4. *Краснокутська Н. С*. Потенціал підприємства: формування та оцінка: навчальний посібник / Н. С. Краснокутська. — К.: Центр навчальної літератури, 2005. — 352 с.

5. *Шершньова З. Є*. Стратегічне управління: навчальний посібник / З. Є. Шершньова. — К.: КНЕУ, 2004. — 699 с.

6. *Рєпіна І. М*. Підприємницький потенціал: методологія оцінки та управління / І. М. Рєпіна // Вісник Української академії державного управління при Президентові України. — 1998. — № 2. — С. 262 — 271.

7. Новейший философский словарь [Электронный ресурс]. — 3-е изд., исправл. — Минск: Кн. Дом, 2003. — 1280 с. — (Мир энциклопедий). — Режим доступа: htpp://slovary.yandex.ru/dict/phil_dict.

8. *Змаженко Т. В*. Ефект синергії в стратегічному розвитку підприємства [Електронний ресурс] / Т. В. Змаженко, Л. П. Артеменко // Режим доступу: http://www.confcontact. com/ 2008dec /3_zmazhenko.htm.

Ingrid Göpfert, Professor of Logistics Department
Philipps-University, Marburg
Wanja Wellbrock, Doctoral Candidate of
Logistics Department Philipps University, Marburg

INNOVATIVE CONCEPTS FOR SUPPLY CHAIN MANAGEMENT. ANALYSIS OF THE NEED AND THE DEVELOPMENT PROCESS

ANNOTATION: The suitability of existing Supply Chain Management concepts to resolve present problems as well as to meet upcoming challenges toward Supply Chain Management are analyzed based on their degree of target achievement and degree of innovativeness. Subsequently, the question of how new concepts can be developed independently in specific Supply Chains is discussed. The developed stage model serves as a reference for companies and Supply Chains that intend to focus on future-oriented aspects of Supply Chain Management.

KEY WORDS: Supply chain management, management concepts, innovations, innovation process, future studies

1 Problem Statement

Although the term Supply Chain Management (SCM) is discussed controversially in scientific literature, a broad consensus about particular aspects can be observed. Thus, the objective of SCM is the inter-company integration and hereby optimization of the flow of goods, information and capital; therefore it is distinguished by a long-term, cooperative character, that is supposed to lead to a high degree of target achievement for the companies involved. Moreover, SCM is

to be aligned flow and process oriented in all cases [9, 10—13; 12, 5; 22, 26—30; 31, 2]. As a specific form of vertical cooperation between companies, SCM plays an important role in modern management theory and gains relevance in business practice as well.

Both in scientific literature as well as in business practice, a number of concepts aimed at the optimization of Supply Chains (SC) can be found. However, the question is often, how much these contribute to the achievement of the objectives set by SCM and how much they can be suitable reactions toward future SCM challenges. Based on this, the need for innovative approaches can be derived in another step.

The basis for the following analysis is a survey carried out by the Department of General Business Administration and Logistics at Philipps-University Marburg among the 100 largest German companies by turnover from ten selected business branches. In each case, the head of logistics respectively SCM was surveyed on the company level. The return rate adds up to 11.1 %, so that a total of 111 companies' reports could be evaluated. The choice of business branches[1] was made under consideration of both internally representing the entire SC as well as integrating the outside-in perspective from logistics service providers and consulting firms. In addition to the degree of target achievement of the distinct concepts, the relevance of future challenges toward SCM was evaluated, so that both the current and the future need for innovative SCM concepts could be determined. For a detailed description of the survey's results cf. [26] and [29].

2 Supply Chain Management Concepts

SCM concepts are specific methods for an efficient design of the entire value creation process from the supplier to the end customer. Their consistent application is a fundamental requirement for the realization of a functioning SC [27, 216]. Based on the core processes of the Supply Chain Operation Reference (SCOR) model [35, 24; 39, 1192—1195; 53, 214; 57, 1—2] a total of 17 existing SCM concepts can be determined (cf. tab. 1). The composition of these concepts is based on discussions with company representatives as well as a thorough literature analysis [e. g. 1, 171—177; 4, 97-109; 54, 179—456; 64, 105—202].

[1] Distribution onto business branches: Consulting 18 %; chemistry, pharmaceutical, medical and biological technology 14 %; automotive industry 13 %; retail 12 %; textile, leather and clothing industry 9 %; logistics service providers 9 %; food industry 7 %; machine tools 6 %; metal production and metal working industry 6 %; electric, electronic and optical systems 5 %. Almost 40 % of the companies possessed more than 5000 employees.

Table 1

CLASSIFICATION OF SUPPLY CHAIN MANAGEMENT CONCEPTS ACCORDING TO THE CORE PROCESSES OF THE SCOR MODEL

Core processes of the SCOR model			
Planning & Controlling	Procurement	Production	Distribution
• Available-to-Promise (ATP) / Capable-to-Promise (CTP) • Collaborative Planning Forecasting and Replenishment (CPFR) • Kanban • Third Party Logistics Provider (3PL) / Lead Logistics Provider (LLP)	• Just-in-Time (JiT) / Just-in-Sequence (JiS) • Supplier Relationship Management (SRM) • Sourcing Concepts	• Collaborative Engineering (CE) • Postponement (PP) • Value Added Partnership (VAP)	• Quick Response (QR) • Continuous Replenishment (CR) / Efficient Replenishment (ER) • Vendor Managed Inventory (VMI) • Consignment Inventory Management (CIM) • Cross Docking (CD) • Efficient Consumer Response (ECR) • Customer Relationship Management (CRM)

3 The Need for the Development of Innovative Supply Chain Management Concepts

3.1 Degree of Target Achievement of Existing Supply Chain Management Concepts

Concepts. As a result of a study of the relevant literature [e. g. 12, 3—19; 13, 3; 17, 52; 22, 110—118; 54, 1, 5—7; 62, 16—22], the following five target categories can be derived for SCM: «Increase of end customer value», «realization of cost reductions», «realization of time reductions», «realization of advantages in quality» and «realization of advantages in flexibility». Ba-sed on these criteria, the degree of target achievement of the existing SCM concepts can be determined to derive the current need for innovative approaches.

As shown in tab. 2, even the best-rated category «realization of cost reductions» with an average of 3.40 points over all concepts on a scale of 1 (very low) to 5 (very high) only ranks slightly above the value «average target achievement». The attribute «realization of advantages in quality» scores lowest with less than three points. There is a similar picture if only the highest values are taken into account. A value of above four is only reached once in the categories «end customer value», «costs reductions» and «time reductions»; apart from that, the results level off in the field between two and three points. This data results in the conclusion that SCM concepts only contribute limitedly to the SCM targets and thus there are noticeable potentials of optimization in almost all objective categories that are preferably to be unlocked by new innovative concepts.

Table 2

OVERVIEW OF THE DEGREE OF TARGET ACHIEVEMENT FOR ALL SUPPLY CHAIN MANAGEMENT CONCEPTS (AVERAGE (Σ); N = 111; SCALE: 1 (VERY LOW) TO 5 (VERY HIGH))

■		Final Customer Value	Costs	Time	Quality	Flexibility
Planning & Controlling	ATP / CTP	3.99 (0.88)	2.77 (1.02)	3.58 (1.05)	2.24 (1.24)	3.28 (1.10)
	CPFR	3.70 (1.02)	3.56 (0.93)	3.70 (0.96)	2.58 (1.26)	3.55 (0.90)
	Kanban	2.51 (1.08)	3.38 (0.97)	3.17 (1.12)	2.31 (1.06)	2.83 (1.00)
	3PL / LLP	2.61 (1.02)	3.70 (0.86)	2.79 (1.22)	2.47 (1.14)	3.45 (1.07)
Pro-curement	JiT / JiS	3.17 (1.41)	3.60 (1.14)	4.05 (1.11)	2.27 (1.16)	3.09 (1.42)
	SRM	3.25 (1.16)	3.56 (1.03)	3.33 (0.99)	3.51 (1.19)	3.33 (1.01)
	Sourcing	2.90 (1.03)	3.98 (1.01)	3.06 (1.03)	3.14 (1.17)	3.38 (1.00)
Pro-duction	CE	3.31 (1.14)	4.00 (0.85)	3.65 (1.01)	3.56 (1.10)	3.28 (1.03)
	PP	3.18 (1.29)	3.22 (1.02)	3.22 (1.05)	2.52 (1.02)	3.49 (1.26)
	VAP	3.32 (1.10)	3.51 (1.11)	3.17 (0.96)	3.54 (0.97)	3.13 (1.10)
Distribution	QR	3.75 (1.10)	3.00 (1.06)	3.68 (1.09)	2.60 (1.10)	3.26 (1.10)
	CR / ER	3.41 (1.16)	3.36 (1.11)	3.55 (1.01)	2.40 (1.00)	3.25 (1.02)
	VMI	3.10 (1.31)	3.57 (1.06)	3.12 (1.17)	2.19 (1.00)	3.20 (1.12)
	CIM	2.98 (1.46)	3.32 (1.22)	3.41 (1.23)	1.99 (0.91)	3.39 (1.29)
	CD	2.72 (1.29)	3.48 (1.13)	3.51 (1.15)	2.22 (0.99)	2.99 (1.06)
	ECR	3.92 (1.01)	3.08 (0.99)	3.43 (0.96)	2.65 (1.09)	3.08 (1.17)
	CRM	4.05 (1.07)	2.68 (0.83)	2.84 (1.06)	2.85 (1.20)	2.83 (1.13)
	Average	**3.29**	**3.40**	**3.37**	**2.65**	**3.22**

3.2 Future Challenges toward Supply Chain Management

Aside from the degree of target achievement, which is an indicator for the current need for innovative SCM concepts, upcoming challenges toward SCM are examined by which the future need for the development can be derived.

By analyzing dedicated future studies from the field of logistics respectively SCM a total of ten challenges can be determined (cf. tab. 3). Publications both from scientific institutes and companies have been taken into account [e. g. 5; 20; 36; 45; 56; 55]. A detailed overview on relevant future studies in the field of logistics respectively SCM can be found at [25, forthcoming] and [27, 204—209].

Table 3

FUTURE CHALLENGES TOWARD SUPPLY CHAIN MANAGEMENT (N = 111; SCALE: 1 (VERY LOW RELEVANCE) TO 5 (VERY HIGH RELEVANCE))

Future challenges toward Supply Chain Management	AV (σ) 1 2 3 4 5
Climate change becomes a central problem	3.40 (1.13)
Further increase in globalization	3.91 (0.95)
New emerging markets (BRIC)	3.96 (0.92)
Threats by industrial espionage, crime, and terrorism	2.79 (0.92)
Rising demand for locally produced goods	2.87 (0.97)
Rising customization (forecasting problem)	3.77 (0.99)
Rise of inter-company data complexity	3.42 (0.99)
Increase of infrastructural bottlenecks	3.37 (0.95)
Rising significance of logistics service	3.73 (0.99)
Expected increase of transportation costs	4.18 (0.77)

The participating companies assume that the trend «**expected increase of transportation costs**» has the greatest relevance. This effect, caused by rising oil prices and regulations, is rated 4.18 and thus noticeably higher than the other trends. Following on position two and three are «new emerging markets» and the «further increase

in globalization». In the future, a progressive globalization of trade and value creating relationships is still about to happen; however, the focus of the global economy is shifting more and more toward the so called BRIC-countries (Brazil, Russia, India, and China). The trends «rising customization» and «rising significance of logistics service» are also rated very high with a score above 3.7 points. The low significance of climate change for SCM is striking. However, in the future, this aspect is going to gain relevance due to a noticeable increase in the number of natural disasters and other ecological problems. While the remaining trends are slightly above average, «threats by industrial espionage, crime, and terrorism» as well as «rising demand for locally produced goods» can be disregarded to some extend due to a rating of less than three points.

3.3 Derivation of the Need for Innovative Supply Chain Management Concepts

In conclusion, the need for innovative SCM concepts can be determined according to the current degree of objective achievement of the existing SCM concepts on the one hand and according to the estimate on future challenges toward SCM on the other hand. During the same empirical study, the respective assessment of the survey participants was asked for explicitly. The need for the development of innovative concepts with regard to current challenges is rated above average with a score of 3.34 and even very high (4.15) with regard to future challenges (cf. tab. 4).

Table 4

NEED FOR INNOVATIVE SUPPLY CHAIN MANAGEMENT CONCEPTS (N = 111; SCALE 1 (VERY LOW) TO 5 (VERY HIGH))

Need for innovative Supply Chain Management concepts AV (σ)	
with regard to current challenges	3.34 (0.96)
with regard to future challenges	4.15 (0.86)

The high relevance of innovative concepts with regard to future challenges toward SCM is closely related to the **degree of innovativeness of the existing concepts**. As shown in tab. 5, the respective average over all SCM concepts is only 2.82 points, which corresponds to a very low score. According to the company representatives, the concepts perceived as most innovative are Value Added Partnership (VAP) and Efficient Consumer Response (ECR), although even those scored only slightly above the value «average

degree of innovativeness». Most of the concepts were developed more than twenty years ago and were adjusted to the business environment at that time. Rising dynamics in company surroundings posed new challenges to SCM that can only be faced with a completely new quality in SCM concepts.

Table 5

DEGREE OF INNOVATIVENESS OF EXISTING SUPPLY CHAIN MANAGEMENT CONCEPTS (N = 111; SCALE: 1 (NOT INNOVATIVE AT ALL) TO 5 (VERY INNOVATIVE))

		Degree of innovativeness (AV (σ))
Planning and Controlling	Available-to-Promise / Capable-to-Promise	2.69 (1.05)
	Collaborative Planning Forecasting and Replenishment	3.08 (1.03)
	Kanban	2.13 (1.08)
	Third-Party-Logistics Provider / Lead Logistics Provider	2.61 (1.02)
Pro-curement	Just-in-Time / Just-in-Sequence	2.30 (0.99)
	Supplier Relationship Management	3.01 (0.89)
	Sourcing Concepts	2.93 (1.02)
Pro-duction	Collaborative Engineering	3.15 (0.98)
	Postponement	2.93 (1.06)
	Value Added Partnership	3.16 (1.06)
Distribution	Quick Response	2.97 (1.07)
	Continuous Replenishment / Efficient Replenishment	2.98 (0.87)
	Vendor Managed Inventory	3.09 (1.01)
	Consignment Inventory Management	2.16 (1.02)
	Cross Docking	2.71 (1.05)
	Efficient Consumer Response	3.14 (1.19)
	Customer Relationship Management	2.98 (1.14)
	Average	2.82

4 The Development Process of Innovative Supply Chain Management

Concepts. Due to the rising relevance of innovative SCM concepts for business practice, scientists are increasingly working on future-

relevant topics in this field as well. An important approach is the thought of how innovative concepts for the controlling of SC-wide flows of information and material can be developed autonomously by the participating companies. From a result-oriented perspective, innovative SCM concepts can be described as «basis or improvement (business network) process innovations that are characterized by an objectively detectable degree of novelty» [27, 217].

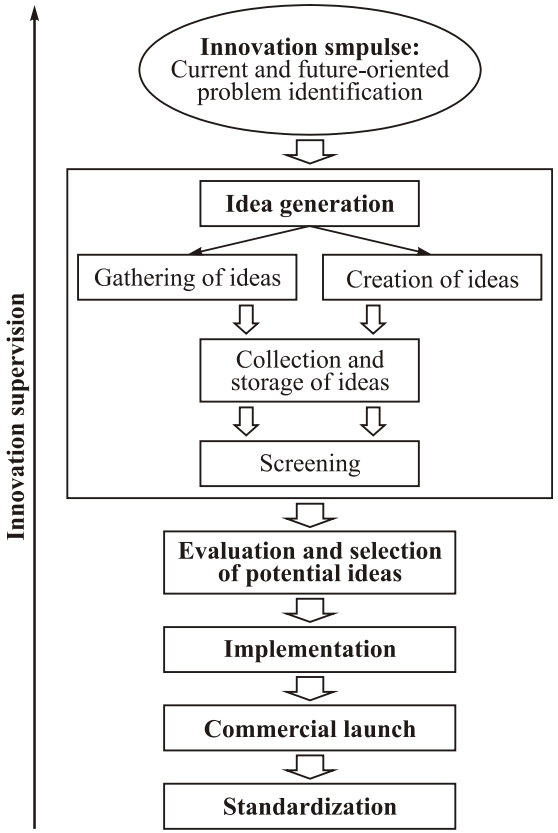
Since the majority of existing concepts were created as process innovations within specific SCs and then — usually by the support of external research institutes — further developed into global standards, the innovation process between the participants of singular inter-company SCs is in the center of the following examination and the stage model [41, 15—62; 46, 49—80; 52, 167—189].

In SCM, not only technical concepts and novelties are focused, but more the inter-company feasibility of the implementation of new controlling and management instruments. Innovative SCM concepts distinguish themselves through their novel organization principles for an optimal integration of all participating companies in a SC. Therefore the developed process model follows the stage model by Vahs and Burmester [61, 92], in which most emphasis regarding the development process is put on the generation and selection of ideas as well as the subsequent organizational implementation, while the technical realization is not focused. The entire model as well as the singular stages are adjusted to the specific requirements of innovative SCM concepts and are displayed subsequently.

The development process of innovative SCM concepts does not start with the generation of ideas, but, as shown in fig. 1, already with the preliminary stage of **problem identification**. Relevant problems can be derived from the discrepancy between the determined current situation and the state aspired by the SC companies. However, more than a strictly present-oriented situation analysis is required to identify relevant discrepancies. Globally successful process innovations are always distinguished by a strong future-orientation, thus not only current problems, but above all problems that arise from future developments of the relevant environment are to be integrated. The identified deficient degree of objective achievement of the existing concepts (cf. chapter 3.1) can be considered to be a starting point for the development of innovative SCM solutions. However, it has to be complemented by future challenges toward SCM (cf. chapter 3.2). A sole present-oriented situation analysis is not sufficient; it must

be extended by the use of future research methods [23, 13—34; 61, 93].

Figure 1: Stage model for the development process of innovative Supply-Chain-Management concepts (based on [61, 92])



During the second stage, **idea generation**, actions for the entire SC are to be determined based on the identification of current or future challenges. Generally, as many companies of a SC as possible are to be consulted, because only through multiple examination from the respective angle of a different value creating level, holistic solutions for the whole SC can be found. However, often, due to the criteria of efficiency, a pre-selection of the involved companies is required, because from an economic perspective, the use of a source is only reasonable if the expected benefit exceeds the necessary costs [61, 146—147]. For example it is doubtful that every supplier of components or even raw

materials can contribute important information for the development of marketing-oriented concepts. The relevance of the companies to be integrated in the innovation process is strongly depending on the respective alignment of the concepts that are to be developed.

The process of idea generation can be divided into two subdivisions. While the gathering of ideas is limited to a holistic problem-oriented treatment of the information and idea material currently available in the company or SC [61, 142], the creation of ideas aims at the development of completely novel insights [50, 30—31; 61, 165]. Innovative solutions do not always have to be based on entirely new thoughts; often, a notable advancement of current approaches is sufficient. One example of an improvement innovation based on the gathering of ideas is the enhancement of a Just-in-Time to a Just-in-Sequence delivery. While, to a large extent, the basic delivery concept was already existing, it was complemented by the aspect of a sequential arrangement of deliveries [22, 206; 24, 18; 47, 130; 58, 20—21; 64, 156]. The **creation of ideas** aims at the development of radical base innovations using different creativity techniques.

Due to the fact that multiple partners from the SC are involved in the development of innovative SCM concepts, a number of problem solutions from different companies are determined during the idea generation process. Therefore the homogeneous collection and storage of all of these ideas plays an important role [32, 181—184]. Before passing on to the evaluation and selection, the individual approaches should undergo a **screening**, so that only ideas with a concrete problem-orientation are regarded [2, 33—34; 59, 568; 60, 9—10; 61, 184—185].

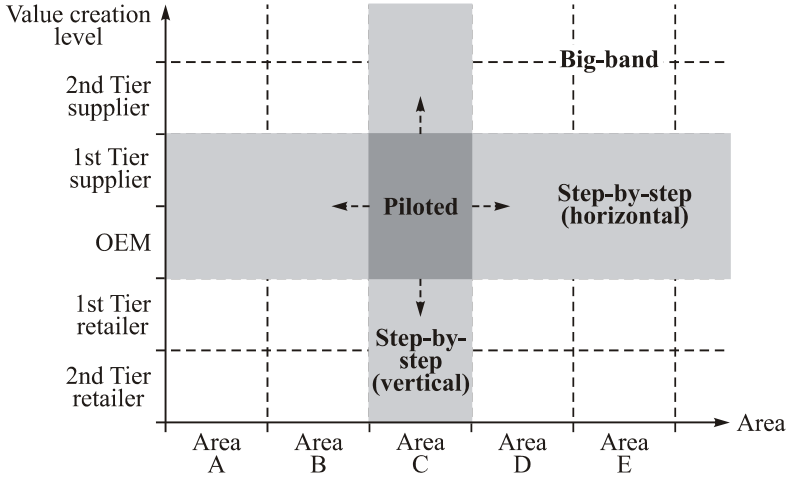
During the subsequent **evaluation and selection of potential ideas**, attention has to be paid toward a holistic optimization of the SC at all times. New approaches cannot exclusively be focused opportunistically on the benefit of singular levels of value creation. The system-wide optimization of the total costs, regarding the whole SC, is in the center of SCM, while company-internal disadvantages should be evened out through the use of specific methods of compensation. Thus, not only the benefit of the SC as a unit but also the individual benefits of the participating companies are increased [15, 568; 37, 65—66, 82-83; 65, 26].

Following the selection of the right ideas, they have to be **implemented** in the SC. Here, one has to distinguish between the **technical implementation** and the **organizational implementation** in the companies. Especially the second aspect posed great challenges on the SC, because contrary to novel products, process innovations in

SCM do not have to be accepted by the market, but within one's own company and simultaneously between the companies one is involved with in business relations. Instead of the acceptance of new customers, the acceptance of managers and employees is put forward [30, 33—34; 65, 4]. The finding of acceptance is thus carried out on two levels: First, a consensus between the companies involved has to be found, afterwards, the sensitization and motivation of the employees is performed [32, 276]. Another important aspect for an efficient implementation of innovative processes is the creation of a holistic SC philosophy. The individual alignment of the cooperating partners is to be transformed into an SC-wide team-feeling. Process innovations that may not be connected to immediate positive effects for single companies can only be implemented with regard to a shared goal alignment [6, 172—175; 16, 184—186].

Yet, the determining factor for the success of process innovations is not only the initial implementation into the SC, but much more the concrete economic execution. The innovative concept must find acceptance in the daily value creating process of the SC [10, 37; 14, 11; 50, 26]. Thus, the commercial launch contains the interval between the start of planning the actual launch and the successful assertion in the value creating process [40, 329—331; 61, 256]. The implementation of innovative processes or concepts can either be done simultaneously along the SC or sequentially between the involved companies (cf. fig. 2).

Figure 2: Roll-out strategies during the commercial launch [32, 272]



In a **«Big-bang» launch**, the switch to new process organizations is carried out simultaneously along the SC without an offset in time or area. The **«sequential» Integration** of new processes can be differentiated in regional spread and integration along the stages of the value chain. The implementation of innovative processes can either be done sequentially within certain regions (vertically) or between certain levels of the SC (horizontally). The origin is in any case a «piloted» implementation between two sequential stages of the value creation process in a certain region. Mostly, the collaboration between the respective Original Equipment Manufacturer (OEM) with a strategically important 1st-tier supplier or retailer in the home country of the OEM is chosen [8, 265—269; 32, 271—274; 48, 4—5; 63, 7—9].

The inter-company innovation process can be extended by an **innovation supervision**. As a comprehensive cross-divisional function, it can support all stages in the innovation process and connect all involved companies and functional departments along the entire SC. The most important aspect is securing a market- and result-oriented controlling of the innovation project. In addition to the role of a supporting partner, supervisors also take the role of a critical auditor [21, 46—47; 33, 528—529; 49, 21—22; 61, 283—285].

All the previously described stages are to a large degree in accordance with the traditional innovation process within a complex SC. However, the development process of innovative SCM concepts is not concluded with the commercial launch by one SC. The implementation in a special SC is distinguished by an individual situation and the industry or region in which the involved companies are acting. Since SCM concepts generally are not constrained with regard to distinct companies, the successfully implemented process innovations have to be detached from the company-specific environmental terms and afterwards further **developed into global standards**.

The process of further development is carried out on two levels that influence each other. Aside from a continuous diffusion in the market, the theoretical foundation plays an important role to ensure preferably universal implementation prerequisites and standardized procedures. During **diffusion**, the innovative approaches are adopted by other SCs and adapted to their specific terms. The social system of diffusion should hereby not be limited toward specific branches or regions, but also contain completely novel fields of application [33, 47; 51, 5; 61, 262].

With increasing diffusion, a rising relevance in business practice is reached, yet for an actual SCM concept there is still a need for a

theoretical foundation besides all branch and company specific context factors. An important aspect in this stage is the cooperation with external research institutes. Based on experience knowledge of previous applications in selected SCs the innovative processes are further developed into universal concepts. In the center of the examination is hereby the inquiry of the relevant **concept knowledge**, according to whose five knowledge categories (cf. tab. 6) a comprehensive description of the distinct concepts can be performed. A preferably high level of abstraction from company and branch specific characteristics is of crucial importance, because a transformation into a universal, globally applicable SCM concept can only be performed this way [3, 6—9; 34, 45—47; 66, 15—16].

Table 6

DIFFERENT CATEGORIES OF CONCEPT KNOWLEDGE [34, 45]

Concept knowledge	**Knowledge of concept logic:** • Distinction between concepts • Elements of concepts (processes, process steps) • Connection and relations between concept elements • Roles regarding the implementation of concepts (operator, process owner)
	Knowledge of concept information • Input and output of underlying processes • Required resources for the implementation of concepts
	Knowledge of concept frame conditions • Critical success factors or disruptive factors • Potential obstacles with the implementation
	Knowledge of concept performance • Quantitative statements about the performance of concepts • Measurement systems during the implementation of concepts (metrics, indicators, target values)
	Knowledge of concept foundation: • Purpose of the existence of concepts • Purpose of the specific design of the distinct elements of concepts

However, the collaboration between science and practice should not be limited to the last stage of the model. The theoretical foundation can also be performed concurrently along the distinct stages of the model.

An intense collaboration between practice and science along the entire development process can be assumed to be an ideal solution due to mutual synergy effects [11, 157—167; 18, 25—35].As shown in the previously described stage model, the business practice is the premier originator for innovative SCM concepts. The best solution approaches often originate from the practical application in SCs that are to be theoretically refined afterwards — preferably in cooperation with external research institutes.

5. Conclusions and Prospects

Indicated by the results of the empirical survey, the development of innovative SCM concepts gains further relevance. Especially with regard to future challenges toward SCM, there is a strong need for novel solutions. New challenges are posed on SCM at all times due to rising dynamics of environmental factors that can only be faced to a limited extent with conventional approaches.

The development of innovative solutions for SCM will become a crucial competitive factor, which is why the developed stage model is not only a motivating incentive for company practice, but — due to its practice-oriented alignment (cf. [28, forthcoming], who apply the model to the development of Kanban] — can be used as a reference for companies and SCs that want to get competitive advantages over their business rivals by concrete pioneer performances. Because of its high relevance, scientists as well should increasingly get involved in this topic to provide more sophisticated tools for company activities in research and development.

Attachment: Structure and Process of the Empirical Survey

The basis for the determination of the largest German companies by turnover in 2010 was the data base «Top 500 Unternehmen in Deutschland 2010» of the journal DIE WELT [43]. The missing companies were afterwards complemented using branch specific tables [e. g. 7; 38; 42; 44] and detailed internet research. International and older rankings were continuously updated and made fit to the German market. Because of this thorough research the performed study can be considered representative for the biggest companies in the examined business branches.

The survey was in all cases send to the head of logistics or SCM on a company level. The direct contact was either determined by internet research or request by telephone. The study itself was carried out in four stages. At first, the questionnaire was created, validated in pretests with selected company representatives and further adjusted. In this area, the problem of differing term definition was examined. It was shown that the singular SCM concepts — despite a partly

diverging usage in literature — were still be understood relatively similar by intuition and thus the informative value of the study was guaranteed. The finished questionnaire was afterwards sent to the corresponding partners with the plea for them to return it or to participate online (www.uni-marburg.de/scm-studie). In two subsequent rounds, each one after three weeks, an email was sent if the questionnaire was missing with a new reminder, so that in the end a return quota of 11.1 % could be achieved.

The problem of a «non-response bias» has to be taken into account with regard to the study's results as well. It can be assumed that especially companies that have already implemented SCM were participating in the survey, while inexperienced companies can be expected to be represented to a lesser degree. However, this has no negative impact on the informational value of the study's results, since SCM-relevant topics are thus mostly answered by corresponding partners who have collected some experience with the distinct topics. This effect is also shown in the participants' distribution over the business branches. For example, in the industries «machine tools» or «metal production and metal working», SCM is often only a side issue [7], which also shows itself in low return quotas of only six per cent. During the analysis of the results, the fact that not all business sectors are represented equally has to be taken into account. However, with regard to the selected key indicators «need for innovative SCM concepts with regard to current problems « and «future problems», a normalized average — in the sense of equalized percentages of the respective branch average — only leads to negligible deviations of less than 0.3 percentage points.

References

1. *Alicke, K.* (2005). *Planung und Betrieb von Logistiknetzwerken. Unternehmensübergreifendes Supply Chain Management*. Springer, Berlin et al.

2. *Baker, K. G. and Albaum, G. S.* (1986). Modeling New Product Screening Decisions. *The Journal of Product Innovation Management*, 3 (1), pp. 32—39.

3. *Bandow, G., Wenzel, S. and Wischniewski, S.* (2008). *Prozess-standardisierung auf Basis von Erfahrungswissen*. Fraunhofer-Publica, Dortmund.

4. *Baumgarten, H. and Darkow, I.-L*. (2004). Konzepte im Supply Chain Management. In Busch, A. and Dangelmaier, W. (eds.), *Integriertes Supply Chain Management. Theorie und Praxis effektiver unternehmensüber-greifender Geschäftsprozesse,* pp. 91—110. Gabler, Wiesbaden.

5. *Beamon, B. M.* (2008). Sustainability and the Future of Supply Chain Management. *Operations and Supply Chain Management: An International Journal,* 1 (1), pp. 4—18.

6. *Best, E. and Weth, M.* (2009). *Geschäftsprozesse optimieren. Der Praxisleitfaden für erfolgreiche Reorganisation.* Gabler, Wiesbaden.

7. BESTgroup Consulting & Software GmbH (2011). *BESTlogistics 2011*. BESTgroup, Postdam.

8. *Bick, M.* (2004). Einführungskonzept für Supply Chain Management Software am Beispiel von SAP APO. In Busch, A. and Dangelmaier, W. (eds.), *Integriertes Supply Chain Management. Theorie und Praxis effektiver unternehmensübergreifender Geschäftsprozesse*, pp. 259—283. Gabler, Wiesbaden.

9. *Braun, D.* (2011). *Von welchen Supply-Chain-Management-Manahmen profitieren Automobilzulieferer? Eine unternehmenswertorientierte Analyse der Wirkungen von Supply-Chain-Management-Maßnahmen an der Schnittstelle zwischen Zulieferer und Automobilhersteller.* Gabler, Wiesbaden.

10. *Brockhoff K.* (1999). *Forschung und Entwicklung. Planung und Kontrolle.* Oldenbourg, München/Wien.

11. *Chow, R. and Joost, G.* (2010). Design Research in University-Industry Collaborative Innovation. In Arnold, H., Erner, M., Möckel, P. and Schläffer, C. (eds.), *Applied Technology and Innovation Management. Insights and Experiences from an Industry-Leading Innovation Centre*, pp. 157—167. Springer, Berlin et al.

12. *Christopher, M.* (2005). *Logistics and Supply Chain Management. Creating Value-Adding Networks*. Prentice Hall Financial Times, Harlow et al.

13. *Cooper, M. C., Lambert, D. M. and Pagh, J. D.* (1997). Supply Chain Management: More than a New Name for Logistics. *The International Journal of Logistics Management*, 8 (1), pp. 1—14.

14. *Corsten, H., Gössinger, R. and Schneider, H.* (2006). *Grundlagen des Innovationsmanagements*. Vahlen, München.

15. *Delfmann, W.* (1999). ECR — Efficient Consumer Response. *DBW — Die Betriebswirtschaft*, 59 (4), pp. 565-568.

16. *Dülfer, E.* (1994). Corporate Culture of Co-operatives. In Dülfer, E. and Laurinkari, J. (eds.), *International Handbook of Cooperative Organizations*, pp. 179-186. Vandenhoeck & Ruprecht, Göttingen.

17. *Elmuti, D.* (2002). The Perceived Impact of Supply Chain Management on Organizational Effectiveness. *The Journal of Supply Chain Management*, 38 (3), pp. 49—57.

18. *Elovici, Y., Englert, R. and Glezer, C.* (2010). Integration of Academic Research into Innovation Projects: The Case of Collaboration with a University Research Institute. In Arnold, H, Erner, M., Möckel, P. and Schläffer, C. (eds.), *Applied Technology and Innovation Management. Insights and Experiences from an Industry-Leading Innovation Centre*, pp. 25-35. Springer, Berlin et al.

19. FoodProcessing.com (2011). *Food Processing's Top 100*. URL: http://www.foodprocessing.com/top100. 25.10.2011.

20. GCI [Global Commerce Initiative], Capgemini, SAP and hp (2008). The Future Supply Chain 2016. Serving Consumers in a Sustainable Way. GCI, no place given.

21. *Gentner, A.* (1993). Vom F&E- zum Innovationscontrolling. Warum die Beschränkung auf F&E-Probleme und -Lösungsansätze zu wenig ist. Controlling — Zeitschrift für erfolgsorientierte Unternehmenssteuerung, 5 (1), pp. 46—47.
22. *Göpfert, I.* (2005). Logistik Führungskonzeption. Gegenstand, Aufgaben und Instrumente des Logistikmanagements und-controllings. Vahlen, München.
23. *Göpfert, I.* (2009). Zukunftsforschung. In Göpfert, I. (ed.), Logistik der Zukunft — Logistics for the Future, pp. 1—37. Gabler, Wiesbaden.
24. *Göpfert, I., Braun, D. and Wellbrock, W.* (2011). Wirkung und Implementierungsgrad von Supply-Chain-Management-Maßnahmen in der Automobilindustrie sowie Empfehlungen zu deren Kombination. Discussion Papers on Logistics and Supply Chain Management Nr. 1. Department of General Business Administration and Logistics, Philipps-University, Marburg.
25. *Göpfert, I., Schulz, M. and Wellbrock, W.* (2012). Zukunftstrends in der Automobilindustrie. In Göpfert, I., Braun, D. and Schulz, M. (eds.), Automobillogistik — Stand und Zukunftstrends, forthcoming. Gabler, Wiesbaden.
26. *Göpfert, I. and Wellbrock, W.* (2011). Zielerreichungsgrad bestehender SCM-Konzepte — Ergebnisse einer Praxisstudie. Discussion Papers on Logistics and Supply Chain Management Nr. 2. Department of General Business Administration and Logistics, Philipps-University, Marburg.
27. *Göpfert, I. and Wellbrock, W.* (2011). Zukunftsorientierung in der Logistik. In Tiberius, V. (ed.), Zukunftsorientierung in der Betriebswirtschaft, pp. 201—226. Gabler, Wiesbaden.
28. *Göpfert, I. and Wellbrock, W.* (2012). Ein Leitfaden für die Entwicklung innovativer Supply-Chain-Management-Konzepte. In Göpfert, I. (ed.), Logistik der Zukunft — Logistics for the Future, forthcoming. Gabler, Wiesbaden.
29. *Göpfert, I. and Wellbrock, W.* (2012). Supply-Chain-Management-Konzepte. Zielerreichung, Innovationsgrad und zukünftige Herausforderungen — Ergebnisse einer Praxisstudie. In Wolf-Kluthausen, Hanne (ed.), Jahrbuch der Logistik 2012, forthcoming. Verlagsgruppe Handelsblatt, Korschenbroich.
30. *Grochla, E.* (1980). Betriebswirtschaftlich-organisatorische Voraussetzungen technologischer Innovationen. ZfbF — Schmalenbachs Zeitschrift für betriebswirtschaftliche Forschung, 32 (Special edition 11), pp. 30—42.
31. *Handfield, R. B. and Nichols, E. J. Jr.* (1999). Introduction to Supply Chain Management. Prentice Hall, Upper Saddle River.
32. *Hansmann, H., Laske, M. and Luxem, R.* (2005). Einführung der Prozesse. Prozess-Roll-out. In Becker, J., Kugeler, M. and Roseman, M. (eds.), Prozessmanagement. Ein Leitfaden zur prozessorientierten Organisationsgestaltung, pp. 269-298. Springer, Berlin et al.
33. *Hauschildt, J. and Salomo, S.* (2007). Innovationsmanagement. Vahlen, München.

34. *Hrastnik, J., Rollett, H. and Strohmaier, M.* (2004). Heterogenes Wissen über Prozesse als Grundlage für die Geschäftsprozessverbesserung. In Engelhardt, C., Hall, K. and Ortner, J. (eds.), Prozesswissen als Erfolgsfaktor. Effiziente Kombination von Prozessmanagement und Wissensmanagement, pp. 37-60. Deutscher Universitätsverlag, Wiesbaden.
35. *Huan, S. H., Sunil, K. S. and Ge, W.* (2004). A Review and Analysis of Supply Chain Operations Reference (SCOR) Model. Supply Chain Management: An International Journal, 9 (1), pp. 23—29.
36. IBM (2009). The Smarter Supply Chain of the Future. Global Chief Supply Chain Officer Study. IBM Corporation, Somers N.Y.
37. *Konrad, G.* (2005). Theorie, Anwendbarkeit und strategische Potenziale des Supply Chain Management. Deutscher Universitätsverlag, Wiesbaden.
38. Lebensmittelzeitung (2011). Die marktbedeutenden Handelsunternehmen 2011. Top 50 in Deutschland. Strukturen, Kennzahlen, Standorte. Trade Dimensions, Berlin.
39. *Lockamy III, A. and McCormack, K.* (2004). Linking SCOR Planning Practices to Supply Chain Performance. An Exploratory Study. International Journal of Operations & Production Management, 24 (12), pp. 1192—1218.
40. *Meffert, H.* (2000). Marketing. Grundlagen marktorientierter Unternehmensführung. Konzepte — Instrumente — Praxisbeispiele. Gabler, Wiesbaden.
41. *Monden, Y.* (1998). Toyota Production System. An Integrated Approach to Just-In-Time. Engineering and Management Press, Norcross.
42. N. n. (2011). Top 100 Handelsunternehmen. URL: http://www. german-business.de/html/Business/Top-100-Handelsunter nehmen/5. 25.10. 2011.
43. N. n. (2011). Die 500 größten Unternehmen in Deutschland. URL: http://top500.welt.de/. 25.10.2011.
44. N. n. (2011). Top 100 — Deutsche Chemie, Pharma und Health Care. URL: http://www.bewerbungsshop24.de/shop/Adressen-Arbeitgeber/Top-100-Deutsche-Chemie-Pharma-und-Healthcare.html. 25.10.2011.
45. *Ogden, J. A., Petersen, K. J., Carter, J. R. and Monczka, R. M.* (2005). Supply Management Strategies for the Future. A Delphi Study. The Journal of Supply Chain Management, 41 (3), pp. 29—48.
46. *Ohno, T.* (2009). Das Toyota-Produktionssystem. Campus-Verlag, Frankfurt a. M.
47. *Pfohl, H.-C.* (2010). Logistiksysteme. Betriebswirtschaftliche Grundlagen. Springer, Berlin et al.
48. *Pietsch, M.* (1994). *Beiträge zur Konfiguration von* Standardsoftware am Beispiel der Geschäftsprozeßimplementierung und der Parameterinitialeinstellung bei der Einführung eines großintegrierten PPS-Systems. Friedrich-Alexander University, Nürnberg.
49. *Pleschak, F.* (1991). Prozeßinnovationen. Schäffer-Poeschel, Stuttgart.
50. *Pleschak, F. and Sabisch, H.* (1996). Innovationsmanagement. Schäffer-Poeschel, Stuttgart.

51. *Rogers, E. M.* (2003). Diffusion of Innovations. Free Press, New York et al.
52. *Shingo, S.* (2008). A Study of the Toyota Production System. From an Industrial Engineering Viewpoint. CRC Press, Boca Raton et al.
53. *Simchi-Levi, D., Kaminsky, P. and Simchi-Levi, E.* (2004). Managing the Supply Chain. The Definitive Guide for the Business Professional. McGraw-Hill, New York et al.
54. *Simchi-Levi, D., Kaminsky, P. and Simchi-Levi, E.* (2008). Designing and Managing the Supply Chain. Concepts, Strategies, and Case Studies. McGraw-Hill/Irwin, Boston et al.
55. SMI [Supply Chain Management Institute], EBS [European Business School] (2008). Future of Logistics 2025 — Global Scenarios. SMI, Hamburg.
56. SMI [Supply Chain Management Institut], PWC [PricewaterhouseCoopers] (2010). Transportation and Logistics 2030. Volume 3: Emerging Markets — New Hubs, New Spokes, New Industry Leaders? SMI, Hamburg.
57. Supply Chain Council (2008). Supply-Chain Operations Reference-Model. Version 9.0. Supply Chain Council, Washington/Amsterdam.
58. *Thun, J.-H., Drüke, M. and Camargos, V. S.* (2007). Just in Sequence. Eine Erweiterung des Just in Time durch Sequenzzulieferung. Logistik Management, 9 (2), pp. 19—31.
59. *Trommsdorff, V., Reeb, M. and Riedel, F.* (1991). Produktinnovationsmanagement. WiSt — Wirtschaftswissenschaftliches Studium, 20 (11), pp. 566—572.
60. *Trommsdorff, V. and Schneider, P.* (1990). Grundzüge des betrieblichen Innovationsmanagement. In Trommsdorff, V. (ed.), Innovationsmanagement in kleinen und mittleren Unternehmen. Grundzüge und Fälle — Ein Arbeitsergebnis des Modellversuchs Innovationsmanagement, pp. 1—25. Vahlen, München.
61. *Vahs, D. and Burmester, R.* (2005). Innovationsmanagement. Von der Produktidee zur erfolgreichen Vermarktung. Schäffer-Poeschel, Stuttgart.
62. *Vokurka, R. J., Zank, G. M. and Lund III, C. M.* (2002). Improving Competitiveness Through Supply Chain Management: A Cumulative Improvement Approach. Competitiveness Review, 12 (1), pp. 14—25.
63. *Welti, N.* (1999). Successful SAP R/3 Implementation. Practical Management of ERP Projects. Addison-Wesley, Harlow et al.
64. *Werner, H.* (2010). Supply Chain Management. Grundlagen, Strategien, Instrumente und Controlling. Gabler, Wiesbaden.
65. *Winkler, H. and Kaluza, B.* (2008). Einsatz einer Wertschöpfungsrechnung zur Erfassung und Bewertung von Produkt- und Prozessinnovationen in Wertschöpfungsnetzwerken. In Specht, D. (ed.), Produkt- und Prozessinnovationen in Wertschöpfungsketten. Tagungsband der Herbsttagung 2007 der Wissenschaftlichen Kommission Produktionswirtschaft im VHB, p. 1—31. Gabler, Wiesbaden.
66. *Zink, K. J. and Schröder, D.* (2007). Standardisierung und Partizipation. Komponenten einer ganzheitlichen Unternehmensführung. REFA-Nachrichten, 60 (2), pp. 14—21.