness or ability to perform. The object "Behavior" represents the endogenous variable success of knowledge management. This means that the success of knowledge management is dependant on how far the organisation members, on the one hand, the ones that have the willingness to perform, are ready to participate; and on the other hand, the ones that have the ability to perform, are ready to practice.

Although it would be desirable to measure the success of knowledge management on the basis of the companies' success, this is not yet possible due to the available exogenous influence (Bharadwaj 2000). Therefore, in this study, success of knowledge management will be seen on the individual level of the organisation member i.e. a successful knowledge management leads to a satisfying information and knowledge supply of the organisation member. This means that the cooperation and communication of the organisation members is raised. In this way, the organisation members learn new abilities which lead to better decisions, which have a positive influence on the productivity. A Delphi-Study of Anantatmula (2007) shows even, that the individual factors are seen as much more helpful as the traditional performance criteria, such as e.g. increase of the market share or of the stock quotation, to determine the success of knowledge management.

The object "Attitude" toward the behavior and Subjective Norm are going to be taken out of this model. Instead of these, the direct exogenous factors, which determine the attitude of the individual and the objective norms, will be connected with the endogenous construct performance: willingness. The endogenous construct performance: ability will be attributed to the exogenous factors, which determine the knowledge respectively the ability of the individual. Figure 9 provides a summary of the categorising of the exogenous construct.

Performance Willingness	Performance Ability
Top-Management Support	Personnel Development
Meta-Communication of KM	Knowledge Management Process
Social Nets/Relationships *	Social Nets/Relationships *
Personality	KMS-Content
Goal System of KM	System Quality
Delegation/Participation	IKT/System Application
Stimulus	
Knowledge encouraging corporate culture	
*These factors cannot be definitely categorised and therefore an effect will be assumed on both constructs	

Figure 9: Categorising of the exogenous constructs (resource: personal display)

Development of a measurement model

To complete the SEM, a measurement model for the constructs must be developed, i.e. constructs must be operationalised through indicators. After the constructs were limited thematically and defined through literary research, it must be decided if the construct will be formative or reflective operational. As in fact, for the most of the constructs, there are no definite true or false answers, actually the decision is taken according to the point of view. The exogenous construct will be operationalised formatively (up to one exception) as here it is interesting, which measure each construct will come out. The endogenous construct will be reflectively operational as here the measurements are not interesting but much more now the respective characters of the construct will be expressed. This chain of thought is based on the suggestion of Albers und Hildebrandt (2006). Figure 10 represents again the respective operationalism.

	Formative Operationalism	*Reflective Operationalism*
Exogenous Construct	Top-Management Support, Social Nets/Relationships, Personality, Goal System of KM, Delegation/Partizipation, Stimulus, Knowledge encouraging corporate culture, Personnel Development, Knowledge Management Process, KMS-Content, System Quality, IKT/System Application	Meta-Communication of KM
Endogenous Construct		*Performance Willingness, Performance Ability, Knowledge Management Success*

Figure 10: Operationalism of the construct (resource: personal display)

Afterwards, the individual constructs must become operational with the suitable manifested variables. The indicators of the three endogenous variables will be taken from the previously carried out studies (Bock et al. 2005; So and Bolloju 2005; Sollberger 2006). The indicators of the exogenous constructs will be taken out of the identified success factor study (Lehner et al. 2008). Additionally, the formative construct will be tested before the carrying out of the study as to the content and respectively expert validity.

Setting up of the SEM

After the structure models as well as the measuring model have been set up, these can be holistically represented through SEM (see figure 11). The following SEM has been reduced for reasons of clarity in this study. With the exogenous construct, the actual number has been disregarded and again there are no actual denominations given to the constructs. Likewise, the correct number of the indicators in the measuring model was also disregarded. Figure 12 displays exemplary the structure model for the endogenous variable performance ability and its endogenous variables.

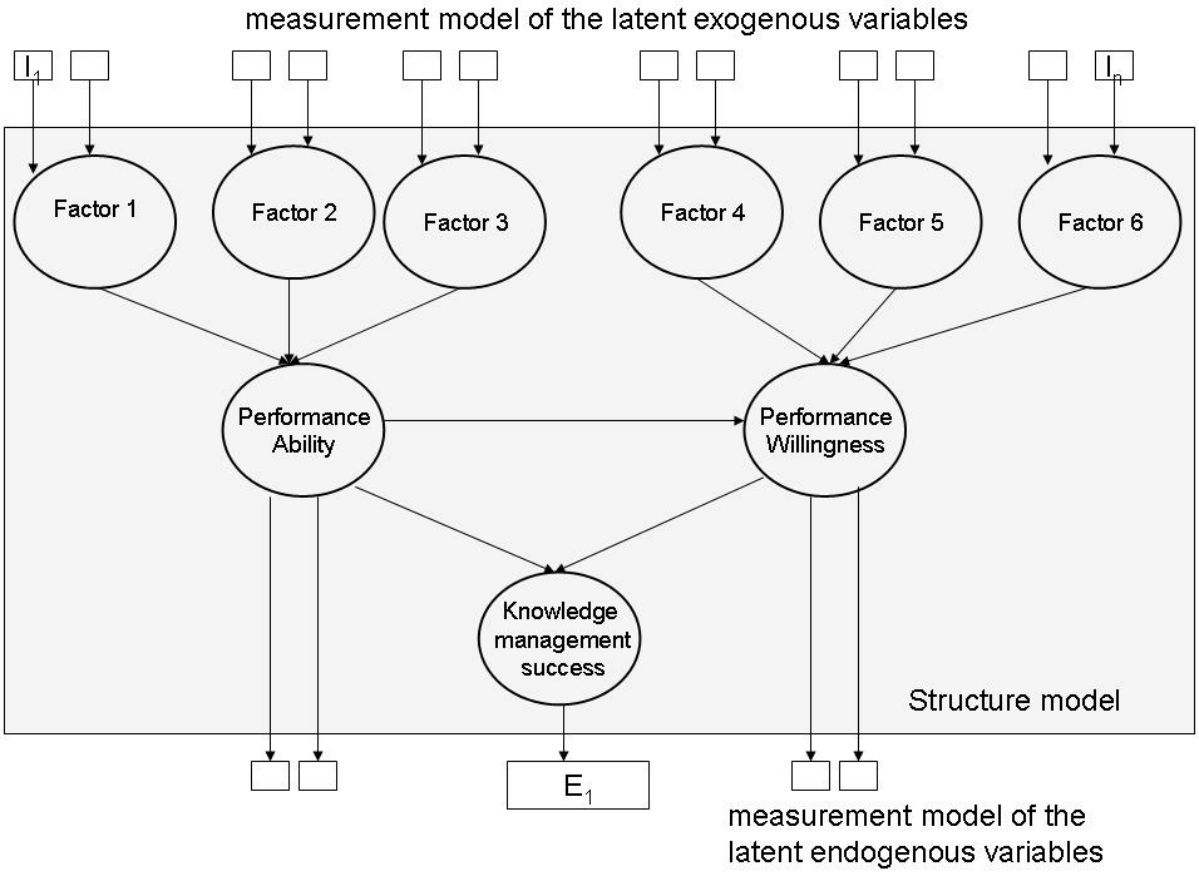

Figure 11: SEM The empirical study (resource: personal display)

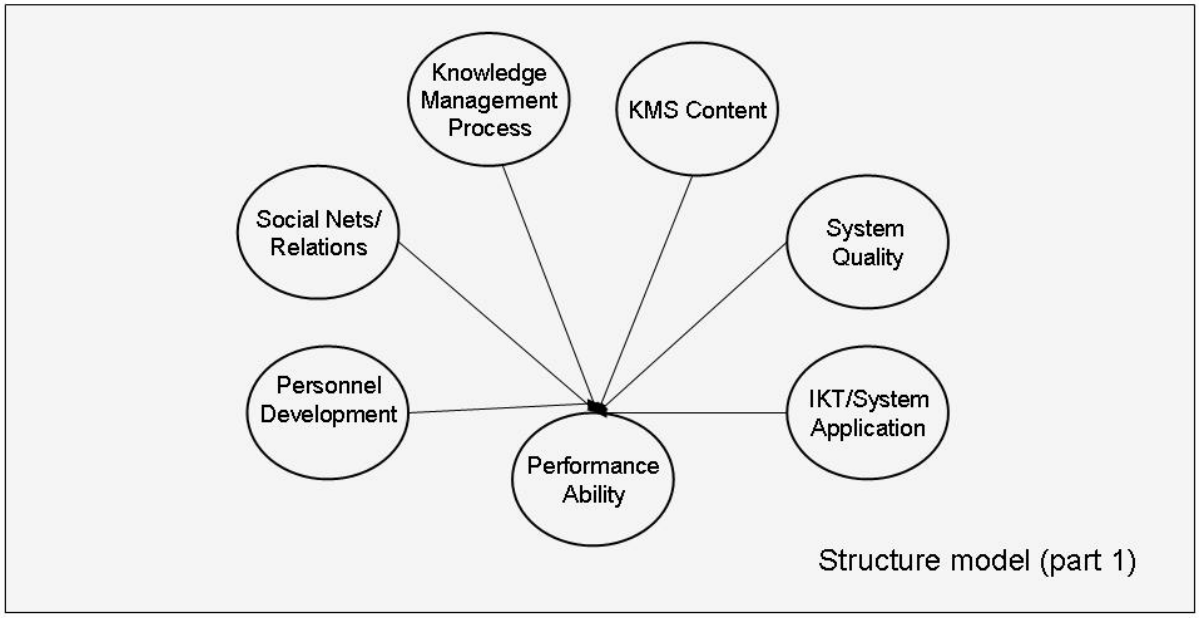

Figure 12: structure model performance ability (resource: personal display)

In SEM, the postulate context of the structural model was connected with the operational, i.e. the measuring model. The testing of the SEM occurs with the help of the PLS-process. With the help of the study, prognostics should respectively meet the success factors of knowledge management.

Likewise, the problem to be studied is new and theoretically not yet founded, anyway, PLS, i.e. the variance analysis is preferable to the covariance analysis in this case.

5. Conclusions

With the help of this study, a further contribution to better success assessments of knowledge management should be supplied. The goal is, to empirically examine the presently known factors, to take a further step in the direction of making general valid success factors. As many of the existing instruments for the assessment of knowledge management rely on success, the use of these could be raised by a valid set of success factors. (Lehner et al. 2008). Therefore the practicability of the model is mainly to support further research in order to validate the success factors. So the model is more addressed to researchers than to practitioners. But the validated success factors could then be used to organize knowledge management in practice.

However, it must be considered that as by every quantitative cross section analysis, the data can only be determined once. If necessary, actual differences will, consequently, not be considered by the factor characteristics in chronological order. Furthermore, the study only considers factors and indicators which have been mentioned in other studies. For this reason, further potential influence factors, which were not yet mentioned, will also not be determined through this study.

Because of the many exogenous influences, it is indeed meaningful to measure success of knowledge management at an individual level, but it has limitations: for one, success is strongly dependant on the subjective individual perception of the organisation member and for another, the point of view of strategical management would be surely desirable, to measure success based on the objective company performance indicators.

References

Ajzen, I. (1991) 'The Theory of Planned Behavior', *Organizational Behavior and Human Decision Processes*, vol. 50, pp. 179 – 211

Albers, S. and Hildebrandt, L. (2006) 'Methodische Probleme bei der Erfolgsfaktorenforschung – Messfehler, formative versus reflektive Indikatoren und die Wahl des Strukturgleichungs-Modells' *Zfbf*, vol. 58, Februar, pp. 2 – 33

Anantatmula, V. (2007) 'Knowledge Management's Impact on Organizational Performance' in Jennex, M. E. (ed.) *Knowledge Management in Modern Organizations*, Hershey: Idea Group Publishing

Bea, F. X. and Goebel, E. (2002), *Organisation*, Stuttgart: UTB

Bharadwaj, A. S. (2000) 'A resource-based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation' *MIS Quarterly*, vol. 24, no. 1, March, pp. 169 - 196

Bock, G.-W., Lee, J.-N., Zmud, R. W. and Kim, Y.-G. (2005) 'Behavioral Intention Formation in Knowledge Sharing: Examining the Roles of Extrinsic Motivators, Social-Psychological Forces, and Organizational Climate', *MIS Quarterly*, vol. 29, no. 1, March, pp. 87 – 111

Bollen, K. A. and Lennox, J. S. (1991) 'Conventional Wisdom on Measurement: a Structural Equation Perspective', *Psychological Bulletin*, vol. 110, no. 2, pp. 305 – 314

Chin, W. W. and Newsted, P. R. (1999) 'Structural Equation Modeling Analysis with Small Samples Using Partial Least Squares', in Hoyle, R. H. (ed.) *Statistical Strategies for Small Sample Research*, Thousand Oaks: Sage Publications

Chin, W. W. (1995) 'Partial Least Squares is to LISREL as Principal Components Analysis is to Common Factor Analysis', *Technology Studies*, vol. 2, pp. 315 – 319

Chin, W: W (1998) 'The Partial Least Squares Approach to Structural Equation Modeling', in Marcoulides, G. A. (ed.), *Modern Business Research Methods*, Mahwah: Lawrence Erlbaum

Diamantopoulus A. and Singuaw, J. A. (2000) *Introducing LISREL*, London: Sage Publications

Fassott G. and Eggert, A. (2005) 'Zur Verwendung formativer und reflektiver Indikatoren in Strukturgleichungsmodellen: Bestandsaufnahme und Anwendungsempfehlungen', in Bliemel, F., Eggert; A., Fassott G. and Henseler, J. (ed.), *Handbuch PLS-Pfadmodellierung*, Stuttgart: Schäffer Poeschel

Fassott, G. (2006) 'Operationalisierung latenter Variablen in Strukturgleichungsmodellen: Eine Standortbestimmung', *Zfbf*, vol. 58, Februar, pp. 67 – 88

Helm, R., Meckl, R. and Sodeik, N. (2007) 'Systematisierung der Erfolgsfaktoren von Wissensmanagement auf Basis der bisherigen empirischen Forschung', *Zeitschrift für Betriebswirtschaftslehre*, vol. 77, no. 2, pp. 211 - 242

Herrmann, A., Huber, F. and Kressmann, F. (2006) 'Varianz- und kovarianzbasierte Strukturgleichungsmodelle – Ein Leitfaden zu deren Spezifikation, Schätzung und Beurteilung', *Zfbf*, vol. 58, Februar, pp. 34 – 66

Holsapple, C.W. and Joshi, K. D. (2000) 'An Investigation of Factors that Influence the Management of Knowledge in Organizations', *Journal of Strategic Information Systems*, vol. 9, no. 2, pp. 235 – 261

Homburg, C. and Pflesser, C. (2000) 'Strukturgleichungsmodelle mit latenten Variablen: Kausalanalyse', in Herrmann, A., Homburg, C. and Klarmann, M. (ed.), *Marktforschung: Methoden, Anwendungen, Praxisbeispiele,* 2nd edition, Wiesbaden: Gabler

Huber F., Herrmann, A., Meyer, F., Vogel, J. and Vollhardt, K. (2007) *Kausalmodellierung mit Partial Least Squares*, Wiesbaden: Gabler

Jahn, S. (2007) 'Strukturgleichungsmodellierung mit LISREL, AMOS und SmartPLS – Eine Einführung', *WWDP 86/2007*, TU Chemnitz

Jarvis, C. B., MacKenzie, S. B. and Podsakoff, P. M. (2003) 'A Critical Review of Construct Indicators and Measurement Model Misspecifications in Marketing and Consumer Research', *Journal of Consumer Research*, vol. 30, September, pp. 199 – 218

Jöreskog, K. G. and Wold, H. (1982) 'The ML and PLS Techniques for Modeling with Latent Variables: Historical and Comparative Aspects', in Jöreskog, K. G. and Wold, H. (ed.), *Systems Under Direct Observations: Causality, Structure, Prediction, Part I*, Amsterdam: North-Holland Publ.

Jöreskog, K. G. (1982) 'The LISREL Approach to Causal Model-Building in the Social Sciences', in Jöreskog, K. G. and Wold, H. (ed.), *Systems Under Direct Observations: Causality, Structure, Prediction, Part I*, , Amsterdam: North-Holland Publ.

Klotz, M. and Strauch. P. (1990) *Strategieorientierte Planung betrieblicher Informations- und Kommunikationssysteme*, Berlin: Springer

KPMG (2000) *Knowledge Management Research Report*, KPMG Consulting

Krafft, M., Götz, O. and Liehr-Gobbers, K. (2005) 'Die Validierung von Strukturgleichungsmodellen mit Hilfe des Partial-Least-Squares (PLS)-Ansatzes', in Bliemel, F., Eggert; A., Fassott G. and Henseler, J. (ed.), *Handbuch PLS-Pfadmodellierung*, Stuttgart: Schäffer Poeschel

Lehner, F., Amende, N., Haas, N. and Wildner, S. (2008) *Erfolgsbeurteilung des Wissensmanagements. Diagnose und Bewertung des Wissensmanagementaktivitäten auf der Grundlage der Erfolgsfaktorenanalyse*, Forschungsbericht, Nr. W-24-07, Lehrstuhl für Wirtschaftsinformatik II, 3. Aufl., Universität Passau

Lohmüller, J.-B. (1989) '*Latent Variable Path Modelling with Partial Least Squares'*, Heidelberg: Physica

Petter, S.; Straub, D. and Rai, A. (2007) 'Specifying Formative Constructs in Information Systems Research', *MIS Quarterly,* vol. 31, no. 4, December, pp. 623 – 656

Ringle, C. M. (2004) '*Gütemaße für den Partial Least Squares-Ansatz zur Bestimmung von Kausalmodellen*', Arbeitspapier Nr. 16, Institut für Industriebetriebslehre und Organisation, Universität Hamburg

Scholderer, J. and Balderjahn, I. (2005) 'PLS versus LISREL: Ein Methodenvergleich', in Bliemel, F., Eggert; A., Fassott G. and Henseler, J. (ed.), *Handbuch PLS-Pfadmodellierung*, Stuttgart: Schäffer Poeschel

So, J. C. F. and Bolloju, N. (2005) 'Explaining the Intentions to Share and Reuse Knowledge in the Context of IT Service Operations', *Journal of Knowledge Management*, vol. 9, no. 6, pp. 30 – 41

Sollberger, B. A. (2006) *Wissenskultur – Erfolgsfaktor für ein ganzheitliches Wissensmanagement.* Bern: Haupt,

Tambyrajah, A. and Al-Shawabkeh, A. (2007) 'Developing Performance Indicators for Knowledge Management' *Proceeding of the 8th European Conference on Knowledge Management.* Barcelona, pp. 972 – 981

Venkatesh, V., Morris, M. G., Davis, G. B. and Davis, F. D. (2003) 'User Acceptance of Information Technology: Toward a Unified View', *MIS Quarterly*, vol. 27, no. 3, September, pp. 425 – 478

Wilde, T. and Hess, T. (2007) 'Forschungsmethoden in der Wirtschaftsinformatik – Eine empirische Untersuchung', *Wirtschaftsinformatik*, vol. 49, no. 4, pp. 280 - 287

