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Doctoral Dissertation

Purchasing and Supply Management Maturity

Critical analysis of established maturity models and development of a situational PSM assessment and transformation framework based on literature review and multiple case studies

for acquiring the academic degree Research Doctorate (Ph.D./Dott. ric.) in Industrial Sciences and Information Engineering

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ABSTRACT

Scientists and practitioners agree that a mature Purchasing and Supply Management (PSM) function can have a major impact on a firm's competitive position. Over recent decades, numerous scientific- as well as management-oriented maturity models in PSM have been developed, trying to indicate the most relevant determining factors of high sophistication and progressive PSM, as well as describing the right path towards being world class. Performing a systematic literature analysis of maturity models from 1988-2015 as well as a multiple case study research, some weaknesses became obvious. The core point of criticism is that these models do not provide proper mechanisms for a context-specific and dynamic adaptation and follow a rigid structure of pre-defined stages indifferent of firm-specific goals, firm size or branch. Therefore, these models mostly exclude or do not sufficiently address the ideas and findings from *contingency theory, resource-based view* and the *dynamic capabilities approach*, as an organisation's ability to reconfigure its competences and structures to address rapidly changing internal and external requirements. Moreover, content-related contradictions, a lack of theoretical and empirical foundation and verification, unclear application logic and missing ready-to-use instruments can be highlighted as further points of criticism, as well as the missing link from the actual assessment to the intended transformation. Given the importance of a well-developed PSM function and the identified rooms for improvement of current models, this thesis aims to develop an original PSM Maturity Framework (PSM^2F) that can be dynamically adapted based upon context-specific factors. Therefore, a two-step approach was introduced – starting with a *self-defined and targeted maturity scenario* (SDTMS) before the actual maturity assessment – to overcome the rigid and hence inflexible structure of following one *uniform maturity point*. Clear and comprehensible application logic was defined as a basic condition to foster self-application *(e.g. triangulation rule of participation, pre-defined maturity reports)* of the framework. Next to this main research goal, developing a clustered overview of the main dimensions and key evaluation points (KEPs) of high PSM maturity as well as elaborating on supportive factors for an effective and efficient transformation were defined as sub-goals. Overall, 25 scientific purchasing maturity models, 22 management-oriented maturity models, 20 purchasing frameworks and 11 studies about trends and challenges in PSM were analysed in a mapping study to finally derive 8 core dimensions and 104 KEPs as reference to assess PSM maturity but also as a set of *response variables* to changing contingencies. Given that the research about maturity in PSM strongly and almost exclusively focuses on the structural change, in this thesis special emphasis was also placed upon behavioural, cultural and individual change aspects, which have proven as a highly relevant ability of an organisation for a successful transformation. Overall, 7 main categories and 45 concrete factors for increasing change management capability were formulated. Based upon these interim results, a first version of the PSM^2F was conceptually designed and validated in a multiple case study approach. In detail, 10 globally operating industrial companies were observed and questioned to gain empirical evidence and ideas for refining the framework and its elements. By combining the theoretical findings from secondary sources as well as practical-experienced based primary sources from the field, a final version of the PSM^2F and its core elements was completed. The framework comprises three core modules *(preparation/work on driving forces, assessment with finally 127 KEPs, reporting/action)* and can be seen as a theoretically well-founded and empirically validated strategic instrument for a context-specific maturity assessment as well as for facilitating and controlling maturity transformation initiatives in a self-application setting. Furthermore, it was possible to identify concrete patterns and structural elements *(e.g. mobilising and blocking congruence; ad-hoc and constant transition)* for a classification and systematisation of maturity improvement initiatives and change behaviours in PSM.

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Jörg Schweiger

Udine and Vienna, March 2016

DECLARATION OF ACADEMIC HONESTY

Hereby I declare that the submitted document is wholly my own work. Any parts of this work, which have been replicated whether directly or indirectly from external sources, have been properly cited and referenced. This work has not previously been submitted to any other examining authority.

Udine and Vienna, March 7th 2016

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LIST OF ABBREVIATIONS

B2B: Business-to-business
BOM: Bill of material
BSC: Balanced scorecard
CBD: Cost break down
CLIP: Confirmed line items performance
CM: Change management
CPO: Chief purchasing officer
CSR: Corporate social responsibility
DISC: Dominance (D), Inducement (I), Submission (S) and Compliance (C)
DoE: Design of experiments
DMS: Document management system
EDI: Electronic data interchange
ERP: Enterprise Resource Planning
ETIM: Electro-technical information model
GTP: General Terms of Purchasing
ICT: Information and communication technology
JIT: Just-in-time
KEP: Key evaluation point
KPI: Key performance indicator
LCC: Low-cost country
LPP: Linear performance pricing
MRO: Maintenance, repair and operations
MRP: Material requirements planning
PMM: Purchasing maturity model
PSM: Purchasing and supply management
PSMF: Purchasing and supply management framework
PSM^2F: Purchasing and Supply Management Maturity Framework
PVO: Purchasing volume
QFD: Quality function deployment
RFQ: Request for quotation
RHMS: Relevant highest maturity scenario
RoW: Rest of world
SCM: Supply chain management
SDTMS: Self-defined and targeted maturity scenario
SMART: Specific, measurable, assignable, realistic, time-related
SME: Small and medium-sized companies
SRM: Supplier relationship management
SWOT: Strengths, weaknesses, opportunities and threats
TCO: Total cost of ownership
THMS: Theoretical highest maturity scenario
TO: Turnover
UNSPSC: United Nations Standard Products and Services Code

Preface

"What distinguishes a professional and mature PSM department?" and *"Which factors determine a successful transformation?"* are two questions that have preoccupied me for more than a decade. Starting my professional career as a scientific assistant at the University of Applied Sciences Joanneum in Austria in 2004, I began to work on these questions from an academic perspective during several projects for the Austrian Research Promotion Agency, the Federal Ministry of Transport, Innovation and Technology and diverse industrial consortia. After finishing a post-graduate degree programme in International Supply Management in 2008, I changed from the academic field to the purchasing consulting business, where I gained the opportunity to work on numerous improvement initiatives in PSM in different industries, including chemicals, engineering, electronics, automotive, energy and the food industry. In 2011, I took charge of building a strategic purchasing department in an industrial company that is operating in a highly competitive and changing market environment. As the head of strategic purchasing in a firm strongly focused on core competencies and innovative products, a mature PSM function is crucial. Due to this practical need for knowing exactly what makes a progressive purchasing and supply management and based upon my unabated interest of dealing with this topic from a scientific perspective, I decided to start a Ph.D. project in this field.

In 2013, I became external Ph.D. candidate at the University of Udine and I was very fortunate to find a supervisor who is also following the approach of creating research results that are theoretically well-founded yet strongly connected with answering questions arising from business practice. This is what management science should be all about.

1 Introduction and positioning of the thesis

The scientific opinion about the importance and necessity of a professional and strategic-oriented purchasing and supply management (PSM) function is obvious. Over recent decades, numerous papers and books have been published expressly underlining the significance of a mature purchasing department as a core function that supports a company's long-term success *(e.g. Hartmann et al., 2012; Lysons/Farrington, 2012; van Weele, 2010; Monczka et al., 2010; Cousins et al., 2008; Carter et al., 2007; Rozemeijer et al., 2003).* Beginning with the much-noticed and frequently quoted paper from *Kraljic (1983)* entitled "Purchasing must become supply management", countless authors from academic or managerial backgrounds have tried to explain the different maturity levels *(purchasing maturity models, chapters 2.2.1-2.2.3)* or more generally the aspects of holistic and professional PSM *(management frameworks in PSM, chapter 2.2.4)* as a sort of guideline to evolve. Nevertheless, the reality in many companies concerning the reached level of professionalism in PSM demonstrates room for improvement. For instance, a study by the consulting company *Oliver Wyman* in 2011 (Purchasing Best-Practice Benchmarking) highlighted the explicit demand for professionalising purchasing organisations, whereby two-thirds of the 300 interviewed German companies defined their own department as being underdeveloped with a need for (further) improvement *(Oliver Wyman, 2011, p.1).* Moreover, *Bergmann/Heß (2014)* drew a similar picture, conducting an investigation in German medium-sized companies. There seems to be a gap between the multitude of recommendations and approaches offered in (dispersed but easy accessible) publications and the successfully implemented measures and strategies within the companies.

One reason for this trend might be that there is *too* much available information (in too many different sources) without a consistent summary that can be easily monitored. Another reason might be that while the goal and direction to reach higher maturity in the different PSM areas is clear, the knowledge about the factors that foster an effective and efficient change and transformation process is missing. Based upon these aspects, the main motivation for this thesis is to make a reasonable contribution to the scientific discussion about maturity research in purchasing and supply management, as well as generating valuable and applicable knowledge for companies *(Stolle, 2008; Jahns, 2005)* that can support them on their path to higher sophistication in PSM.

For a profound positioning of the thesis, the initial situation as well as the problem definition will be discussed in this chapter. Accordingly, the concrete object of study, the research goals and finally the research methodology and the structure of the thesis will be presented.

1.1 Initial Situation and problem definition

With a 60 to 70 percent share of total revenue, the costs for purchased parts have a tremendous effect on the bottom line in the main industries like metal, automotive or electronics *(e.g. Arnolds et al., 2012; Wallner/Schweiger, 2012; BME, 2011; Ortner et al., 2011; Trent, 2004; Ballou, 1998).* Apart from this leverage of PSM on the operating result, which is an argument for the importance of PSM itself, the PSM function in a company is directly affected by major internationally driven business trends like globalisation, short product life-cycles, high volatility and risks on the (raw material) market, complex supply chain structures or sustainability issues *(e.g. Aberdeen, 2014; Roland Berger, 2014; Spina et al., 2013; Dust, 2013; Tate et al., 2012; Wildemann, 2008; Ogden et al., 2005).*

These current aspects and challenges lead to a steadily increasing set of goals the PSM department has to fulfil. Next to the traditional, mostly operational but central objective to ensure the security of supply at low costs and high quality standards *(e.g. Cousins et al., 2008; Arnolds et al., 1998; Kluck, 1998),* more strategic goals with mid- to long-term orientation came on the agenda of PSM executives. Examples are contributing to product design and innovation through early (supplier) involvement *(Roland Berger, 2014; Axelsson et al., 2005a)*, building differentiated sourcing strategies and supplier partnerships *(Aberdeen, 2014; Ortner et al., 2011; Monczka/Markham, 2007),* evaluating the "right" organisational structure (e.g. central, hybrid, decentral; offshoring, nearshoring, onshoring; *Benton, 2010; Monczka et al., 2010; Cousins et al., 2008*), starting corporate social responsibility (CSR) and green procurement initiatives *(van Weele, 2010; Burt et al., 2003),* establish early warning and risk management systems *(A.T. Kearney, 2011)* or ensure highly efficient PSM processes within the company and with the most important suppliers using the proper information and communication technology *(Spring Procurement, 2010; Schweiger et al., 2009).*

To cope with these challenges a high level of professionalism, dynamic adaptability and innovative orientation in the purchasing function is crucial *(Schweiger, 2014; Rozemeijer et al., 2003).* Increasingly more companies realise that a strategically aligned purchasing department can have a major influence on a company's success *(Baier et al., 2008; Ellram et al., 2002).* The installation or promotion of strategic purchasing managers *(e.g. Rozemeijer et al., 2003)*, the establishment of comprehensive IT and controlling tools (e.g. ERP systems, SRM/eProcurement systems, spend management tools) as well as starting programmes for procurement excellence (e.g. Purchasing 2020, Purchasing 2.0, Fit4Purchasing, World Class Supply Management) or sustainability issues are examples of this *(Schweiger et al., 2009)*, marking the will of a

company and its purchasing department to become more professional.[1] In this context, it is interesting for both academics and practitioners to answer the following question: *What distinguishes professional and progressive PSM and what are the most determining issues the respective firm should focus on to reach higher maturity?*

In business practice, executive managers or PSM professionals often see (too) many things to (concurrently) improve *(Schweiger, 2015a; Stolle, 2008).* Taking the resource-based view *(e.g. Barney, 2001; Peteraf, 1993; Wernerfelt, 1984)* as well as the theory of constraints *(e.g. Gupta/Boyd, 2008; Rahman, 1998; Goldratt, 1990)* into account, companies are always limited by its available resources (e.g. personnel, budget), thus making it very important to set priorities on these initiatives that have the highest leverage on the firm's performance or intended goals. Having to handle too many initiatives and actions next to the daily business inevitably leads to more diversity and complexity for the employees in the purchasing department, which can again lead to "*counter-productive effects of improvement" (Schweiger, 2015a, p.12).* This is a serious problem especially for small and medium-sized companies (SME) with limited organizational resources *(Cocca/Alberti, 2010; Singh et al., 2008; Garengo et al., 2005)* as well as an operational focus on securing the materials supply at a good price, in the defined quality and on time *(Sollish/Semanik, 2012).* Consequently, having the ability and knowledge to set the right priorities and transformation steps that lead to a more powerful and competitive PSM is crucial *(Baier et al., 2008).*

In this context, purchasing maturity models (PMMs) can be applied. Over the last decades several scientific as well as practical-oriented PMMs have been developed (see chapter 2.2.1-2.2.3), which describe *"several stages an organization is expected to go through in its quest for greater sophistication" (Schiele, 2007, p.274).* These models offer many suggestions what a company – and in this specific context the PSM department – should do to reach the next maturity level. The hypothesis is that mature purchasing organisations apply best practices, while unsophisticated organisations fail to employ them *(Übeda et al., 2015; Rozemeijer et al., 2003; Ellram et al., 2002; Chiesa et al., 1996),* and that greater maturity and strategic orientation is associated with better (firm) performance *(e.g. Batenburg/Versendaal, 2008; Schiele, 2007; Lockamy/McCormack, 2004; Vickery et al., 2003; Narasimhan/Das, 2001; Carr/Smeltzer, 2000; Carter/Narasimhan, 1996).*

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[1] Several organisations like CIPS (Chartered Institute of Procurement & Supply), BME (Bundesverband Materialwirtschaft, Einkauf und Logistik/Association Materials Management, Purchasing and Logistics), Procurement Leaders, National Procurement Institute, European Institute of Purchasing Management or the Association for Network Logistics (VNL) but also consulting firms like A.T. Kearney (annual Purchasing Performance Excellence Award) are offering Purchasing and Supply Management Awards for innovative PSM activities and projects.

Parallel to that, (management) frameworks in PSM *(e.g. Four Pillars of Purchasing and Supply Chain Excellence by Monczka et al., 2010; Framework for Managing External Resources by EFQM, 2006; House of Sourcing and Supply Management by Eßig, 2005; for an overview see Ortner/Schweiger, 2010 and Schweiger, 2015b; chapter 2.2.4.1)* as well as studies about future trends and challenges in PSM *(e.g. CPO Agenda by Aberdeen, 2014; Past, present and future trends of purchasing and supply management by Spina et al., 2013; Future of Purchasing by Spring Procurement, 2010, see chapter 2.2.4.2)* also deliver helpful aspects to answer the raised question above. In contrast to the maturity models, these frameworks do not distinguish between different stages of maturity but rather offering a condensed description of a holistic and well-structured purchasing function and organisation. Including current PSM studies into the research seems reasonable to ascertain whether a mature PSM function has to cope with new challenges and future trends that are (possibly) not covered from the available models in literature or current models offered from consulting companies or organisations.

At the beginning of the research, a consistent, current and transparent overview and content-related alignment of PMM (scientific and practical-oriented), management frameworks in purchasing and supply management (PSMF) and studies about trends and challenges in PSM was still missing, but necessary to rank the *most important and determining factors of maturity in PSM* as a guideline for PSM professionals. For these factors, the term *key evaluation points* (KEP) will be used in this thesis (see also *Kim et al., 2010, p.191)*.[2] The derived KEPs should be understood as a set of best-practice recommendations[3] or principles of "good" PSM derived from theory and empirical investigation, a company and in a narrower sense a PSM department can choose from and might focus on to reach the intended objectives or better cope with current or anticipated contingency factors.[4]

As it will be shown in chapter 2.2.2 and 2.2.3, the available maturity models in PSM cover a broad spectrum of aspects of high maturity in purchasing and thus they represent a good starting point for research and content-related deepening. However, they also have some shortcomings: Along with some minor issues, these models mainly describe a single and linear path of sequenced stages and do not provide proper mechanisms for a dynamic adaptation or configuration due to contextual aspects *(see*

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2 *De Bruin et al. (2005)* who did a research on maturity models in knowledge management used the term *"domain components"* and *"sub components"* for those determining factors.

3 It would be more suitable to use "good" or "successful" practices, because the term "best practices" would require a global and complete analysis of companies or the opinion of academic and practical experts. Due to the fact that the term "Best Practices" has established itself (also for scientific purpose) it will be used here as well *(e.g. Sousa/Voss, 2008; Netland, 2007; Schiele, 2007; Jahns, 2005; Frehner/Bodmer, 2000)*.

4 According to contingency theory, these KEPs represent a set of *"response variables" (Sousa/Voss, 2008, p.703)*.

also Jording/Sucky, 2015). Therefore, these models do not adequately address the *dynamic capabilities approach (Teece et al., 1997; Eisenhardt/Martin, 2000),* as an organisation's ability to reconfigure its internal and external competences and structures and set the right priorities, in order to cope with changing requirements to stay powerful and competitive in the long term. Moreover, the analysed PMM focus on different and not coherent KEPs of maturity assessment and mainly exclude the transformation phase of the PSM function. Finally, they do not clearly outline or provide recommendations about the (right) application setting in a company.

To overcome these shortcomings, the main motivation of this thesis was to derive an original *Purchasing and Supply Management Maturity Framework (PSM²F)*[5] based upon a well-founded critical evaluation on current maturity models, and theoretical constructs and ideas from other fields in PSM (e.g. management frameworks in PSM, studies about trends and challenges in PSM) and beyond (e.g. change management, organisational development). To be easily applicable, the conceptually designed framework was also validated in a multiple case study research.

1.2 Research goals, methodology and structure of the thesis

Based upon the mentioned initial situation, the outlined fundamental question as well as due to the discussed problems and shortcomings, the dissertation focuses on the following research goals.

Main research goal: Development of an original *Purchasing and Supply Management Maturity Framework (PSM²F)* taking situational and context-specific factors into consideration.	
1.1	Examine the limitations of well-established PMM.
1.2	Develop a consistent and clustered overview of the main dimensions and KEPs of PSM maturity as a basis for setting up a best-practice database ***(first content-related core element of PSM²F)***.
1.3	Derive a *factor model of supportive elements* for effective maturity improvement initiatives ***(second content-related core element of PSM²F)***.
1.4	Develop clear and comprehensible application logic to foster self-application of the PSM²F.
1.5	Clarify if there are concrete patterns and structural elements that enable a classification and systematisation of maturity improvement initiatives and change behaviours in PSM.

Table 1: Research goals

After defining the main research goals, the definition of the research methodology is the next step. In general, the research project can be allocated to the field of managerial economics and management science. Within this research field – and thus also in this thesis – the problems that lead to new research activities mainly appear in practice *(Moser, 2007; Ulrich, 1984),* why managerial economics can be defined as part of the

[5] Defining a clear and unique name for the maturity framework was a deliberate decision in order to be distinguishable from the other models.

applied sciences *(e.g. Schreyögg, 2007; Ulrich, 1984)*. Based upon existing and scientifically grounded results combined with additional inputs from experts representing several hierarchies and industries, recommendations and solutions should be derived.

The defined research goals are directly linked with the research methodology that comes into question *(Schreyögg, 2007)*. In general, it can be distinguished between *explanatory* and *exploratory research*. Whereas the explanatory approach is focusing on testing hypotheses, the exploratory research aims to contribute in a field that previously has been subject to little research. By doing that, a profound basis is created for further hypothesis testing. Although there is quite a discussion about purchasing maturity going on in the scientific community over the last decades, it will be shown in chapter 2 that there is a lack of depth of content concerning critical appraisal, theoretical foundation, practical application as well as empirical validation. Accordingly, the *exploratory multiple case study research approach* was chosen in combination with a *systematic literature review*. The goal of this exploratory approach is to create new insights and knowledge in the area of purchasing and supply management maturity research (assessment and transformation) than rather an empirical verification or falsification of a single aspect of PSM. However, in this thesis, great emphasis is also placed on the explanatory component by focusing on a verification of the theoretically derived concepts in a firm's surrounding to foster easy self-application of the framework in a company.

Applying a combination of three specific research strategies – the *factual-analytical*, the *formal-analytical* and the *empirical research strategy (e.g. Lechner et al., 2013; Ulrich, 1984; Grochla, 1976)* – makes it possible to achieve descriptive as well as prescriptive results.

Research strategy	Description	References to the thesis
factual-analytical	Complex correlations are logically-analytically investigated and recommendations are condensed without empirical testing (mainly literature-based).	Identification of *relevant sources* about PSM maturity. Derive a *common consensus about the core dimensions and KEPs of PSM maturity.* Development of a *factor model of supportive elements* for an effective and efficient PSM transformation.
formal-analytical	Complex structures of problems are simplified to deduce rational decisions (mainly literature-based).	Development of an integrated *Purchasing and Supply Management Maturity Framework* (PSM^2F) using the theoretical findings.
empirical application/ validation	Using case studies for explorative inputs as well as for deriving descriptive statements.	*Gain empirical evidence and validation* from the field using multiple case studies and action research. *Refinement of the PSM^2F.*

Table 2: Research strategies used in the dissertation

Following the statement of *Stuart et al. (2002, p.431)* that *"the customer of the academic knowledge generation process are ultimately the practitioners who "do" purchasing and supply management every day"*, the present thesis defines both, academics *and* practitioners, as target group. For the scientific community the thesis is offering a theoretically well-founded deepening in the field of PMMs as well as a scientific specialisation concerning change management aspects that can foster transformation initiatives in PSM. Moreover, the developed and comprehensively described Purchasing and Supply Management Maturity Framework – with a portfolio of KEPs as well as a condensed summary of factors that have to be taken into account when initiating a transformation in its kernel – can be a useful strategic instrument for practitioners in terms of assessing and continuously improving the PSM performance.

The concrete research procedure for the thesis is based upon two ideal-typical reference models of an empirical research project adapted from *Schnell et al. (2005, p.8)* and *Riesenhuber (2007, p.4)*:[6]

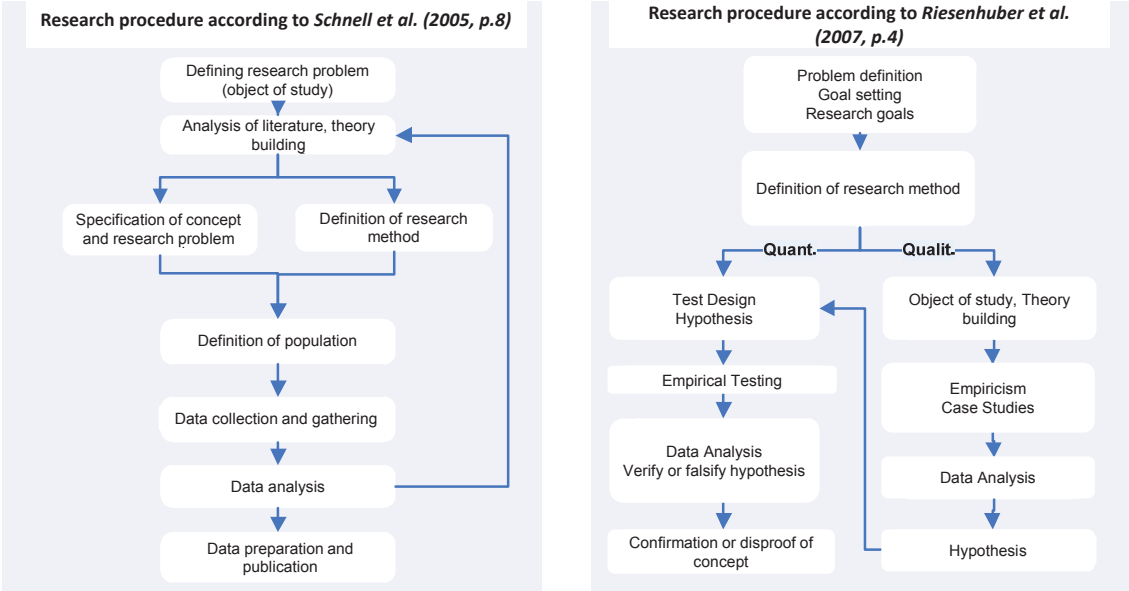

Figure 1: Reference models for research design

Both references start with the definition of the research problem and the goal setting. *Schnell et al. (2005)* are focusing more on the theory-building, whereas *Riesenhuber (2007)* elaborates more on the decision between the different research methods. Depending on the research method, the empirical part of the research project is different concerning its scope. Ultimately, the data has to be collected, analysed and finally used for the adjustment of the model or for the verification or falsification of the hypothesis.

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6 For further information concerning research process models see *Golicic et al. (2005)* and *Stuart et al. (2002)*.

Figure 2 shows the research design for the thesis. It follows mainly the reference models. Nevertheless, it was necessary to partly adapt it with some elements and feedback-loops to meet the pre-defined requirements of practical relevance and exploratory characteristics. In the beginning the research goals – based upon the initial situation and problem definition – are defined (step 1, chapter 1.2). As previously mentioned, a combination of the factual-analytical, the formal-analytical as well as the empirical research approach – using secondary sources from literature as well as primary sources from case studies – will be applied to reach the intended research goals (step 2).

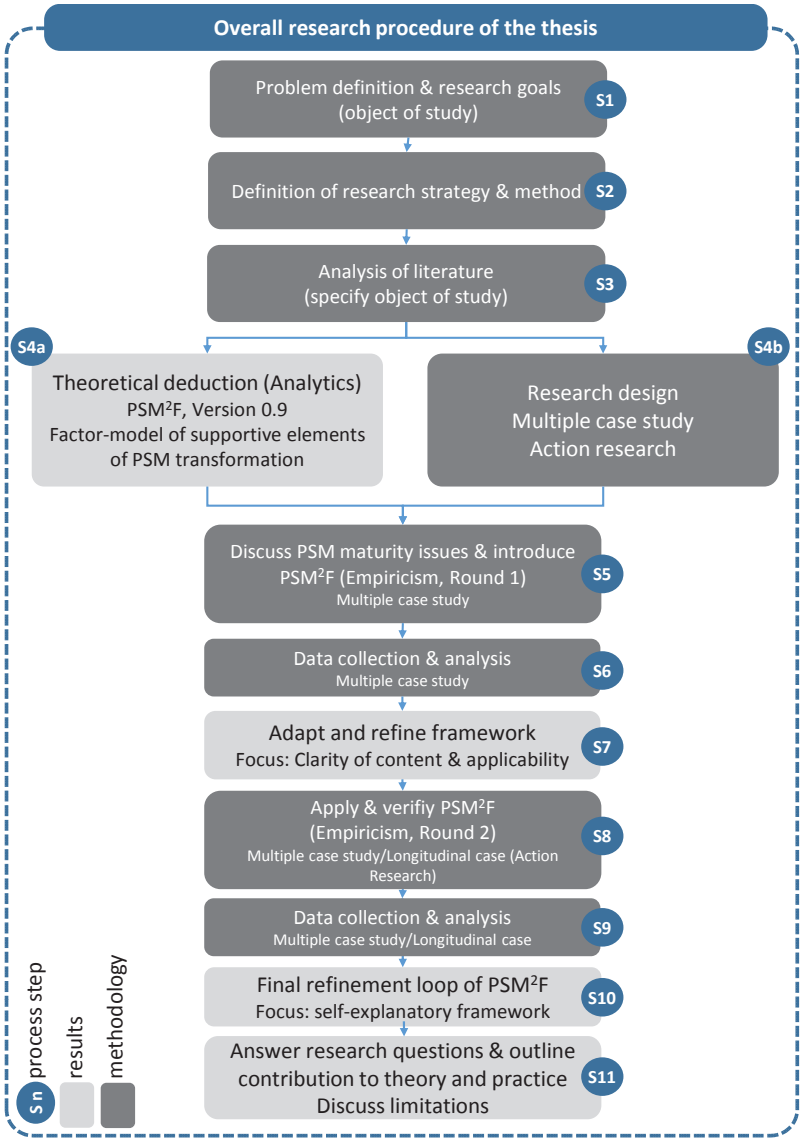

Figure 2: Research Procedure

Within the empirical research approach, quantitative and qualitative measures can be distinguished. In this thesis, the empirical research part will be mainly qualitative,

although quantitative methods will also be used for (summarised) data analysis.[7] A qualitative approach makes sense when the research question cannot be exclusively answered by quantitative measures, or when the complexity of the research goals precludes the sole use of quantitative methods *(e.g. Atteslander, 2010; Golicic et al., 2005).*[8]

An extensive literature study (step 3, chapter 2) is the next step in the research procedure. The focus here is to provide a critical appraisal of existing PMMs as well as deriving a transparent overview of determining KEPs of PSM maturity, including other relevant sources (frameworks and studies). In this step, special focus will also be placed upon analysing supportive factors for change initiatives in PSM. Taking these two elements – *(1) common consensus about progressive purchasing* and *(2) fostering factors for an effective and efficient transformation in PSM* – as a basis, a preliminary version of the original Purchasing and Supply Management Maturity Framework (PSM²F) will be analytically deduced (step 4a, chapter 3).

The main intention of the next step within the research project is to gain empirical evidence from *"real-world conditions" (McCutcheon/Meredith, 1993, p.239)* using a multiple case study approach *(time frame: 06/2014-06/2015).* Based upon the defined research strategy (Table 2) and by following a detailed case study protocol (step 4b, chapter 4 and appendices) serving as a guideline for the empirical research part (step 5-6; 8-9), the specific situation, needs as well as the experiences and opinions of ten companies representing different industries and different firm sizes (concerning number of employees) can be analysed and used to refine the PSM^{2}F and search for concrete patterns and possible classification options of improvement initiatives and change behaviours in PSM (step 7, chapter 5). Therefore, the Purchasing and Supply Management Maturity Framework will be introduced in ten companies and discussed with the participants of each firm to acquire further insights concerning clarity and simplicity in its application *(see research goal 1.4)*. Furthermore, one of these ten companies was also accompanied in a longitudinal study (10/2014-08/2015). Goal of this step was to apply one cycle of the PSM^{2}F (preparation phase/set-up, assessment, transformation and re-assessment) to validate the usability of the framework as a strategic instrument for managing a transformation of PSM (chapter 5.3). In this part of

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7 *Dul/Hak (2007)* state that usually there is a mixture between quantitative as well as qualitative elements within a research, and that it is necessary to make a distinction between qualitative and quantitative methods for *measurement* (the data collection and coding process can therefore lead to numerical scores *(quantitative)* or textual *(qualitative)* scores) as well as qualitative and quantitative methods for *data analysis* (e.g. statistical analysis = *quantitative*; visual inspection/observation = *qualitative*).

8 *Bortz/Döring* are giving a good overview of *qualitative-empirical methods (2006, p.295ff).* Problems and limitations of the qualitative research methods are discussed from *Diekmann (2007, p.451ff).* A general discussion about research methodologies in Supply Chain Management can be found in *Kotzab et al., 2005*.

the research project a methodological shift and overlap between the case study method and the action research approach *(e.g. Mathiassen et al., 2012; Kock, 2007; Müller, 2005; Prybutok/Ramasesh, 2005; Davison et al., 2004, Coughlan/Coghlan, 2002)* becomes obvious. Whereas the case study approach primarily focuses on *observation* and *discussion*, the action research "allows" direct *collaboration* and *facilitation* of the researcher with the firms to derive improvements and solutions for a specific (company-specific) problem *(Baker/Jayaraman, 2012; Prybutok/Ramasesh, 2005).*[9]

Within the case study but also throughout the entire research period, multiple and diverse sources of evidence were used (primary and secondary; see chapter 4.3). To conclude the manager's and practitioner's perspective in the review and interpretation of the preliminary and theoretically derived results and constructs *(Spina et al., 2013),* especially expert interviews were highly valuable and important. These interviews are frequently applied in Management (and Social) Science as an instrument to include the expertise of people who can contribute to the defined research goal due to their responsibility or position in the corporate practice *(Pfadenhauer, 2005; Bogner/Menz, 2005; Deeke, 1995).*

In the end (chapter 6), the research questions will be answered as well as the contribution to theory and practice can be highlighted (step 10). Moreover, limitations and ideas will be discussed, which subsequently form the basis for further research projects (step 11).

RESEARCH NOTE

In accordance with the classification from *Wendler (2012, p.1324),* the present thesis aims to contribute to all four domains in maturity model research:

- *Meta-Analysis of available maturity models (chapter 2)*
- *Maturity model development (chapter 3)*
- *Maturity model application (chapter 4)*
- *Maturity model validation (chapter 5)*

[9] For another example of combining case study and action research see *Rozemeijer et al. (2003)*, *Momme/Hvolby (2002)* and *Wagner/Kaufmann (2004).*

2 Literature review and theoretical foundation

Sound empirical research begins with strong grounding in related literature, followed by identifying research gaps that lead to a need for further investigation *(Eisenhardt/Graebner, 2007)*. Accordingly, a theory-based perspective on PSM maturity research from diverse perspectives will be given in this chapter. Based upon this, the main areas and factors of maturity *(key evaluation points/KEPs)* can be derived, limitations can be discussed and transferred into the development of a situational and context-specific Purchasing and Supply Management Maturity Framework (chapter 3).

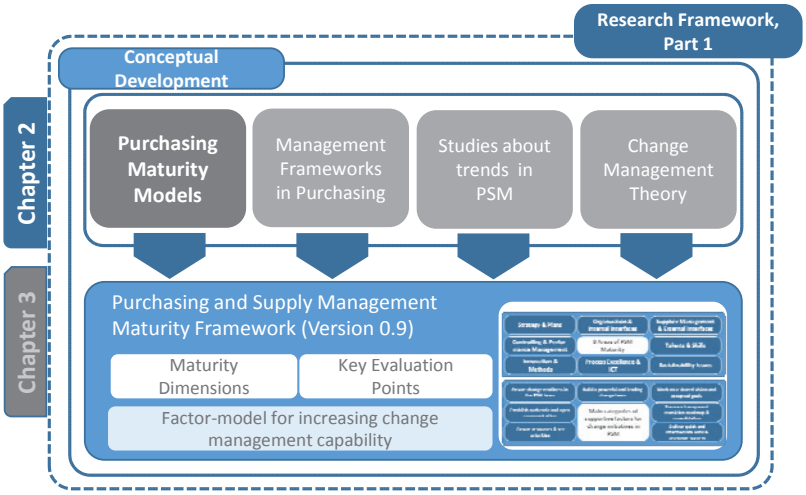

Figure 3: Research Framework, Conceptual Development (I)

It is not clearly indicated where maturity models have their origin. *Van Looy* (2014), *Wendler* (2012) and *Fraser et al.* (2002) state that they are rooted in the field of quality management *(Quality Management Process Maturity Grid by Crosby (1979))*.[10] Others *(Bititci et al., 2015)* see the roots in the field of information systems management *(Four stages of electronic data processing growth by Gibson/Nolan, 1974)*. In the ICT domain, maturity models are still very common, especially in the domain of software development and improvement (e.g. CMMI: Capacity Maturity Model Integration by *Software Engineering Institute*, SPICE/ISO-IEC 15504: Software Process Improvement and Capability Determination). Other examples can be found in the field of process management (e.g. BPMM: Business Process Maturity Model by *Object Management Group*, BPOMM: Business Process Oriented Maturity Model by *McCormack/Johnson, 2001*, PEMM: Process and Enterprise Maturity Model by *Hammer, 2007*; vPMM: A value-based Process Maturity Model by *Lee et al., 2009;* Process Management Maturity Assessment by *Rohloff, 2009*), project management *(e.g. Ibbs/Kwak, 2000; Crawford,*

[10] *Wendler* states that first thoughts about the maturity (model) concept date back to the 1930s and are connected with *Shewhart's* work in the early 1930s (Economic Control of Quality of Manufactured Product, London, 1931).

2014), service operations *(McKluskey, 2004),* performance management *(e.g. Bititci et al., 2015; Cocca/Alberti, 2010),* ERP systems *(Holland/Light, 2001),* innovation management and new product development *(e.g. Panizzolo et al., 2010; Cormican/O'Sullivan, 2004; Chiesa et al., 1996),* construction *(e.g. Hutchinson/Finnemore, 1999)* or knowledge management *(e.g. Chen/Fong, 2012; Kaner/Karni, 2004)*.[11]

2.1 Literature review approach

The goal of this paragraph is to make the process of searching, selecting and analysing the literature as transparent as possible to emphasise rigour in this research step. The main goal is to identify and cover the relevant literature and sources to derive the most important themes, topics, patterns as well as critical issues concerning the research goals *(Seuring et al., 2005).* The approach presented here comprises the classic steps of a literature review *(e.g. Sartor et al., 2014; Spina et al., 2013, Bryman, 2012; Rousseau et al., 2008; Webster/Watson, 2002):*

1. *Source identification*
2. *Source selection & evaluation, and*
3. *Data analysis & interpretation*

As the main source, the most important peer-reviewed journals in PSM – analytically derived from *Wynstra (2010)* – were taken as primary basis and were extended with other scientific journals and databases in the PSM field.

relevant journals regularly publishing on PSM topics (Wynstra, 2010) *>> title search*	▪ Journal of Purchasing and Supply Management ▪ Journal of Supply Chain Management ▪ Supply Chain Management: An International Journal ▪ International Journal of Operations and Production Management ▪ International Journal of Production Economics ▪ International Journal of Production Research ▪ Journal of Business and Industrial Marketing ▪ Journal of Business Research ▪ Journal of Operations Management ▪ Industrial Marketing Management
extended list *>> keyword search*	▪ International Journal of Physical Distribution and Logistics Management ▪ Journal of Business Logistics ▪ Supply Chain Management Review ▪ Harvard Business Review ▪ MIT-Sloan Management Review ▪ Industrial Management ▪ Benchmarking: An international Journal ▪ Journal of Change Management ▪ Journal of Organizational Change Management
scientific databases *>> keyword search*	▪ EBSCO Business Source Premier ▪ ABI/Inform Global - T&I ProQuest

Table 3: Selected sources for (electronic) literature research

[11] *Saco* estimates that there are between 100-200 maturity models in diverse fields in existence today *(Saco, 2008, p.12). De Bruin et al. (2005)* speak about 150 maturity models. A profound analysis and overview about maturity model research in general can be found in *Wendler* (2012).

The detailed analysis of maturity models in PSM was the primary focus and inner kernel of literature research (chapters 2.2.1-2.2.3). However, it was obvious also to place emphasis on management frameworks as well as studies about future trends and challenges (chapter 2.2.4) in the purchasing field. Especially for deriving the factor model of supportive elements on maturity improvement initiatives *(research goal 1.3),* the analysis of change management models and constructs and sources about organisational development also appeared reasonable (Figure 4). This step might be highly relevant given that the maturity models primarily focus on the assessment of (structural elements of) maturity (chapters 2.2.2 and 2.2.3) but beyond that virtually do not provide recommendations concerning the transformation of the PSM function. Furthermore, this decision to collect data from multiple sources not only focusing on maturity models in PSM ensured avoiding selection bias.

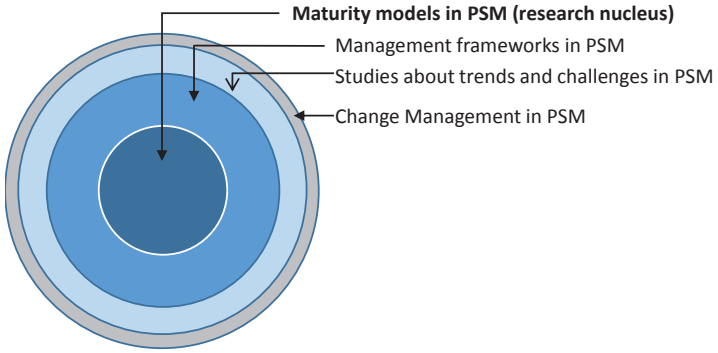

Figure 4: Layers of research

Whereas a maturity model describes different stages/levels through which a PSM department has to proceed to be *world class*, PSM frameworks can be understood as a structured summary of (linked) functions and processes of a holistic and well-structured purchasing department *(Ortner/Schweiger, 2010)*. Finally, studies about future trends in PSM can help to indicate these aspects, which are (perhaps) not covered from the available models in literature but might be necessary to anticipate in order to prepare the PSM function for forthcoming challenges.

As a first step, a title search for the mentioned journals from *Wynstra (2010)* for the period 1984-2015 (Table 3) was carried out, followed by a keyword search *(e.g. Bititci et al., 2012)* in the scientific databases *EBSCO Business Source Premier* and *ABI/Inform Global-T&I ProQuest* ("anywhere except full text", "abstract" or "title").[12] The initial keywords were *"Purchasing Maturity", "Supply Management Maturity", "Procurement Maturity", "Supply Chain Management (SCM) Maturity", "Supply*

[12] The keyword research was carried out at the library of the *Vienna University of Economics and Business* which is offering the biggest choice and amount of scientific (electronic) resources in the business and management domain in Austria.

Maturity", "Maturity Model + Purchasing", "Maturity Model + Supply Management", "Maturity Model + Procurement", "Maturity Model + Supply Chain Management", "Maturity Model + Supply" as well as *"Stage Model + Purchasing", " Stage Model + Supply Management", " Stage Model + Procurement", "Stage Model + Supply Chain Management" and "Stage Model + Supply – Chain"*. For detecting relevant contributions concerning PSM frameworks the following keywords were chosen: *"Purchasing Framework", "Supply Management Framework", "Procurement Framework", "Supply Chain Management Framework", "Supply Framework", "Purchasing Model", "Supply Management Model", "Procurement Model", "Supply Chain Management Model", "Supply Model"* as well as *"Management Model + Purchasing", "Management Model + Supply Management", "Management Model + Procurement", "Management Model + Supply Chain Management"* and *"Management Model + Supply"*.

		Business Source Premier		ABI/Inform Global T&I ProQuest	
Keywords	*Searching in…*	*Total mentions*	*Peer rev. mentions*	*Total mentions*	*Peer rev. mentions*
Purchasing Maturity, Supply Management Maturity, Procurement Maturity, SCM Maturity, Supply Maturity	anywhere except full text	10	8	17	8
Maturity Model + Purchasing, Supply Management, Procurement, Supply, SCM	Abstract	33	19	40	16
Stage Model + Purchasing, Supply Management, Procurement, Supply, SCM	Abstract	55	55	67	46
Purchasing Framework, Supply Management Framework, Procurement Framework, Supply Framework, SCM Framework	Abstract	59	30	123	35
Purchasing Model, Supply Management Model, Procurement Model, Supply Model, SCM Model	Abstract/ Title[13]	420/65	316/53	850/107	298/40
Management Model + Purchasing, Supply Management, Procurement, Supply, SCM	Abstract	88	69	141	65

Table 4: Result of first round of keyword search[14]

Subsequently and based upon the first results, the following keywords were added to the keyword search:[15] *"Purchasing Excellence", "Supply Management Excellence", "Procurement Excellence", "Supply Chain Management Excellence", "Supply Excellence", "Purchasing Audit", "Supply Management Audit", "Procurement Audit", "Supply Chain Management Audit", "Supply Audit", "Purchasing Power", "Supply Management Power", "Procurement Power", "Supply Chain Management Power", "Supply Power", "World Class Purchasing", "World Class Supply Management", "World Class Procurement", "World Class Supply Chain Management", "World Class*

[13] For the keywords *"Purchasing Model, Supply Management Model, Procurement Model, Supply Model, Supply Chain Management Model"* it was necessary to limit the search to "title" instead of "abstract" because of too many mentions.

[14] The two databases have a different view on peer-reviewed journals, why the same articles count for "peer-reviewed" in the one and for "grey literature" in the other database (e.g. Business Horizons).

[15] It was very helpful to use the functionality "recommended articles" in order to find related articles or other relevant keywords.

Supply", "Purchasing Stages", "Supply Management Stages", "Procurement Stages", "Supply Chain Management Stages" and *"Supply Stages".*

Given that one main research goal was to derive a *factor model of supportive elements* for effective and efficient maturity improvement/change initiatives, the keywords *"Purchasing Evolution", "Supply Management Evolution", "Procurement Evolution", "Supply Chain Management Evolution", "Supply Evolution", "Purchasing Transformation", "Supply Management Transformation", "Procurement Transformation", "Supply Chain Management Transformation", "Supply Transformation", "Change Management + Purchasing", "...+Supply Management", "...+Procurement", "...+Supply Chain Management"* and *"Change Management + Supply"* were also added.

		Business Source Premier		ABI/Inform Global T&I ProQuest	
Keywords	*Searching in…*	*Total Mentions*	*Peer rev. mentions*	*Total Mentions*	*Peer rev. mentions*
Purchasing Excellence, Supply Management Excellence, Procurement Excellence, SCM Excellence, Supply Excellence	Abstract	50	2	66	3
Purchasing Audit, Supply Management Audit, Procurement Audit, Supply Audit, SCM Audit	Abstract	11	8	20	11
Purchasing Power, Supply Management Power, Procurement Power, Supply Power, SCM Power	Abstract/ Title[16]	5261/ 940	2689/ 657	12957/ 1961	1906/ 550
World Class Purchasing, World Class Supply Management, World Class Procurement, World Class Supply, World Class SCM	Abstract	55	10	142	8
Purchasing Stages, Supply Management Stages, Procurement Stages, Supply Stages, SCM Stages	Abstract	11	8	23	8
Purchasing Evolution, Supply Management Evolution, Procurement Evolution, Supply Evolution, SCM Evolution	Abstract	11	3	5	0
Purchasing Transformation, Supply Management Transformation, Procurement Transformation, Supply Transformation, SCM Transformation	Abstract	37	7	64	3
Change Management + Purchasing, Supply Management, Procurement, Supply, SCM	Abstract	133	64	131	23

Table 5: Result of second round of keyword search[17]

Next to scientific journals also selected academic textbooks, which have been frequently cited in the relevant articles, were used as further relevant sources for information (Table 6).

[16] For the keywords *"Purchasing Power, Supply Management Power, Procurement Power, Supply Power, Supply Chain Management Power"* it was necessary to limit the search to "title" instead of "abstract" because of too many mentions.

[17] The selected papers for the in-depth analysis are listed in chapter 2.2.1 (maturity models), 2.2.4 (PSM frameworks) and 2.2.5 (PSM transformation).

(selected) academic textbooks on PSM	▪ *Bhote:* Strategic Supply Management (1989) ▪ *Hahn/Kaufmann:* Handbuch industrielles Beschaffungsmanagement (EN: Handbook of Industrial Purchasing Management, 2002) ▪ *Burt et al.:* World Class Supply Management (2003) ▪ *Axelsson et al.:* Developing Sourcing Capabilities (2005) ▪ *Cousins et al.:* Strategic Supply Management (2008) ▪ *Large:* Strategisches Beschaffungsmanagement (EN: Strategic Purchasing Management, 2009) ▪ *Monczka et al.:* Purchasing & Supply Management (2010) ▪ *Benton:* Purchasing and Supply Chain Management (2010) ▪ *Van Weele:* Purchasing and Supply Chain Management (2010) ▪ *Lysons/Farrington:* Purchasing and Supply Chain Management (2012) ▪ *Sollish/Semanik:* The Procurement and Supply Manager's Desk Reference (2012)
(selected) academic textbooks on Change Management	▪ *Champy:* Reengineering im Management (EN: Reengineering in Management, 1995) ▪ *Liebmann:* Vom Business Process Reengineering zum Change Management (EN: From Business Process Reengineering to Change Management, 1997) ▪ *Kotter/Cohen:* The heart of change (2002) ▪ *Cacaci:* Change Management (2006) ▪ *Holman et al.:* The Change Handbook (2006) ▪ *Carnall:* Managing Change in Organizations (2007) ▪ *Graaf/Kolmos:* Management of Change (2007) ▪ *Steinle et al.:* Change Management (2008) ▪ *Pfannenberg:* Veränderungskommunikation (EN: Change Communication, 2009) ▪ *Cameron/Green:* Making Sense of Change Management (2009) ▪ *Krüger:* Excellence in Change (2009) ▪ *Kostka/Mönch:* Change Management (2009) ▪ *Hiatt/Creasey:* Change Management: The People Side of Change (2012) ▪ *Kotter:* Leading Change (2012) ▪ *Lauer:* Change Management (2014)

Table 6: Relevant (academic) textbooks in the PSM and change management field

For a final counter-check and as a necessary means for gaining information about management-oriented maturity models, a keyword search ("maturity model") on www.google.com and scholar.google.com was conducted. Moreover, webpages of specified consulting companies in the area of PSM (taking the *Vault-Ranking of TOP-Consulting Companies* (2014) and the ranking of *Brand Eins Thema, Special Edition "Consulting Companies" (2014)* as a basis) and well-known PSM institutions were searched for useful information, and if possible a direct contact by mail or telephone was established (Table 7).

Consulting companies	Accenture, adcpi Consulting, ADR international, Arthur D. Little, A.T. Kearney, Bain & Company, Boston Consulting Group, Bearing Point, booz&co, Cell Consulting, ConMoto Consulting Group, Effico-Consulting, futurepurchasing, H & Z, Horváth & Partners, Implement Consulting Group (ICG), Innovative Management Partner (IMP), Insight Sourcing Group, Kerkhoff Consulting, McKinsey & Company, MHP, Mercer, OC&C Strategy Consultants, Oliver Wyman, OptiAchats, PA Consulting Group, pm2Consult, PMMS Consulting Group, Porsche Consulting, Purspective, PricewaterhouseCoopers, Roland Berger, Sourceone Management Services, Spring Procurement, Strategic Procurement Solutions, synGroup
PSM organisations	Aberdeen Group, Bundesverband Materialwirtschaft, Einkauf und Logistik (BME)/Association Materials Management, Purchasing and Logistics, CAPS Research/University of Arizona, Chartered Institute of Purchasing & Supply Management, European Foundation for Quality Management (EFQM), Gartner Group, Institute of Supply Management, International Purchasing and Supply Education and Research Association, National Procurement Institute, Supply Chain Council, Supply Chain Management Association, The Institute for Public Procurement, The International Federation of Purchasing and Supply Management

Table 7: Contacted consulting companies and organisations in the PSM field

The decision not only to include scientific but also so-called *grey literature* into the research seems important to identify more recent and emerging topics that have not been published thus far or will not be published at all from academic press *(e.g. Laurans et al., 2013; Peng/Nunes, 2009; Rothstein/Hopewell, 2009; Adams et al., 2006)*. So the possible publication bias *("file drawer" effect*) can be limited to a minimum *(Sartor et al., 2014; Witherspoon et al., 2013; Pagell/Kristal, 2011).*

Due to the close interrelation between Purchasing and Supply Management (PSM) as *"the management of the company`s external resources in such a way that the supply of all goods, services, capabilities and knowledge which are necessary for running, maintaining and managing the company`s primary and support activities is secured at the most favorable conditions" (van Weele, 2010, p.8)* and Supply Chain Management (SCM) as *"a process-oriented approach to managing product, information, and funds flows across the overall supply network, from the initial suppliers to the final end consumers" (Spina et al., 2013; p.1202),* also models or frameworks focusing on SCM were deliberately included.[18]

RESEARCH NOTE

There are numerous definitions for purchasing and supply management as well as discussions about the difference between purchasing, procurement, supply management and sourcing in academic journals and books *(e.g. Monczka et al., 2010; van Weele, 2010; Cousins et al., 2008; Stolle, 2008; Dobler/Burt, 1996)*. Until today, there exists no common agreement on the definition of each of these terms *(Moser, 2007; Jahns, 2005)*. In this thesis these terms are used interchangeably, but it will be focused more on PSM as a function *(Dobler/Burt, 1996)* and not just as a functional group *(Lysons/Gillingham, 2003).*

Before starting with the detailed content analysis, it was necessary to exclude irrelevant articles. After the first round of the above presented keyword research (direct search in journals, databases and textbooks), only articles in English, German or French were kept. Moreover, articles that did not deal with maturity models, frameworks or change management aspects in its kernel were excluded. The final result of relevant contributions is presented in chapters 2.2.1 to 2.2.3 *(for PSM maturity models),* 2.2.4 *(for PSM frameworks)* and 2.2.5 *(for change management models).*

[18] When analyzing SCM models only factors related to the *source-side* (excluding *production* or *distribution)* were considered.

2.2 A theory-based perspective on Purchasing and Supply Management Maturity Research

Based upon the conducted literature review and analysis of further sources like white papers, presentations or information on web-sites, it was possible to deduce a summary about *25 scientific maturity models* and *22 management-oriented maturity models* including both operational and strategic aspects of holistic PSM.[19] This was the basis for the in-depth analysis of descriptive as well as content-related findings. PMMs with a narrow focus on single PSM aspects were excluded. Examples are maturity models in the area of global sourcing maturity from *Trent/Monczka* (2003) or *Rast* (2008), supplier integration/supply chain integration from *Childerhouse et al.* (2011), *Fawcett* (2008), *Johnston* (1997) and *Cox* (1996), supply chain operations maturity from *Netland* (2011), eProcurement maturity from *Caniato et al.* (2010), sourcing maturity from *Dominick/Lunne*y (2012), contract management maturity from *Rendon* (2008) or MRO purchasing maturity from *Barry/Cavinato* (1996).

2.2.1 Maturity models in PSM at a glance

In the following two tables, the collected PMMs are listed, divided into *scientific* and *management-oriented models*. Next to the name of the model, the corresponding author/s, the year and source of publication as well as the number of maturity stages is shown in a historical descending (for scientific models, Table 8) or alphabetic ascending order of author(s)/name of company or organisation (for management-oriented models, Table 9). The classification for the *scientific models* was made depending on whether the model was published in a scientific journal, in conference proceedings or in an academic textbook following a scientific objective. The other models, mainly offered from consulting companies were categorised as *management-oriented models*.[20]

As shown in table 8, the different PMMs distinguish between three and ten different maturity stages (see also *Schumacher et al., 2008* and *Schiele, 2007*). The average number of maturity levels ranges between four and five.

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19 The overview of *Schiele (2007)* contains 11 models; the overview of *Übeda et al. (2015)* contains 12 models, without making this distinction between scientific and management-oriented models.

20 The available publications of these models – if any – do normally not contain citations, don't rise to a review process or do not clearly indicate the (scientific or empirical) basis for their recommended criteria of assessment.

No.	Name of PMM	Author(s)/Publication	Year	Maturity levels
1	15M maturity model[21]	Heß, Reifegradmanagement im Einkauf (EN: Maturity Level Management in Purchasing), Wiesbaden	2015	5
2	Purchasing maturity model	Übeda et al., Journal of Business Research, Vol.68, No.2, pp.177-188	2015	5
3	Quick scan purchasing maturity tool	Bemelmans et al., Benchmarking: An international journal, Vol.20, No.3, pp.342-361	2013	6
4	PSM drivers and firm performance	Hartmann et al., Journal of Purchasing & Supply Management, Vol.18, No.1, pp.22-34	2012	3
5	Supply chain capability maturity model	Reyes/Giachetti, Supply Chain Management: An International Journal, Vol.15, No.6, pp.415-424	2010	5
6	Purchasing and supply development model	Van Weele (et al.): Purchasing and Supply Chain Management // Proceedings of the 7th Annual IPSERA Conference	2010/ 1998	6
7	Stages in purchasing strategy development	Monczka et al., Purchasing & Supply Chain Management, Hampshire	2010	4
8	Reference model purchasing and supply management	Wildemann, Advanced Purchasing, Munich	2009	4
9	Performance determinants of the procurement business function	Batenburg/Versendaal, ECIS Proceedings	2008	5
10	Conceptual model of drivers of PSM evolution	Stolle, From Purchasing to Supply Management, Wiesbaden	2008	3
11	Supply management maturity model	Schiele, Journal of Purchasing & Supply Management, Vol.13, No.4, pp.274-293	2007	4
12	SCMAT: Supply Chain Maturity Assessment Test	Netland et al., Proceedings of the 14th International EurOMA Conference	2007	5
13	Levels of strategic purchasing	Paulraj et al., Journal of Purchasing & Supply Management, Vol.12, No.3, pp.107-122	2006	3
14	Purchasing function maturity	Cousins et al., International Journal of Operations and Production Management, Vol.26, No.7, pp.775-794	2006	4
15	Purchasing function maturity	Bruel/Petit, Cahier de recherche HEC département MIL	2005	5
16	Supply chain management process maturity model	Lockamy/McCormack, Supply Chain Management: An International Journal, Vol.9, No.4, pp.272-278	2004	5
17	World Class Supply Management	Burt et al., World Class Supply Management, New York	2003	4
18	Purchasing development stages	Jones, Supply Management	1999	5
19	From reactive to strategic procurement	Dobler/Burt, Purchasing and Supply Management, New York	1996	4
20	Purchase position benchmarking	Sysons, BPICS Control	1994	3
21	American Keiretsu	Burt/Doyle, The American Keiretsu: Die neue Waffe zur Kostensenkung (EM: A Strategic Weapon for Global Competitiveness), Düsseldorf	1994	4
22	Towards purchasing excellence/MSU	Monczka/Trent, International Journal of Purchasing and Materials Management, Vol.28, No.4, pp.9-19	1991/ 92	10
23	Fitting purchasing to the strategic firm	Freeman/Cavinato, Journal of Purchasing and Materials Management, Vol.26, No.1, pp.6-10	1990	4
24	The four stages of supply management	Bhote, Strategic Supply Management, New York	1989	4
25	Strategic stages in the development of a purchasing function	Reck/Long, Journal of Purchasing and Materials Management, Vol.24, No.3, pp.2-8	1988	4

Table 8: List of scientific purchasing maturity models

[21] This maturity model is based on the 15M architecture of strategic supply management, published by *Heß* in 2008.

Analysing the distribution of the published maturity models in PSM over time (1988-2015), an ongoing relevance in the academic and scientific community with a *high* between 2003 and 2007 and a *low* between 1993 and 2002 can be realised (Figure 5).

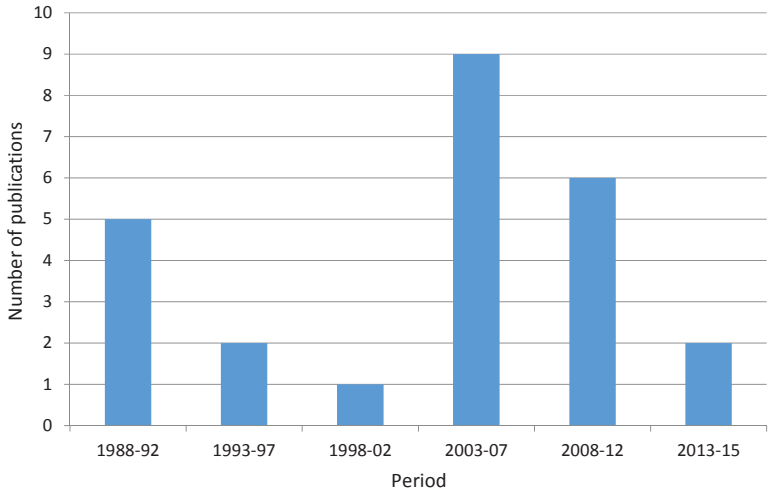

Figure 5: Publications presenting a new scientific PMM over time

Reaching the hype in 2007 also initiated a first wave of critical discourse about this topic *(Ramsay/Croom, 2008; Rozemeijer, 2008).*[22] After a break between 2009 and 2013, there is now a second wave of a more intensive discussion in the scientific field about theoretical issues and design characteristics of PMMs. Examples are *Jording/Sucky* (2015), *Schweiger* (2015a/2015b), *Liebetruth et al.* (2015) or *Van Poucke (2014),* who all focus on bringing the discussion about PMMs to a next level concerning theoretical and/or empirical foundation.

From 33 contacted consulting companies and 12 organisations in the PSM field (Table 7), direct feedback during interviews or detailed further information in the form of white papers or web-links about 22 management-oriented models was provided (Table 9). Some of them – like McKinsey or Arthur D. Little – changed the name of their PMM over the time and carried out some adaptations. There is also a close interrelation between the models from Arthur D. Little, IMP Consulting and Cell Consulting/University St. Gallen given that they all have the "Purchasing Performance Index" from 2002 *(Vollrath/Nase, 2003)* as a basis. The number of maturity stages of management-oriented maturity models differs between three (e.g. Purchasing EmPowerment) and five (e.g. stages of purchasing maturity). When the name/s of the author/s is/are added in brackets, publications (journals or books) are available for this PMM. In the other cases, the information was gathered from the respective website, white papers or from directly contacting and interviewing experts from the company.

[22] In general, analytical reflections of maturity models or the maturity concept itself in form of meta-articles are very rare. Exceptions are *van Looy (2014), Röglinger et al. (2012)* or *Wendler (2012).*

No.	Name of PMM	Author(s)/Source	Maturity levels
1	Best-in-class maturity framework	Aberdeen	3
2	Purchasing Performance Excellence	Arthur D. Little	4
3	Purchasing Value Excellence		4
4	Assessment of Excellence in Procurement	A.T. Kearney	2
5	Purchasing Performance Index	Cell Consulting/University St. Gallen	4
6	Maturity Model of value-based Purchasing	ConMoto Consulting Group	6
7	Framework for managing external resources	EFQM	3
8	360° Procurement Performance Analysis	Horváth & Partnerss	4
9	Management-oriented purchasing analysis[23]	H&Z (Schumacher et al., 2008)	4
10	Procurement Maturity Model	Implement Consulting Group (ICG)	5
11	Procurement Performance Excellence	Innovative Management Partner (IMP)	5
12	Stages of purchasing sophistication	McKinsey & Company (Kraljic, 1983; Cammish/Keough, 1991; Keough, 1993)	4
13	Stages of strategic purchasing		5
14	Stages of purchasing maturity		5
15	Levels of procurement development	Mercer (Anderson/Katz, 1998)	4
16	The Procurement Maturity Model	National Rural Electric Cooperative Association (Guth, 2010)	6
17	Purchasing Maturity Model	OptiAchats	4
18	Purchasing Excellence	Roland Berger	3
19	Purchasing EmPowerment	Roland Berger (Voegele/Schwientek, 2002)	3
20	SCORmark	Supply Chain Council	4
21	360° Supply Chain Efficiency Review	Strategic Procurement Solutions	-[24]
22	Best Value Procurement	adcpi Consulting	

Table 9: List of management-oriented purchasing maturity models

RESEARCH NOTE

This obvious trend of regularly presenting new maturity models in general *(see also the study of Wendler, 2012)* or specific maturity models in PSM, might be an indication, that available models do not meet the requirements (any longer) or – what is possibly very probable for the management-oriented models – that specialised consulting firms may see it as a sign of professionalism and prestige having their own model.

Before presenting the overall descriptive as well as content-related findings, five purposeful selected scientific as well as two management-oriented models – covering a period of almost 30 years (1988-2015), being frequently cited and reflecting descriptive as well as content-related differences – will be presented. The main reason for this step is to provide a better understanding about the fundamental logic and structure of

[23] This model is primarily based on the *supply management maturity model* from *Schiele (2007)*, who is also one of the co-authors of the textbook.

[24] At the time of submitting this thesis, the information about the number of maturity levels from these two models was not yet available.

maturity models and make several limitations and shortcomings transparent *(see research goal 1.1),* which were the main drivers for intensifying the research on an original *Purchasing and Supply Management Maturity Framework.*

Type of PMM	Name of PMM	Author/s
scientific PMM	Strategic stages in the development of a purchasing function	*Reck/Long (1988)*
	Purchasing development model	*van Weele et al. (2010/1998)*
	World Class Supply Management	*Burt et al. (2003)*
	Supply management maturity model	*Schiele (2007)*
	Purchasing maturity model	*Übeda et al. (2015)*
management-oriented PMM	Stages of strategic purchasing	*McKinsey & Company/Keough (1993)*
	Maturity model of value-based purchasing	*ConMoto (2012)*

Table 10: Selected PMM for clarifying the fundamental logic of a maturity model

Strategic stages in the development of a purchasing function *(Reck/Long, 1988)*
The model of *Reck/Long (1988)* is *"the first and most influential" (Stolle, 2008, p.19)* maturity model and to date one of the most referred works in the PSM maturity discussion *(Andreasen, 2012).* It describes *"how purchasing can evolve into the role of a strategic contributor trough four progressive stages" (Reck/Long, 1988, p.2).*

Maturity Levels	Description
1. Passive	*The purchasing function has no strategic direction and primarily reacts to the requests of other functions.*
	High proportion of purchaser's time is spent on quick-fix and routine operations.
	Purchasing function and individual performance are based upon efficiency measures.
	Little inter-functional communication takes place due to purchasing's low visibility.
	Supplier selection is based upon price and availability.
2. Independent	*The purchasing function adopts the latest purchasing techniques and practices.*
	The strategic direction of PSM is independent of the firm's competitive strategy.
	Performance is primarily based upon cost reduction and efficiency measures.
	Coordination links are established between purchasing and technical disciplines.
	TOP-management recognises the importance of professional development.
	TOP-management recognises the opportunities in purchasing for contributing to profitability.
3. Supportive	*The purchasing function supports the firm's competitive strategy by adopting purchasing techniques and practices that strengthen the firm's competitive position.*
	Suppliers are considered a resource that is carefully selected and motivated.
	Markets, products and suppliers are continuously monitored and analysed.
	Purchasers are included in sales proposal teams.
	People are considered a resource with emphasis on experience, motivation and attitude.
4. Integrative	*Purchasing's strategy is fully integrated into the firm's competitive strategy and PSM implements a strategic plan.*
	Cross-functional training of purchasing professionals.
	Purchasing performance is measured in terms of contribution to the firm's success.
	Permanent lines of communication are established among other functional areas.
	Professional development focuses on strategic elements of the competitive strategy.

Table 11: Strategic stages in the development of a purchasing function by Reck/Long (1988, p.4)

Each of the four maturity levels from *passive* over *independent*, *supportive* and finally to *integrative* (Table 11) are described verbally – based upon 15 expert interviews and

two case studies in the consumer and industrial products industry *(Baier, 2008)* – to position a PSM department accordingly. *Reck/Long* state that these successive stages are directly connected with contributing to the firm's competitive advantage and that managers can easily use the model to assess their current position to derive rooms for improvement and start a change initiative. A clear description of the assessment and application logic, as well as an empirical grounding of the maturity-performance link is missing in their publication.

Although *Reck/Long* focus on these four pre-described stages, they outline that there is no clear and fixed transformation from one to another stage and that it is possible that a company can exhibit characteristics of two or more stages in parallel. However, they suggest that in such a case the dominant perception of the purchasing manager/CPO about the overall maturity leads to one appropriate overall position.

Reck/Long also underline the necessity of the right attitude of the PSM personnel as well as the TOP-management commitment as necessary preconditions to reach high maturity and thereby bring a sort of behavioural dimension into the discussion. Moreover, they suggest a gradual development without trying to skip stages, whereby it is possible that the affected people (from the PSM department) can adapt to the changed and more challenging requirements of a higher stage. They also observed that it is possible to move up and down the development continuum depending on internal and external reasons. Nevertheless, they insist on one final stage of being world class, which all types of companies should pursue.

Purchasing development model *(van Weele et al., 1998/2010)*

The model of *van Weele et al.,* first published in 1998, comprises six maturity stages from *"transaction orientation", "commercial orientation", "co-ordinated purchasing", "internal integration", "external integration/supply chain management"* to *"value chain orientation"* (Table 12).

Van Weele et al. (1998) tried, most likely inspired by *Keough (1993)*, to bring a contingency perspective into the scientific discussion by including a causal relationship between industry as well as the role of the CPO *and* the level of maturity into their research *(see also Bemelmans et al, 2013).* Accordingly, they state, that public utilities or construction companies are normally at a low maturity level, whereas electronics, retailers and automotive are examples for high developed branches in PSM *(van Weele, 2010, p.69).*

Regarding information about the application, also this model does not offer a clear description, and in analogy to *Reck/Long (1988)* define one final "world-class" maturity stage the PSM function should set itself as target. Apart from that, *van Weele et al. (1998)* raised the question – without answering it – of whether the development of the

PSM function takes place as a process of continuous change (the unanimous opinion thus far) or more by abrupt and discrete changes, and if all companies – regardless of industry and other contingent factors – need to follow the same rungs on the maturity ladder.

Maturity Levels	Description
1.Transaction orientation: Serve the factory	Ensure plant does not run out of raw materials. Find appropriate suppliers.
	Strong operational orientation, with no explicit strategy in place, and goals are formulated very rudimentary.
	Decentralised organisation on a low hierarchy level.
	Reactive culture.
	Low educational level.
	Little knowledge about total spend.
	Management is based upon complaints. No complaints means PSM does a
2.Commercial orientation: Lowest unit price	Pro-active purchasing manager in place.
	Negotiation with focus on lowest price and savings.
	PSM has more autonomy and reports to a senior executive.
	PSM increasingly has the role of a specialist function.
	Cost savings are used as a prime performance indicator for assessing purchasing's overall performance.
	Good hands-on experience of PSM personnel.
3.Coordinated purchasing	Stronger centralisation leads to uniform buying policies, contracts and systems.
	Emphasis on cross unit coordination and communication.
	First strategies are formulated.
	Next to price issues, PSM is seen as having an important influence on the quality level.
	Higher TOP-Management recognition.
	Purchasing staff has a specific PSM background and training (analytical skills, quality management, communication skills).
	ICT is available but not linked to each other (isolated applications).
4. Internal integration: Cross-functional purchasing	Cross-functional problem solving focusing on total life-cycle costs.
	Partnership orientation with suppliers.
	Process orientation and seeing the other departments as internal customers.
	Centre-led structure of the PSM organisation.
	Focus also on non-production purchasing.
	Culture is characterised by team-based management (e.g. cross-functional teams).
	PSM is involved in strategic issues like make-or-buy-decisions.
	eProcurement and order-to-pay-systems are in place and integrated with systems of other departments.
	Purchasing performance measurement is conducted (e.g. classic KPIs, internal customer satisfaction survey, Benchmarking).
	Purchasing staff has a broad business perspective and a high educational level.
5.External integration: SCM	Active outsourcing strategy with intensive cooperation with suppliers (e.g. residential engineering is installed).
	Making things simple for the internal customer (e.g. Purchasing Cards, EDI, e-catalogues).
	Intensive use of ICT to foster process excellence internally and with the most important partner suppliers.
	Strong integration with other teams to make integrated SCM possible.
	Culture is characterised by participation.
	Management style is supportive and coaching-based.
	Highly skilled PSM team.
6.Value chain orientation	Suppliers are actively involved in product development.
	Strong end-customer orientation.
	Purchasing strategy is strongly interlinked with the corporate strategy.
	Shared vision and entrepreneurial thinking.
	ICT systems are internally and externally linked with the relevant partners.

Table 12: Purchasing development model by van Weele et al. (1998/2010)

World Class Supply Management *(Burt et al., 2003)*

The model of *Burt et al.* (2003) – adapted from *Burt/Doyle (American Keiretsu, 1994)* – comprises four stages from *clerical* to *world class (Table 13)*, and is described by the authors as a kind of "*philosophy of continuously improving the process of design, development and management of an organization's supply system, with the objective of improving the bottom line." (Burt/Starling, 2002, p.95)*

Maturity Levels	Description
1. Clerical	Process Paperwork
	Confirm actions to others
	Emphasis: Convenience
	Relationships: Personal
	Bottom line impact: Overhead
	Reporting: very low level
	Data: not available
2. Mechanical	Transactional focus
	React to requisitions
	Not involved in key source/supplier selection
	Emphasis: Purchase price
	Relationships: Transactional/Adversarial
	Bottom line impact: Revenue neutral
	Reporting: low level
	Data: used to expedite
	Computer processed paperwork
3. Pro-active	Coordinate procurement systems
	Develop suppliers
	Long-term contracts
	Involved in development of requirements and plan for recurring requirements
	Procurement adds value
	Active in source selection
	Near defect-free materials and services
	Emphasis: cost, quality and time
	Relationship: Transactional and collaborative
	Bottom line impact: Profit contributor
	Reporting: Upper Management
	Data: Facilitates sourcing and pricing
	Fulfil social responsibility
	e-Commerce
4. World class	Supply management as core competence
	Strategic sourcing and monitoring of supply environment
	Develop and implement commodity strategy
	Develop and manage alliances and networks
	Time-based competition
	Virtually defect-free materials and services
	Leverage supplier technology and integrate supplier strategy
	Manage risk
	Emphasis: total cost
	Relationship: Transactional, collaborative and alliance
	Bottom line impact: increase shareholder value
	Reporting: Member of executive group
	Data: Facilitates strategic planning
	Understand key supply industries
	e-Commerce 2.0

Table 13: World Class Supply Management by Burt et al. (2003)

The authors underline – in accordance with *Reck/Long (1998)* – the importance of senior management recognition for evolving the PSM function in a firm. Also this

model does not describe the application logic in detail, but recommends to benchmark against the derived best-in-class practices and to develop metrics enabling a measurement of the progress towards the highest stage. However, the questions about which metrics make sense to create a sense of urgency for a change (see chapter 2.2.5 and chapter 3.3) or measure the status of the intended improvement path remain open.

***Supply management maturity model** (Schiele, 2007)*

The maturity model from *Schiele (2007)* was by the date of its publication (and beyond) the most comprehensive maturity model published in a scientific journal.[25] The focus of *Schiele's* contribution was not only on deriving a model for qualitatively assessing the maturity level but also to test the maturity-performance link in 14 firms of the metal manufacturing industry.[26] Savings were chosen as a performance indicator.

Maturity Levels	**Description** *(only 1 example for each of the management dimensions is presented in the table)*
Stage 1	*Planning:* Product or project planning is sporadically known to PSM.
	Organisational Structure: Many commodities are not managed in responsibility of PSM.
	Process Organisation: Sourcing process is documented insufficiently.
	Human Resources and Leading: Target agreements on the non-managerial level do not exist.
	Controlling: Target-/Actual-comparisons are unregularly applied.
Stage 2	*Planning*: Dedicated purchasing personnel are informed about product or project planning. Purchasing has access to demand planning systems.
	Organisational Structure: Purchasing indicates programmes and measures for mandating procurement fields (Penetration: >50%).
	Process Organisation: Approach for sourcing has been defined internally in purchasing.
	Human Resources and Leading: Occasional finalisation of target agreements on the non-managerial level. Target agreements include qualitative and quantitative targets.
	Controlling: Target-/Actual-comparisons are regularly applied. Necessary correction measures partly initiated.
Stage 3	*Planning*: Purchasing is integrated into product and project planning and utilises existing demand planning systems. Purchasing inclusion points are defined in the process documentation.
	Organisational Structure: Purchasing has the mandates for complete purchasing volume (Penetration: >80%).
	Process Organisation: Compliance with the documented and cross-functionally accepted sourcing process.
	Human Resources and Leading: Target agreements finalised with the complete staff. Continuous support and review.
	Controlling: Target-/Actual-comparisons are applied basis upon rolling forecasts. Correction measures are consequently implemented.
Stage 4	*Planning:* Early involvement of purchasing in product and project planning is always ensured. Planning results are an integrative component of the purchasing strategy.
	Organisational Structure: Regulations for sanctions in case of non-compliance are introduced. Penetration app. 100%.
	Process Organisation: The organisation is aligned to support the sourcing process.
	Human Resources and Leading: Target agreements are coordinated and defined with cross- functional partners if necessary, reviewed during the fiscal year.
	Controlling: Business results of the identified measures are reviewed and documented.

Table 14: Supply management maturity model by Schiele (2007)

[25] After the publication in the Journal of Purchasing and Supply Management in 2007, the model was also published together with other authors in a managerial textbook *(Schumacher et al., 2008)*.

[26] In his paper *Schiele* (2007) also gives a profound summary about maturity models being published from 1988-2006 and categorises them according *"deduced from dominant theory", "observation based"* and according *"empirical performance test"* (p.275).

The maturity model comprises four maturity levels and is organised according the five management dimensions *Planning, Organisational Structure, Process Organisation, Human Resources and Leading* and *Controlling* (Table 14). Within these categories there are 111 questions (only 56 are available in the publication) that have to be assessed by conducting a *purchasing audit* executed by a third party.[27] During the audit a matrix is used with four fully formulated statements, representing best practices following process organisation principles (e.g. assigned responsibilities, documentation).

Next to an attempt of marking the application logic more clearly than the previous models *(purchasing audit by a third party),* the *"minimum maturity point" (Schiele, 2007, p.283)* an organisation needs to reach to profit from the best-practice recommendations for each maturity stage,[28] is another important contribution by *Schiele (2007)* for the discussion about PMMs (Figure 6) and the transformation of the PSM function (see chapter 2.2.5).

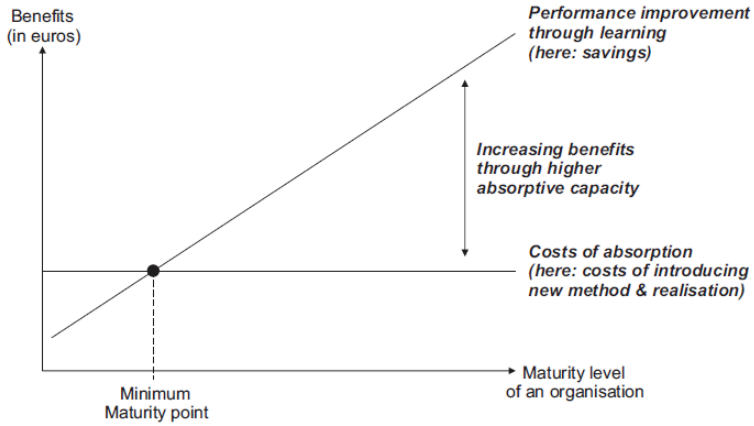

Figure 6: The minimum maturity point (Schiele, 2007, p.282)

The minimum maturity point defines a lower limit of competencies and capabilities of the employees, which are directly related with a sort of *"absorptive capacities" (Schiele, 2007, p.283).* These capacities are necessary to benefit from the introduction of best practices. A central managerial implication for that outcome is to avoid over-investing in tools and strategies the PSM team is not yet ready to absorb, and develop the people first (e.g. training, education).

Also *Schiele (2007)* insists on one uniform desirable final maturity stage for being world class, regardless of company size, branch or other contextual factors (e.g. corporate goals, level of competition, business model).

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27 A discussion about the Purchasing Management Audit can be found at *Scheuing (1989)* and *van Weele (2010).*

28 *Rozemeijer et al. (2003)* use the term *"minimum purchasing skill base"* (p. 7) for this.

Purchasing maturity model *(Übeda et al., 2015)*

The model from *Übeda et al.* contains also five management dimensions – but different ones as in *Schiele's* model – to cluster and subsequently measure the level of PSM maturity: *Strategy, people, organisation & process, suppliers* and *communication.* A five-digit scale ranging from 1 (low) to 5 (high) serves as the assessment scheme.

Maturity Levels	Description *(only 1 example for each of the management dimensions is presented in the table)*
Stage 1	*Strategy:* Company strategy is unknown.
	People: College degree of PSM less than 10%.
	Organisation & Process: PSM is not in the organisational chart.
	Suppliers: PSM concentrates on less than 10% of suppliers.
	Communication: No reporting installed.
Stage 2	*Strategy:* Company strategy is partly known.
	People: College degree of PSM between 10%-20%.
	Organisation & Process: PSM is a department at the third hierarchy level.
	Suppliers: Concentrate on 10%-20% of suppliers.
	Communication: Reporting to other departments.
Stage 3	*Strategy:* CPO knows the company strategy.
	People: College degree of PSM between 20%-40%.
	Organisation & Process: PSM is a department at the second hierarchy level.
	Suppliers: PSM concentrates on 20%-40% of suppliers.
	Communication: Reporting within the company.
Stage 4	*Strategy:* All members of PSM know the company strategy.
	People: College degree of PSM between 40%-60%.
	Organisation & Process: PSM is a department at the first hierarchy level.
	Suppliers: PSM concentrates on 40%-60% of suppliers.
	Communication: Reporting regularly to all suppliers and internally.
Stage 5	*Strategy:* All members know the strategy and participate.
	People: College degree of PSM higher than 80%.
	Organisation & Process: PSM is part of the board.
	Suppliers: PSM concentrates on more than 80% of suppliers.
	Communication: Reporting to all relevant stakeholders (inside/outside).

Table 15: Purchasing maturity model by Übeda (2015)

In analogy to *Schiele (2007), Übeda et al.* tested the maturity-performance link by carrying out a survey in 278 Chilean companies. They could verify that more mature purchasing organisations spend more time on strategic activities (e.g. demand analysis, strategic development, sourcing) and use a broader set of purchasing tools (e.g. volume grouping/pooling, auctions), which thus results in cost savings.

Stages of strategic purchasing *(McKinsey & Company/Keough, 1993)*

Based upon several years of consulting experience at McKinsey & Company, *Keough (1993)* presented a five stage evolutionary model (Table 16) of the purchasing function in *McKinsey Quarterly* that is – despite having not published its scientific or empirical grounding thus far – a highly cited reference in the scientific PSM maturity discussion at present *(e.g. Luzzini et al. 2015; Übeda et al., 2015; Zimmermann/Foerstl, 2014).*

Keough (1993) provides examples of typical industries that fit to one of these stages of evolution. For example, he states that the pharmaceutical industry is in the first maturity level, whereas computer manufacturers are at level four and electronics and automotive

firms are at level five at the date of publication. Unfortunately, he did not refer to a study or other verifiable data in his publication that form the basis for this assumption. Nonetheless, the assumption that an entire industry can be assigned to one maturity level may be essentially questioned.

Maturity Levels	Description
1. Serve the factory	Ensure that plant does not run out of raw materials.
	PSM exists on plant level and reports to materials or plant manager.
	No relevant and specific education for the PSM personnel.
	Focus on clerical, logistical and expediting duties.
2. Lowest unit costs	Spend and cost management are becoming crucial.
	Negotiation becomes a key skill for PSM personnel.
	PSM is forming a recognised team at a plant level.
3. Coordinated purchasing	Cooperative purchasing strategies (e.g. bundling) are becoming more important.
	Lead buyers will be installed.
	Centralisation of PSM.
	Contracting and negotiating multi-site agreements are becoming key skills.
	Development of compliance- and corporate policies.
4. Cross-functional purchasing	PSM is involved in design and specification of the product (Early Involvement).
	Supplier development becomes relevant.
	Cross-functional teamwork.
	TCO mind-set of PSM team.
5. World class supply management	Supplier Relationship Management as key skillset.
	Early supplier involvement to save costs.
	Strategic supplier selection and collaboration.
	Long-term relationship.

Table 16: Stages of strategic purchasing by Keough/McKinsey & Company (1993)

Furthermore, he did not offer background information for his statement that companies moving from one stage to another realise savings of around 5-10 percent. Next to the presentation of his maturity model for assessing the current PSM status of a firm, *Keough* also highlights typical barriers (e.g. poor basic information about spend, missing skills, no KPIs, low status of PSM) as well as some suggestions to overcome them: He recommends tracking and analysing the purchasing volume from multi-dimensional perspectives, formation of cross-functional teams for working on cost saving initiatives, supplier involvement, standardisation and rethinking the recruitment and development process for obtaining or evolving highly skilled employees.

Maturity model of value-based purchasing *(ConMoto, 2012)*

The last here presented maturity model was deliberately chosen from a smaller (80 consultants) – in contrast to McKinsey & Company (9.000 consultants) – and highly specialised consulting firm in the PSM field. Based upon a study about value-based purchasing (n=111 companies), this model comprises six ex-post defined stages from *"not organised"* to *"innovative value based purchasing"*.

Maturity Levels	**Description** (only exemplary criteria are presented in the table based upon provided information)
1.Not organised	Tasks, competencies and responsibilities are not defined and thus unclear.
	The user/internal customer buys the demand without integrating PSM.
2.Reacting	Start of an order after receiving a request.
	No sufficient market analysis and searching for suppliers.
	The selection of the supplier is undertaken by the user/internal customer without integrating PSM.
3.Acting	Pro-active attitude in PSM.
	Defined structures within the PSM department.
	No multi-project or multi-site bundling.
	Intensive use of requests for quotations/tendering.
4.Networking	Early involvement of PSM.
	PSM is accepted as equal partner.
	The core processes are documented and the work is undertaken accordingly.
	Multi-project and multi-site bundling.
	PSM is central contact for the supplier (one-face-to-the-supplier).
5.Performing	PSM is the active and driving part in the processes.
	High level of professionalism in PSM is linked with positive results.
	A PSM strategy that is linked with the corporate strategy is in place.
	A sourcing committee is established.
6.Innovative value based purchasing	PSM is bringing innovation to the processes.
	The PSM strategy is continuously updated and refined based upon internal and external factors.
	Early supplier involvement.
	Highest efficiency in decision making is guaranteed throughout all purchasing processes.

Table 17: Maturity model of valued-based purchasing by ConMoto (2012)

The authors outline that according to their experience as well as the mentioned study the automotive industry is the leading industry with the highest maturity in PSM. They perceive the biggest room for improvement in the construction industry, which matches with the findings of *van Weele (2010)* mentioned above. A clear explanation about the application as well as a further differentiation concerning other contextual aspects (e.g. firm size, balance of power with suppliers) is not made in the publicly available and provided documentation.

2.2.2 Descriptive findings

In this section the main descriptive findings as well as the most important critical remarks about the reviewed maturity models in PSM are presented, followed by a discussion about the content-related commonalities (2.2.3). The emphasis of this research step was to ascertain what are the main textual and architectural overlaps and differences among the current PMMs and finally conclude with a consistent and unified definition. This seems an important contribution considering the fact that in the available publications the definition of the term *"maturity model"* is, deliberately or by chance, often avoided *(see also Bititci et al., 2015; Wendler, 2012).*

- **Unidirectional structure in pre-defined stages**

The main commonality of the PMMs is the description of a unidirectional sequence of levels that form a sort of evolution path of the PSM function from a low to a high maturity status according pre-defined stages *(Jording/Sucky, 2015; Andreasen, 2012; Stolle, 2008)*. By applying such a model the goal is to measure *"the degree to which a purchasing department is advanced, sophisticated and professional" (Übeda et al., 2015, p.178)*. The higher the maturity, the better is PSM's contribution to the firm's performance (e.g. cost savings; *Schiele, 2007*), so the assumption.

This structural logic in terms of a fixed number of stages might be a trade-off between *"improved comprehension on the one hand, and increased simplification, abstraction and possible misunderstanding on the other hand" (Ramsay/Croom, 2008, p.199)*. Sometimes this self-imposed limitation to describe every maturity dimension with the same number of (pre-formulated) stages partly appears artificial and inappropriate. Taking two examples of *Schiele's model (2007)* might make this aspect transparent (Table 18).

	Structure and mandates *(Dimension "Organisational Structure")*	**Communication with suppliers** *(Dimension "Process Organisation")*
Stage 1	Purchasing acts locally without exchange with other purchasing departments.	Evaluation results are sporadically communicated to suppliers.
Stage 2	Purchasing remedially exchanges information with other purchasing departments.	Evaluated suppliers are promptly informed about the evaluation results. Results are internally recorded.
Stage 3	Purchasing is an active part of the group-wide procurement network.	Evaluation results are discussed with selected suppliers in a cross-functional team.
Stage 4	Purchasing is an integrative part of the worldwide procurement network.	Evaluation results are discussed with selected suppliers under involvement of the management.
Points of criticism	▪ If a company only acts locally and do not have a worldwide (PSM) organisation, this would mean that for this maturity aspect they would never reach the highest stage. ▪ Especially between Stage 3 and Stage 4 the difference appears marginal and not absolutely clear.	▪ Whereas the first three stages seem rather well formulated and clear, involving the management (Stage 4) appears impractical and not absolutely necessary and feasible in daily business. ▪ It is also not defined who is meant by "management" (management of supplier, TOP-management of firm).

Table 18: Examples of potentially inappropriate fixed stages (taking the model from Schiele as example)

Ramsay/Croom (2008) criticise that this numbered stage-logic *"reinforce in the reader's mind the notion that some [non-strategic] activities are primitive and undeveloped" (p. 195)* and others more strategic elements further up the scale are basically more important for a professional PSM function.

The possibility of *actively* accepting a decrease of maturity in a specific area by reconfiguring and shifting resources to another area due to internal (e.g. new corporate goals) or external reasons (e.g. change of customer and market requirements; changing strategies of suppliers) is not discussed by the authors of the models at all or simply in

passing.[29] Although *Reck/Long* already stated in 1988 that the purchasing function can *"move up and down the development continuum" (Reck/Long, 1988, p.8),*[30] and that both research and practical experience have shown the limitations of linear models of organisational change *(Carnall, 2007),* the following authors saw no reason to change this evolution metaphor *(Ramsay/Croom, 2008).*[31]

- **Specified maturity dimensions VS one overall PSM maturity level**

Some models (type I) have a clear indicated number of dimensions or process areas *(e.g. Übeda, 2015; Heß, 2015; EFQM, 2012; Batenburg/Versendaal, 2008; Schiele, 2007),* while others (type II) offer more or less a generic description of each maturity level as a whole *(e.g. Van Weele, 2010/1998; Reck/Long, 1988).* For the first type of models, "maturity grids" *(Jording/Sucky, 2015; Heß, 2015)* with pre-formulated maturity stategs are typically applied to evaluate the maturity in each dimension before calculating an overall PSM maturity score. These grids are either designed for the respective maturity model or based upon traditional (neutral) maturity models like the Business Process Orientation Maturity Model *(Lockamy/McCormack, 2004).* For type II all criteria of one stage need to be met in order to pass on to the next phase *(Wilke, 2007).*

- **One final stage of being world class**

The unanimous opinion is that there is one uniform desirable final stage that each company is expected to reach to be *world class (e.g. van Weele, 2010; Rozemeijer, 2008; van Weele et al., 1998).* Taking a look simply at the seven described PMMs in the previous section of this thesis it becomes clear that there are content-related contradictions about this final stage as well as the gradations of maturity in PSM. Not only that there are three to ten maturity stages (and not *one* common model with e.g. four stages), but also the thematic focus and allocation of the criteria are not yet consistent. Accordingly, you can find the aspect of *early supplier involvement* on level 5 out of 5 in the model of *ConMoto* yet only in level 4 out of 5 in the model from *Keough (1993)*. The criteria of taking price and availability issues into account when selecting a supplier is a basic criterion (level 1 out of 4) in the model of *Reck/Long* and a level 2 (out of 4) criterion in the model of *Burt et al.* As example, the aspect of managing non-productive material is – taking again the seven presented models as a basis – only

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29 Therefore, the PMMs do not adequately address the *"dynamic capabilities approach" (Teece et al., 1997; Eisenhardt/Martin, 2000),* as an organisation's ability to reconfigure its internal structures and competences to adequately cope with the dynamically changing requirements and challenges.

30 Nevertheless, the statement of *Reck/Long (1988)* assumes that there is one fixed and linear maturity continuum indifferent of the specific situation and environment of the firm.

31 The critique about this strict linearity of predefined maturity paths as well as the demand for maturity models that are configurable *(Mettler, 2011)* can also be found in the discipline of process management maturity *(e.g. Röglinger et al., 2012; McCormack et al., 2009; de Bruin et al., 2005).*

directly addressed by *van Weele et al. (1998)*, the aspect that it is important to have some promotions to and from PSM is only emphasised by *Übeda et al.* (2015).[32] While it is widely agreed that PSM should be integrated into the decision-making process of a firm (e.g. adequate hierarchical level of PSM, attending strategic meetings, being part of developing the corporate strategy, *e.g. van Weele, 2010; Baier, 2008*), there are different opinions concerning recommendations about the "right" organisational structure or sourcing strategies. Whereas some authors *(e.g. Bemelmans et al., 2013; van Weele, 2010/1998)* define a centre-led PSM structure as a criterion of high maturity, other authors *(e.g. Schiele, 2007)* insist on not prescribing any particular form of organisation as better. They rather ask for clearly defined tasks, competencies and responsibilities. This seems to particularly making sense due to the confirmed opinion from research that there is not one best organisational structure *(e.g. Johnson et al., 2014; Carnall, 2007; Johnson/Leenders, 2006).*

- **Lack of contingency and flexibility**

Aspects concerning weighting of criteria or whole maturity dimensions in terms of considering contextual aspects for a better fit to organisation-specific needs *(Röglinger et al., 2012)* are not addressed at all or only insufficiently by current models *(see also Jording/Sucky, 2015).* This seems a very critical aspect and one of the main weaknesses, because the definition what is (strategically) important for a company can strongly differ regarding internal (e.g. corporate goals, strategy, culture) and external contingent factors (e.g. behaviour of competitors and suppliers, characteristics of the purchasing market, technological change). For example, if *speed of response* and *delivery-to-customer* are two critical success factors in the respective branch and thus defined as central corporate goals (e.g. trade business), then *purchase order delivery* and *high efficient ordering processes* – which are frequently regarded as rather low (operational) purchasing tasks and not a sign for high maturity *(Ramsay/Croom, 2008)* – need to be criteria of highest focus and relevance. Moreover, *Cousins (2005)* brings in the contingency perspective by stating that cost-focused companies or business units will mainly emphasise on cost-minimisation strategies and process excellence, whereas companies with a differentiating approach may focus more on strategic collaboration and early supplier involvement. In this regard it is important to add that it can make much sense from a management perspective to switch from a value-based and innovation orientation (back) to a more cost-centric (and in terms of *maturity model language* "low level") approach *(fall-back scenario; Axelsson et al., 2005b, p.24).* Selecting and challenging suppliers primarily based upon price issues (usually an aspect

[32] As will be shown in chapter 2.2.3 there are certainly numerous KEPs of maturity in PSM upon which most of the current models agree, although it will also be made clear that there are several KEPs only covered from individual models.

of the lowest maturity level) as well as to strongly focus on cost cutting initiatives was a necessary and certainly "right" strategic decision during the financial crisis to "*achieve congruence with the changing business environment" (Teece et al., 1997, p.515)* in terms of the strained situation economic situation in the firms, and definitely not a sign of being *immature*. Due to the rigid structure of the available PMMs, they do not offer proper mechanisms for adapting to these appropriate "*response variables" (Sousa/Voss, 2008, p.703)* or *dynamic capabilities* as the *"firms abilities to integrate, build, and reconfigure internal and external competences" (Teece et al., 1997, p.516; see also Eisenhardt/Martin, 2000)* that are (more) recommendable (than others) for the changing requirements and contingencies.

This leads to the question concerning whether it makes sense that these aspects which are very important for (a company's) PSM maturity in a specific context-specific situation should be on the highest ladder or whether it is recommendable to work on these context-relevant aspects first. This would be a significant contradiction considering the widespread opinion that it is not "allowed" to jump or skip over one level and follow a pre-defined ladder *(e.g. Schiele, 2007; Lockamy/McCormack, 2004, van Weele 2010/1998).*

RESEARCH NOTE

It might be proposed to turn away from the strict focus on one specific (final) maturity *point*, and rather turn towards relevant maturity *scenarios (dynamic combination of response variables)*, which a company should target due to their context-specific and dynamically changing situation and environment *(contingency variables)* to reach the intended goals *(performance variables)*.[33] Accordingly, it might be recommended to introduce one *self-defined and targeted maturity scenario (SDTMS)* based upon contextual aspects or the assumed cost-benefit ratio[34] as well as a *relevant highest maturity scenario (RHMS)* based upon the specific benchmark (e.g. branch, size). This differentiation to only one *theoretical highest maturity scenario (THMS)* would allow a shift from strongly focusing on a uniform one-fits-all-maturity sequence to a more context-specific one. By doing that, the field of application of these models might probably rise and become more useful (also) for the large number of SMEs *(Cocca/Alberti, 2010; Ramsay/Croom, 2008).*[35]

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33 These three types of variables are very common terms in contingency theory (e.g. Sousa/Voss, 2008).

34 To also address the cost-benefit ratio and the (mainly strained) resource situation of a firm, brings in the perspective of the theory of constraints *(Goldratt, 1990; Rahman, 1998; Gupta/Boyd, 2008)* and the necessity of a strategic choice of the management and the firm to select those strategies and measures that correlate best with the intended goals in consideration of the available resources.

35 To the knowledge of the researcher there is only one paper *(Söderberg/Bengtsson, 2002)* which describes the application of a purchasing maturity model (in this case the model of *Lockamy/McCormack, 2004*) in SMEs (15 SMEs in Swedish engineering industry).

Only these few examples might show that it is highly unlikely and almost impossible to apply one single PMM to all types of companies and branches without having the possibility of weighting and possibly also complementing the evaluation dimensions or criteria based upon contingent and company-specific factors. More likely there must be one (temporarily) most appropriate maturity level depending on the business and corporate context *(e.g. Carnall, 2007; Rozemeijer et al., 2003)* and not one overall best maturity point for any kind of firm and situation. Especially for SMEs the imbalance of power compared with their large suppliers and limited resources may lead to different (realistic) maturity scenarios. Exemplary, also for SMEs implementing a mature logistics concept like *supplier managed inventory* or establish *long-term contracts to fix an optimum price level* with their large suppliers, might be theoretically right but in most of the practical cases highly unrealistic in its implementation due to limited bargaining power.

- **Different types of assessment & lack of methodical detail**

Not always indicated in the respective publication but also an important aspect of differentiation is the assessment method itself. So you can find maturity models for self-assessment *(e.g. Reck/Long, 1988),* third-party assessment *(e.g. Bemelmans et al., 2013; Schiele, 2007)* or a specific form of third-party assessment by a certified partner *(e.g. Framework for managing external resources by the European Foundation for Quality Management)*. Partly, also the concrete methods to determine the respective maturity value (e.g. questionnaire, Likert scale, checklists) are indicated: Some models like the *supply chain management process maturity model* by *Lockamy/McCormack (2004)* apply a central and uniform assessment logic based upon a general maturity model (in this case the Business Process Orientation Maturity Model; a five-digit scale from *fully disagree/never* or *does not exist* (1) to *fully agree/always* or *definitely exists* (5)) for the overall assessment, others use pre-formulated target characteristics for each maturity element *(e.g. Schiele, 2007).* The management-oriented approaches usually recommend a combined two-step procedure for evaluating the maturity level *(e.g. IMP, Purspective, OptiAchats, A.D. Little):* First, the company receives a questionnaire free of charge for a self-assessment,[36] whereby this assessment will subsequently be analysed by the consultants and feedback about the maturity profile relatively to the specific industry or other comparison options is given.[37] Accordingly, detailed fee-based workshops, analysis and interviews are offered to deduce rooms for improvement.

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[36] IMP (2014) indicates, that approximately 90 minutes are necessary to fill out this initial online diagnosis (PULSE CHECK PPE©). A.D. Little defines 90-120 minutes for their assessment (in a self-experiment approximately four hours were necessary to fill out all the information requested), A.T. Kearney indicates six hours to complete the assessment.

[37] As mentioned in chapter 2.2.1, this connection to the industry can also be found in the model of *van Weele et al., 1998/2010* and *Keough, 1993.*

In the majority of publications about PMMs, clearer recommendations for proper application settings in a company would be desirable *(Rozemeijer, 2008).* It is throughout also not clearly discussed if and when to repeat the assessment and who should participate. Furthermore, information for the average time duration of the application of the maturity assessment model in a firm *(except in the model of Bemelmans et al., 2013; Netland et al., 2007; Schiele, 2007* and *A.D. Little, A.T. Kearney or IMP)* is mainly missing.[38]

- **Major differences in theoretical foundation and documentation quality**

The authors of the scientific models deduced the maturity aspects mainly from theory *(e.g. van Weele, 2010/1998; Cousins et al., 2006; Paulraj et al., 2006; Dobler et al., 1996)* or/and added the opinion of experts in the form of interviews *(e.g. Paulraj et al., 2006; Burt/Doyle, 1994; Freeman/Cavinato, 1990; Bhote, 1989; Reck/Long, 1988)* or applying the Delphi method *(Reyes/Giachetti, 2010).* Some authors defined the stages ex-ante *(e.g. Bhote, 1989, Freeman/Cavinato, 1990)* while some did an ex-post assembling of the stages based upon observation or a survey *(e.g. Cousins et al., 2006; Keough, 1993; ConMoto).*

Authors of the management-oriented models emphasise on the integration of their consulting experience into their PMM. Scientific and academic findings are of course indirectly integrated, without using citations or references to relevant sources, but the consideration of specialised expertise and thorough knowledge of various industries makes them unique and a rather helpful source for deriving the PSM^2F.

Following the findings of *Jording/Sucky* (2015) – who conducted research about the design characteristics of maturity models in general – that *"nearly all models can be criticized for their insufficient documentation quality"* and that *"especially the development process of the models and the empirical evaluation leave room for interpretation" (Jording/Sucky, 2015, p.105; see also de Bruin et al., 2005),* the same can be stated for maturity models in the PSM field.[39]

- **Lack of empirical verification of scientific PMMs**

Only a few models have been empirically tested thus far or used empirical data for the development of the model itself: *Übeda et al. (2015)* carried out a study of 278 Chilean companies to identify key activities, tools and methodologies, organisations can use to improve their purchasing performance. *Hartmann et al. (2012)* did an international survey of 306 major companies from eight industry sectors and proved that the use of

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[38] Especially for SMEs that can be a serious barrier for not applying such a model, because of not knowing how to (efficiently) do it and how many resources they might need to reserve for it *(Garengo et al., 2005).*

[39] Furthermore, a more intense and combining discussion of theories in operations management (e.g. contingency theory, resource based view of the firm) and their impact or relevance for the PMM advancement would be recommendable.

advanced and comprehensive PSM activities can contribute to an improvement of PSM's and a firm's performance. *Reyes/Giachetti (2010)* applied the Delphi method with 80 experts in Mexico to gather multiple perspectives on maturity aspects of Supply Chain Management and to derive a maturity model, followed by a pilot test with a Mexican firm to demonstrate the practical implementation of the model. *Batenburg/Versendaal (2008)* conducted a survey among 117 Dutch organisations from various industries and company size to test the alignment between procurement maturity and a company's performance. The same did *Schiele (2007)* by carrying out a purchasing audit in 14 companies to evaluate the purchasing maturity (as the independent variable) and subsequently linking it to the performance of purchasing (he chose ability to achieve cost savings as main performance indicator) as dependent variable. Through quantitative data collection from 151 UK companies followed by a cluster analysis, *Cousins et al. (2006)* developed four typical purchasing configurations *(strategic, celebrity, undeveloped, capable)* as basis for his maturity model. *Paulraj et al.* (2006) did a cross-sectional mailing in the USA with an effective response rate of 23.3 % (221 out of 954) to test several hypotheses concerning the link of the level of strategic orientation of PSM and its impact on the firm's performance. Another example for empirical verification is the model from *Lockamy/McCormack (2004).* In a survey with 478 Brazilian companies, they investigated the relationship between supply chain maturity and performance *(McCormack et al., 2008)*. For all the other models no publications concerning empirical tests or verifiable empirical data for the development of the model are available.

- **Primary focus on assessment rather than transformation and change management**

Although some authors describe their model as a sort of *"road-map for implementing World Class Supply Management" (Burt/Starling, 2002, p.96),* the aspect of maturity assessment and gap identification is the core focus, whereas the transformation and change management aspects are not covered and discussed sufficiently *(Jording/Sucky, 2015; de Bruin et al., 2005).*[40] The description of the different stages can certainly be understood as a sort of textual "recipe" what to do first, second etc. However, integrating aspects of organisational development and change management theory would also extend the discussion by behavioural as well as cultural factors that have proven crucial for a successful transformation *(Bititci et al., 2015; Lauer, 2014; Kotter, 2012; Carnal, 2007)*. Of course, the authors of the analysed models provided some recommendations like to *ensure management support (e.g. Reck/Long, 1988), ensure a minimum maturity level (Schiele, 2007),* which is required for applying sophisticated

[40] Furthermore, it is not described how to proceed if the proposed (linear) road map towards world class PSM does not contribute to reach the intended goals.

methods and strategies and as necessary means for reaching a higher maturity level or *work on a culture of excellence (Lockamy/McCormack, 2004).* However, a consistent and scientifically well-founded factor model including critical success factors for fostering the change management capability in PSM remains missing to date *(research goal 1.3).* Before leading over to the content-related and thematic findings, the main areas of criticism of the PMMs discussed in this chapter are summarised in Figure 7:

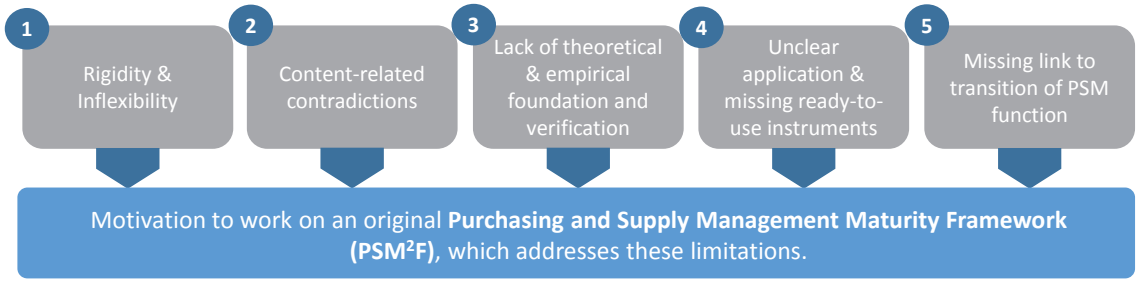

Figure 7: Condensed critical appraisal of analysed PMMs

RESEARCH RESULT

Taking all the discussed commonalities and differences into account, and given that there is up to now no single and accepted definition of a maturity model in PSM[41] the following definition of *PMM* might be proposed:

"A purchasing maturity model is a strategic instrument for evaluating the current policies, processes and structural elements of the PSM function according predefined stages and predefined dimensions based on key evaluation points. The evaluation of the attained performance level can be done independently by the company itself or by a third-party. The overall goal is to create transparency about strengths and weaknesses of the PSM function as basis for launching improvement initiatives in order to better respond to current or future challenges."

2.2.3 Content-related and thematic findings

Next to the descriptive analysis of current maturity models in PSM, one further goal of this thesis is to derive a common consensus about determining factors of maturity in PSM as ***first content-related core element of the PSM²F***. By doing that, the basis for

[41] For the IT domain, *Becker et al. (2009)* derived a general definition of maturity: *"A maturity model consists of a sequence of maturity levels for a class of objects. It represents an anticipated, desired or typical evolution path of these objects shaped at discrete stages." (p.213)* Another example is provided by *Jording/Sucky (2015, p.104): "A maturity model can be defined as a construction-based model which consists of an anticipated limited development path, separated into stages with defined characteristics and dimensions. It has one or more objectives related to the stage evaluation, gap identification and transformation."*

setting up a (dynamic) *best-practice database* for PSM *(research goal 1.2)* can be created.

Given that publications about PMMs can be seen as a scientific movement that systematically organises knowledge about progressive PSM over time *(Rozemeijer, 2008),* a systematic mapping study *(Hausladen/Haas, 2014; Wendler, 2012)* combined with a detailed content analysis *(e.g. Schneider/Wallenburg, 2013; Spina et al., 2012; Kähkönen 2011; Piekkari et al. 2010)* of PMMs was deliberately chosen as main and central step for deriving these maturity elements (Figure 8). This approach is a specific form of literature review with the goal of identifying, analysing and clustering elements that substantially belong together based upon previous research.

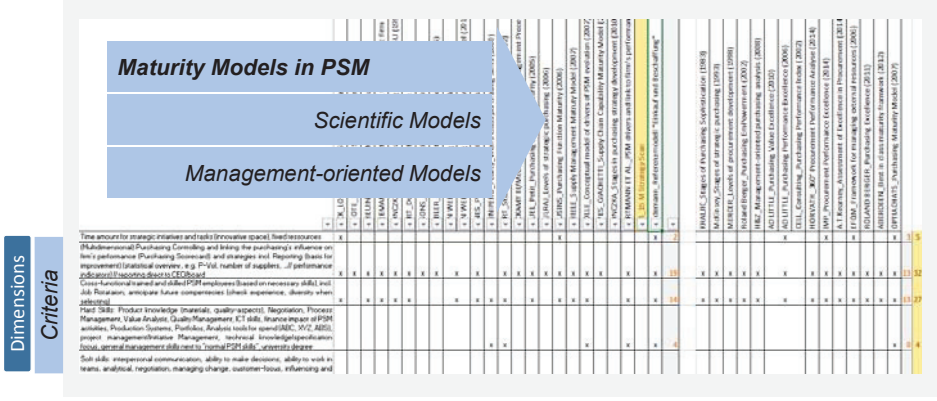

Figure 8: Content Analysis & Coding of areas of sophistication/maturity in PSM

Within this mapping study the different sub-groups/sub-criteria *(attributes)* of the variables *"dimensions/areas of maturity"* and *"criteria of maturity"* were identified by following two of three possible coding stages,[42] suggested by *van Looy (2014; p.30; see also Schneider/Wallenburg, 2013; Spina et al., 2013; Glaser/Strauss, 1967/2010):*

1. *Open (initial) coding: Reading the selected articles/books/white papers about purchasing maturity and going back and forth to identify possible attributes, topics and variables.*

In detail, all the positively formulated aspects of maturity concerning structural elements, policies, processes (things a mature PSM function *should do/have*) from the existing PMMs were considered, as described by the following example using the model of *Reck/Long* from 1988 (Table 19). With this example it should be illustrated that positive and determining aspects of maturity can be deduced from (almost) every level and not only from the highest one. During the review process, high attention was

[42] For the defined purpose of deriving categories and attributes of PSM maturity, the open and axial coding stages are adequate. Selective coding, the third coding stage, with the goal to select the core (or main) category, and then systematically relating it to the other categories, does not seem to make sense in this regard. Based on possible contingent factors, it is highly unlikely that there is one overall and most important category of PSM maturity, all other categories must subordinate *(see also Jahns, 2005).*

paid on a (objective) positivist text analysis (rather than a subjective interpretivist analysis; *Lacity/Janson, 1994, p.140*) to reduce personal bias to a minimum. All texts were at least read for two times to record all relevant aspects *(van Looy, 2014)*. Where possible, multiple documents were used for the same model or framework to ensure a broader and more objective view on the results.

Due to a lack of purchasing specific classifications *(Wynstra, 2010)* as well as a missing consensus about unique maturity categories (see chapter 2.2.2), this open coding approach seems to be a logical and appropriate step to map the research outcome in a suitable and relevant way, and not by following a strict and possibly not well fitting construct. In the beginning the framework of *Schneider/Wallenburg (2013, p. 147)* appeared as suitable, but finally had to be discarded: Based upon an analysis of almost 50 years of research on organising the purchasing function (1962-2010), they came up with a classification of the following twelve main categories: (1) *Structure and formalities, (2) relationship management, (3) strategic performance and measurement, (4) everyday processes and policies, (5) evolving responsibilities, (6) strategic alignment, (7) buying centres and purchasing's status, (8) HR and change management, (9) decision making, (10) organisational learning, (11) leadership & culture* as well as *(12) IT and e-business*. By reviewing the dimensions and also the contents covered, it became obvious that for a maturity framework it is possible to group some of these categories like "structure and formalities" and "buying centres and purchasing's status" or "everyday processes and policies" and "IT and e-business". Moreover, "leadership and culture" as well as "HR and change management" seem closely connected. However, other categories like "decision making" appeared too narrow to be suitable for an independent maturity dimension.

Maturity Levels	Description of maturity level *(Excerpt)*	Evaluation of wording	Use for PSM²F
1.Passive	The purchasing function has no strategic direction and primarily reacts to the requests of other functions.	*Negative*	☒
	High proportion of purchaser's time is spent on quick-fix and routine operations.	*Negative*	☒
	Purchasing function and individual performance are based upon efficiency measures.	*Negative*	☒
	Little inter-functional communication takes place due to purchasing's low visibility.	*Negative*	☒
2.Inde-pendent	The purchasing function adopts the latest purchasing techniques and practices.	*Positive*	☑
	The strategic direction of PSM is independent of the firm's competitive strategy.	*Negative*	☒
	Performance is primarily based upon cost reduction and efficiency measures.	*Negative*	☒
	Coordination links are established between purchasing and technical disciplines.	*Positive*	☑
3.Suppor-tive	The purchasing function supports the firm's competitive strategy by adopting purchasing techniques and practices.	*Positive*	☑
	Suppliers are considered a resource that is carefully selected and motivated.	*Positive*	☑
	Markets, products and suppliers are continuously monitored and analysed.	*Positive*	☑
4.Inte-grative	Purchasing's strategy is fully integrated into the firm's competitive strategy and PSM implements a strategic plan.	*Positive*	☑
	Cross-functional training of purchasing professionals.	*Positive*	☑
	Purchasing performance is measured in terms of contribution to the firm's success.	*Positive*	☑

Table 19: Transfer of maturity aspects to the best-practice database of the PSM²F (exemplary, Reck/Long 1988)

2. *Axial coding: Rethinking the attributes and variables and relating the variables and attributes to the main categories.*

By analysing topics that frequently appeared in the analysed documents, eight main areas of maturity of PSM were finally derived (Figure 9).[43] Taking these main clusters as a basis, the articles and books were read again to finally assign the single criteria of high maturity to one of these eight maturity categories to derive a sort of best-practice database for PSM practices.

Figure 9: Eight dimensions of high maturity in PSM

Following the suggestion from *Sartor et al. (2014), Bititci et al. (2012)* and *Seuring/Müller (2008)* to ensure validity of the result, the derived categories were not only discussed with the focus group at the University of Udine, but were also presented at two international scientific conferences (*9th International Conference of Logistics Conference* in Hamburg/Germany, 2014; *8th Scientific Symposium Supply Management* in Würzburg/Germany, 2015), one scientific workshop (*20th IFPSM Summer School in Advanced Purchasing and Supply Management* in Twente/Netherlands, 2015) and one industrial congress (*10th Supply Management Conference* in Kapfenberg/Austria, 2015) to have the chance to improve the interim results based upon constructive criticism of the reviewers and the audience at the conferences.

RESEARCH NOTE

Netland et al. (2007) stated, taking reference to the *Supply Chain Operations Reference (SCOR)* model, the *European Foundation for Quality Management's (EFQM) Excellence Model* and the *Best Manufacturing Practices Center of Excellence from the University of Maryland* that currently only very few publicly available best-practice collections in operations management exist.

For purchasing and supply management such a synopsis of the most relevant aspects of maturity in PSM does not exist to date, but might be rather helpful for both researchers

[43] *Schiele (2007)* who also did a comparison between the PMM published between 1988 and 2006 derived six categories: "Planning", "Structural organization", "Process organization", "Human Resources", "Controlling" and "Collaborative supply relation", but did not provide – in the researcher's perspective – the adequate significance to *the strategic, the innovative* and *the sustainability perspective.*

and practicioners. Thus, the following results (chapters 2.2.3.1ff) might be understood as an initial point for the creation of a *dynamic best-practice database for purchasing and supply management (research goal 1.2),* which can continuously be extended due to new research findings over time.

Based upon the pre-defined limitation only to include maturity models that are covering more than simply single aspects of progressive PSM, a model could thus cover all eight or only two dimensions (see Table 20 and Table 21).

	STRATEGY & PLANS	ORGANISATION & INTERNAL INTERFACES	PROCESS EXCELLENCE & ICT	SUPPLIER MANAGEMT & EXTERNAL INTERFACES	CONTROLLING & PERFORMANCE MANAGEMENT	TALENTS & SKILLS	INNOVATION & METHODS	SUSTAINABILITY & ETHICS
HEß_15M maturity model (2015)	✓	✓	✓	✓	✓	✓	✓	✓
ÜBEDA et al. Purchasing maturiy model (2015)	✓	✓	✓	✓	✓	✓	✓	
BEMELMANS et al._Quick scan purchasing maturity tool (2013)	✓	✓	✓	✓	✓	✓	✓	
HARTMAN ET AL._PSM drivers and firm performance (2012)	✓	✓		✓	✓	✓	✓	
REYES_GIACHETTI_Supply chain capability maturity model (2010)		✓	✓	✓	✓		✓	
VAN WEELE_Purchasing and supply development model (2010/1998)	✓	✓	✓	✓	✓	✓	✓	✓
MONCZKA et al._Stages in purchasing strategy development (2010)	✓	✓	✓	✓				
BATENBURG/VERSENDAAL_Performance determinants of the procurement business function (2008)	✓	✓	✓	✓	✓	✓		
SCHIELE_Supply management maturity model (2007)	✓	✓	✓	✓	✓	✓	✓	
STOLLE_Conceptual model of drivers of PSM evolution (2007)	✓	✓	✓	✓	✓	✓	✓	
NETLAND et al._Supply Chain Maturity Assessment Test (2007)	✓	✓	✓	✓	✓	✓		✓
WILDEMANN_Reference model purchasing & supply management (2007)	✓	✓	✓	✓	✓	✓	✓	
PAULRAJ et al._Levels of strategic purchasing (2006)	✓	✓	✓	✓	✓			
COUSINS et al._Purchasing function maturity (2006)	✓	✓		✓	✓	✓		
BRUEL_PETIT_Purchasing function maturity (2005)	✓	✓		✓	✓	✓		
LOCKAMY/McCORMACK_Supply chain management process maturity model (2004)		✓	✓	✓	✓		✓	
BURT et al._World Class Supply Management (2003)	✓	✓	✓	✓	✓	✓		✓
JONES_Purchasing development stages (1999)	✓	✓	✓	✓	✓	✓		
DOBLER/BURT_From reactive to strategic procurement (1996)	✓	✓	✓	✓	✓	✓		
SYSONS_Purchase position benchmarking (1994)	✓	✓	✓	✓	✓			
BURT/DOYLE_American Keiretsu (1993)	✓	✓	✓	✓	✓	✓		
MONCZKA/TRENT_Towards purchasing excellence/MSU (1991/1992)	✓	✓	✓	✓	✓	✓	✓	
FREEMAN/CAVINATO_Fitting purchasing to the strategic firm (1990)	✓	✓	✓	✓	✓	✓		
BHOTE_Four stages of supply management (1989)		✓	✓	✓	✓	✓	✓	
RECK_LONG_Strategic stages in the development of a purchasing function (1988)	✓	✓		✓	✓	✓		

Table 20: Coding of scientific maturity models according to the main maturity categories

	STRATEGY & PLANS	ORGANISATION & INTERNAL INTERFACES	PROCESS EXCELLENCE & ICT	SUPPLIER MANAGEMT & EXTERNAL INTERFACES	CONTROLLING & PERFORMANCE MANAGEMENT	TALENTS & SKILLS	INNOVATION & METHODS	SUSTAINABILITY & ETHICS
ABERDEEN_Best in class maturity framework	✓	✓	✓	✓	✓	✓	✓	✓
A.D.LITTLE_Purchasing Performance Excellence/Purchasing Value Excellence/CELL Consulting/Univ. St.Gallen	✓	✓	✓	✓	✓	✓	✓	
A.T.KEARNEY_Assessment of Excellence in Procurement	✓	✓	✓	✓	✓	✓	✓	✓
CONMOTO_Maturity Model of value-based Purchasing	✓	✓	✓	✓	✓	✓	✓	
EFQM_Framework for managing external resources	✓	✓	✓	✓	✓	✓	✓	✓
HORVATH_360° Procurement Performance Analysis	✓	✓	✓	✓	✓	✓	✓	
H&Z_Management oriented purchasing analysis	✓	✓	✓	✓	✓	✓	✓	
ICG_Procurement Maturity Model	✓	✓	✓	✓	✓	✓	✓	✓
IMP_Procurement Performance Excellence	✓	✓	✓	✓	✓	✓	✓	✓
McKINSEY_Stages of purchasing sophistication/Stages of strategic purchasing/…	✓	✓	✓	✓	✓	✓	✓	
MERCER_Levels of procurement development	✓	✓	✓	✓	✓	✓	✓	
PAULRAJ et al._Levels of strategic purchasing (2006)	✓	✓	✓	✓	✓	✓	✓	
OPTIACHATS_Purchasing Maturity Model	✓	✓	✓	✓	✓	✓	✓	
ROLAND BERGER_Purchasing Excellence	✓	✓	✓	✓	✓	✓	✓	✓
ROLAND BERGER_Purchasing EmPowerment	✓	✓	✓	✓	✓	✓	✓	
SCC_SCORmark	✓	✓	✓	✓	✓	✓	✓	

Table 21: Coding of management-oriented maturity models according to the main maturity categories

The categories *Organisation & Internal Interfaces* and *Supplier Management & External Interfaces* are covered from all scientific PMMs, *Controlling & Performance Management* is covered by (24), *Strategy & Plans* by (22), *Process Excellence & ICT* and *Talents & Skills* by (20), *Innovation & Methods* by (12) and *Sustainability & Ethics* by (4) PMMs. All management-oriented models provided KEPs for all categories, apart from *Sustainability & Ethics*. Only five models covered issues of this maturity dimension.

RESEARCH NOTE

Although there is a lively and intensive discussion about "Green Procurement" and "Corporate Social Responsibility" in Purchasing and Supply Chain Management *(e.g. Zorzini et al., 2015; Blome et al., 2014; Hoejmose/Adrien-Kirby, 2012; Carter/Easton, 2011; Carter/Rogers, 2008; Roberts, 2003; Maignan et al., 2002)*, the dimension "Sustainability & Ethics" seems to be under-represented in the current maturity models thus far.

Given that that there is a growing number of publications discussing and validating the green purchasing-performance link (e.g. *Wang/Sarkis, 2013; Bititci et al., 2012; Green et al. 2012)*, and due to continuously increasing requirements from customers as well as governmental regulations, it can be proposed that maturity in this dimension will certainly be a topic of rising (future) importance and an interesting field for further research.

Next to the eight areas of PSM maturity mentioned above, in this research step *82 key evaluation points* were identified (see Table 22-Table 29). To elaborate a well-balanced, self-explanatory set of best-practice recommendations for the final PSM^{2}F that are comprehensible in a self-assessment setting and can be evaluated with one uniform assessment scheme (see chapter 3.2), it was largely necessary to reformulate the wording, to regroup as well as condensing the criteria and variables used in the respective publications *(see also Netland et al., 2007)*[44] to ensure a balance between a proper breadth and depth of content of the derived assessement scheme *(see also Garengo et al. 2005; de Bruin et al. 2005)*.

In the following section the result of the coding process for each of the maturity categories is presented. For each of the eight categories a table with the KEPs sorted by descending order based upon total mentions in the above presented scientific (SCI) and management-oriented (MAN) maturity models is shown including exemplary references, followed by a description of the top ranked KEPs.

[44] This was also necessary because of the above presented criticism about the partly inappropriate and contradictory defined stages (chapter 2.2.2)

2.2.3.1 Strategy & Plans

No.	Key Evaluation Points	#	#SCI	#MAN	Exemplary references
1	Based upon a corporate strategy, PSM develops an overall PSM strategy as well as short-, mid- and long-term plans and goals (e.g. negotiation targets, process goals, supplier goals) in a structured way (strategy alignment, roadmap approach).	29	16	13	Heß (2015), Bemelmans et al. (2013), Monczka et al. (2010), Paulraj et al. (2006), Dobler/Burt (1996); Aberdeen, ICG
2	The PSM department and its employees know or (better) are part of creating the corporate goals and budgets and consider the strategic goals of the company in their actions.	23	12	11	Übeda et al. (2015), Hartman et al. (2012), Stolle (2008), Sysons (1994); Horváth & Partnerss, McKinsey & Company
3	Formulated and differentiated sourcing strategies (per category and/or supplier) are established based upon a structured process (e.g. using portfolio-technique; strategic importance of products, risk factors, availability).	23	11	12	Heß (2015), Schiele, (2007), Paulraj (2006), Burt et al. (2003), Monczka/Trent (1991/92); A.T. Kearney, OptiAchats
4	Risk and market monitoring is established as integrated part of the PSM operations (e.g. anticipate trends, SWOT) to secure the supply.	22	14	8	Übeda et al. (2015), Bemelmans et al. (2013), Hartmann et al. (2012), Bruel/Petit (2005), Reck/Long (1988); McKinsey & Company, IMP
5	Clear and suitable commodity structure based upon an agreed commodity code classification with defined responsibilities is in place.	18	7	11	Hartmann et al. (2012), Schiele (2007), Burt et al. (2003), Monczka/Trent (1991/92); EFQM, H&Z
6	Global sourcing strategies are evaluated and if relevant put into practice in a structured way.	12	8	4	Bemelmans et al. (2013), Monczka et al. (2010), Batenburg/Versendaal (2008), Wildemann (2009), Jones (1999); A.D. Little, A.T. Kearney
7	There are fixed resources (time, manpower) for strategic tasks and initiatives next to daily operations.	8	3	5	Wildemann (2009), Cousins et al. (2006), Reck/Long (1988); EFQM, IMP
8	The derived strategies are continuously reviewed and if necessary adapted (on a global and/or category level).	4	1	3	Bemelmans et al. (2013); Conmoto; OptiAchats
9	Differentiation of supplier management strategies according PSM power/situation on supply market.	3	1	2	Bemelmans et al. (2013); McKinsey & Company, OptiAchats
10	Contingency plans for disruptions in the supply chain are available.	1	1	0	Netland et al. (2007)
11	PSM is involved in the due diligence phase of M&A to ascertain e.g. savings potential through pooling.	1	1	0	Stolle (2008)
12	The PSM strategy and goals are known by the relevant internal stakeholders and the management team.	1	0	1	OptiAchats

Table 22: Key evaluation points "Strategy & Plans"

Working on a PSM strategy, as well as on short-, mid- and long-term plans and goals based upon a corporate strategy is the most frequently mentioned issue in this category. In this regard it is also crucial that the *PSM department and its employees know or (better) are part of creating the corporate goals* and consider the strategic goals of the company in their actions. Next to having an overall PSM strategy with formulated goals, a *definition of differentiated sourcing strategies (per category)* based upon a structured process (e.g. using portfolio-technique) is a factor of high maturity. Therefore, a clear and *suitable commodity structure* based upon an agreed commodity code classification (e.g. eClass, UNSPSC, ETIM) with defined responsibilities is the basis. Moreover, *risk and market monitoring* (e.g. anticipate trends, monitor market indices, carry out SWOT analysis) should be established as integrated part of PSM operations.

2.2.3.2 Organisation & Internal Interfaces

No.	Key Evaluation Points	#	#SCI	#MAN	Exemplary references
13	There are clear interfaces and communication structures in the company (e.g. R&D for new product ideas, standardisation issues/ production planning for forecasting issues/ logistics for delivery planning/ sales/business units for budgeting issues). It is clearly defined when PSM has to be involved (in a cross-functional team).	31	18	13	Heß (2015), Schiele (2007), Lockamy/McCormack (2004), Freeman/Cavinato (1990), Reck/Long (1988); Aberdeen, EFQM
14	The PSM department is at a senior hierarchical level in the company (part of the management or directly in the first reporting line to the executive management).	21	8	13	Übeda et al. (2015), Schiele (2007), Wildemann (2009), Paulraj et al. (2006), Jones (1999); Horváth & Partners, ICG
15	Roles and responsibilities for specific tasks and approval steps are clearly defined (e.g. mandates, job descriptions and requirement profiles).	19	10	9	Heß (2015), van Weele (2010), Monczka et al. (2010), Netland et al. (2007), Freeman/Cavinato (1990); A.D. Little, McKinsey & Co.
16	There is a TOP-Management commitment for PSM strategies, goals and actions.	17	9	8	Stolle (2008), Paulraj et al. (2006), Cousins et al. (2006), Burt/Doyle (1994), Bhote (1989); Aberdeen, NRECA
17	The needs of the internal and external customers are known and PSM regularly asks for feedback.	15	8	7	van Weele (2010), Monczka et al. (2010), Lockamy/McCormack (2004), Sysons (1994), Freeman/Cavinato (1990); A.T. Kearney, H&Z
18	PSM has the mandates for the complete purchasing volume. If there is Maverick Buying, PSM knows the concrete amount and responsibilities of these orders.	15	5	10	Heß (2015), Übeda (2015), Schiele (2007), Bruel/Petit (2005), Freeman/Cavinato (1990); Horváth & Partners, Roland Berger
19	Different options of organising the PSM department are analysed, implemented (e.g. central, decentralised, hybrid, Shared Service, outsourcing, offshoring, lead buyer) in a structured way and if necessary further developed based upon business strategy and benchmarks.	12	3	9	Bemelmans et al. (2013), Stolle (2008), Burt/Doyle (1994); A.D. Little, H&Z
20	A sourcing committee is installed for defining the requirements profile for a supplier and the final selection of new suppliers (including the relevant departments like QM, Logistics, Production, R&D).	10	4	6	Schiele (2007), Burt/Doyle (1994), Monczka/Trent (1991/92), Bhote (1989); A.T. Kearney, ConMoto
21	There are noticeable activities to implement a working climate and culture for continuous improvement and know-how-sharing.	8	3	5	Reyes/Giachetti (2010), van Weele (2010), Stolle (2008); EFQM, IMP
22	Valid purchasing guidelines (e.g. acceptance of gifts) are in place.	3	1	2	Heß (2015); ICG, OptiAchats
23	Regular check if number of employees is adequate according the relevant industry benchmark.	1	1	0	Wildemann (2009)
24	PSM management has autonomy for making decisions that are necessary to reach the defined goals.	1	0	1	OptiAchats
25	PSM has a high professionalism in actions with high visibility to (internal and external) stakeholders (e.g. design of RFQ, offer comparison, negotiation, meeting coordination, controlling).	1	0	1	ICG
26	Internal marketing for "good procurement stories" or "transformation plans" (e.g. road-shows) is carried out.	1	0	1	ICG
27	Professional meeting structure within the PSM department and for all the meetings PSM has the responsibility.	1	0	1	ICG

Table 23: Key evaluation points "Organisation & Internal Interfaces"

The most important maturity indicator in the category "Organisation & Internal Interfaces" is *having clear interfaces and communication structures in the company* (e.g. R&D for new product ideas, standardisation issues; production planning for

forecasting issues; logistics for delivery planning), and a clear definition (e.g. in process descriptions) if and in which process step PSM needs to become involved.

Another crucial aspect of a mature and powerful PSM function is its *hierarchical position in the company*. If the PSM department is at a senior hierarchical level in the company (part of the management or directly in the first reporting line to the executive board), it might be easier to launch new projects directly in accordance with the management and better understand the overall corporate situation and strategy, which may subsequently help to align the PSM actions and strategies correspondingly.

Clear understanding of roles and responsibilities for specific tasks and approval steps is also indicated as highly relevant aspect (e.g. mandates, job descriptions). Next to *being part of the management*, or especially if not, *having TOP-Management commitment for PSM strategies, goals and actions* is a further key element of a mature PSM function. Finally, showing *customer orientation by knowing the needs of the internal and external clients and by regularly asking for feedback* characterise a progressive PSM function due to the analysed literature and sources.

2.2.3.3 Supplier Management & External Interfaces

No.	Key Evaluation Points	#	#SCI	#MAN	Exemplary references
28	Strategic supplier (relationship) management is defined as an important asset in the company. A closed supplier management cycle is established from supplier analysis and selection, assessment and development.	32	21	11	Übeda et al. (2015), Monczka et al. (2010), Batenburg/Versendaal (2008), Cousins et al. (2006), Reck/Long (1988); IMP, McKinsey & Company
29	The strategy and technology roadmap of relevant supplier is considered when working on the own PSM strategy and product development.	30	18	12	Heß (2015), Hartman et al. (2012), Schiele (2007), Wildemann (2009), Bhote (1989); A.T. Kearney, Horváth & Partners
30	Concepts of process- and/or IT Integration with (relevant) suppliers for efficient and effective operations are established (e.g. EDI, SRM).	27	17	10	Bemelmans et al. (2013), van Weele (2010), Paulraj (2006), Sysons (1994), Monczka/Trent (1991/92); A.D. Little, ConMoto
31	Structured policies and documented procedures for the core phases in the supplier management process are in place, as well as clear responsibilities.	19	10	9	Hartman et al. (2012), Reyes/ Giachetti (2010), Netland et al. (2007), Bruel/Petit (2005), Burt/ Doyle (1993); Horváth & Partners, H&Z
32	Contract management is established at a professional level (coverage rate, standards, archive, compliance rules, different templates for different supplier types). If there are no contracts, clear general purchasing terms are in place.	16	9	7	Heß (2015), van Weele (2010), Schiele (2007), Burt/Starling (2002), Burt/Doyle (1994); McKinsey & Company, Mercer
33	There are defined resources to work on supplier development initiatives (e.g. defined key supplier managers and task force for special topics apart from daily business like value engineering or standardisation).	15	10	5	Bemelmans et al. (2013), Hartman et al. (2012), Paulraj et al. (2006), Monczka/Trent (1991/92), Bhote (1989); A.D. Little, Roland Berger
34	Professional QM methods and processes with suppliers (e.g. QFD, target values, audits, statistical process control, certification, DoE, zero defect programmes, 8D report) are in place.	8	7	1	van Weele (2010), Wildemann (2009), Cousins et al. (2006), Burt/Doyle (1994), Bhote (1989); IMP
35	Early supplier involvement for product development and innovative issues (e.g. shorten time-to-market, life-cycle-costing).	3	3	0	Heß (2015), Bemelmans et al. (2013), Netland (2007)
36	Frame orders and call-offs with main suppliers are properly used to increase efficiency of the purchasing process and use price advantages of pooling.	3	1	2	Heß (2015); ConMoto, ICG
37	PSM is established as main and first contact to the supplier.	2	1	1	Heß (2015), OptiAchats
38	For selecting new suppliers a multi-dimensional approach covering not only price issues is applied.	2	1	1	Bemelmans et al. (2013); OptiAchats
39	The supplier portfolio is regularly analysed for rationalisation possibilities (e.g. exit strategies).	2	1	1	Monczka/Trent (1991/92); OptiAchats

No.	Key Evaluation Points	#	#SCI	#MAN	Exemplary references
40	Next to the 1st tier supplier also the relevant sub-tiers for strategic products are known.	1	1	0	Monczka/Trent (1991/92)
41	Suppliers receive forecast data to plan their processes and supply chain in an efficient way.	1	1	0	Netland (2007)
42	For the critical parts a second source is defined.	1	1	0	Netland (2007)
43	Suppliers are regularly asked for feedback (about the relationship).	1	0	1	OptiAchats
44	Price and payment terms are managed in a professional and structured way to optimise the liquidity level and the profit margin (e.g. open book policy).	1	0	1	ICG

Table 24: Key evaluation points "Supplier Management & External Interfaces"

The core maturity aspect in this category is whether *strategic supplier (relationship) management is defined as an important asset in the company (e.g. management attention)* and *whether a closed supplier management cycle is established* from supplier analysis and selection, assessment and development. Each element of the supplier management cycle might certainly be a relevant aspect for itself, although their interaction makes them powerful.[45]

To *integrate the strategy and technology roadmap of relevant suppli*ers (e.g. investment in specific technology, new market entries, planed M&A) into the own PSM strategy and product development, is the next key evaluation point in this category. Having established concepts of *process- and/or ICT integration with (relevant) suppliers* for routine operations (e.g. EDI, SRM) might furthermore be of particular relevance in terms of increasing efficiency.

Structured policies, documented procedures as well as clear responsibilities for the core phases in the supplier management process are defined as a separate key evaluation point but closely connected to the top ranked aspect in this category. This also applies for the aspect of having *defined resources to work on supplier development initiatives* (e.g. defined key supplier managers or a task force for special topics apart from daily business like value engineering or standardisation).[46]

Another frequently mentioned aspect for maturity in the category "Supplier Management & External Interfaces" is whether *contract management is established at a professional level*. This contains appropriate standards for different types of suppliers or processes (e.g. serial parts, tooling, services), clear compliance rules and a central archive for administration issues.

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45 Due to that, but also to keep this dimension in a reasonable and balanced scope to the other categories, it was deliberately decided not to define seperate KEPs for all single phases of supplier management.

46 The aspect of supplier development was deliberately chosen as separate key evaluation point: Studies but also observations in companies regularly show that in a lot of companies supplier assessment is being implemented, but without a subsequent supplier development program. A study by the BME in 2006 showed, that from 80% of the companies that took part in the survey, only 17% launched a systematic supplier development *(BME, 2006, pp.30-32).*

2.2.3.4 Controlling & Performance Management

No.	Key Evaluation Points	#	#SCI	#MAN	Exemplary references
45	KPIs for critical processes and goals are defined and are regularly reviewed (e.g. ability to delivery, on-time-delivery, complaints).	38	25	13	Heß (2015), Stolle (2008), Schiele (2007) Paulraj (2006), Bhote (1989); Horváth & Partners, NRECA
46	By applying a (multi-dimensional) purchasing controlling it is possible to link the purchasing's influence on firm's performance (e.g. scorecard).	24	14	10	Hartman et al. (2012), Schiele (2007), Stolle (2008), Monczka/Trent (1991/92), Reck/Long (1988); IMP, ICG
47	Standard and ad-hoc reporting is available and used as basis for improvement and for informing internal and external stakeholders.	14	4	10	Hartman et al. (2012), Reyes/Giachetti (2010), Netland et al. (2007), Schiele (2007); Horváth & Partners, ICG
48	Based upon the measured KPIs, initiatives for improvement are implemented, if there are differences between the planned and actual figures.	11	3	8	Heß (2015), Schiele (2007), Monczka/Trent (1991/92); Horváth & Partners, H&Z
49	PSM reporting is also directed to the CEO/board.	9	1	8	Burt et al. (2003); IMP, McKinsey & Co.
50	Purchasing controlling comprises well-balanced quantitative (e.g. on-time-delivery, order confirmation) and qualitative (e.g. project status, learning) KPIs.	7	4	3	Van Weele (2010), Schiele (2007), Cousins et al. (2006), Monczka/Trent (1991/92); EFQM, Horváth & Partners

Table 25: Key evaluation points "Controlling & Performance Management"

The authors of the reviewed sources agreed that monitoring critical processes and goals with a *(multi-dimensional) purchasing controlling* is another element of PSM maturity. Furthermore, it is highly relevant having the ability to *link the purchasing's influence on firm's performance*.

Obtaining the relevant key performance indicators from *standard and ad-hoc reports* as a basis for improvement and informing internal and external stakeholders is another determining factor of a mature PSM function, as well as having a *balance between quantitative and qualitative metrics* and *being in the direct reporting line to the board of directors*.

2.2.3.5 Talents & Skills

No.	Key Evaluation Points	#	#SCI	#MAN	Exemplary references
51	A cross-functional training and skill management for PSM employees prepare the PSM team for their tasks (e.g. internal and external education/ training, job rotation, training plans).	33	16	17	Übeda et al. (2015), van Weele (2010), Cousins et al. (2006), Freeman/Cavinato (1990), Reck/Long (1988); EFQM, Horváth & Partners
52	There is a clear career path for professional advancement in the PSM department.	19	10	9	Hartman et al. (2012), Schiele (2007), Bruel/Petit (2005), Jones (1999), Monczka/Trent (1991/92); A.T. Kearney, IMP
53	Clear targets and a standardised feedback process for personnel (e.g. annual meeting, feedback-questionnaire) are in place.	11	4	7	Hartman et al. (2012), Schiele (2007), Netland et al. (2007), Monczka/Trent (1991/92); EFQM, McKinsey & Co.
54	The CPO and other PSM team members with responsibility for employees have the necessary leadership competencies.	10	3	7	Heß (2015), Stolle (2008), Burt/Doyle (1994); Aberdeen, Mercer
55	The hard skill portfolio of the PSM team is managed in an appropriate way (e.g. negotiation, process management, quality management, ICT skills, finance impact, project management, technical knowledge, blueprint reading).	8	6	2	Übeda et al. (2015), Hartman et al., (2012), Batenburg/ Versendaal (2008), Wildemann (2009), Burt et al. (2003); ICG, OptiAchats
56	The soft skill portfolio of the PSM team is managed in an appropriate way (e.g. communication, teamwork, analytical skills, customer orientation, problem-/conflict solving, self-motivation, managing changes, cultural awareness, selling ideas).	7	4	3	Übeda et al. (2015), Batenburg/ Versendaal (2008), Wildemann (2009), Burt et al. (2003); ICG, NRECA

No.	Key Evaluation Points	#	#SCI	#MAN	Exemplary references
57	Integration programmes for new personnel (e.g. job rotation, job profiles, checklists, mentoring, feedback, team-building) helps to easily integrate new employees.	8	4	4	Bemelmans et al. (2013), Schiele (2007), Stolle (2008), Monczka/Trent (1991/92); A.T. Kearney, H&Z
58	An adequate level of remuneration according industry standards is guaranteed.	8	4	4	Übeda (2015), Bemelmans et al. (2013), Stolle (2008), Jones (1999); ICG, McKinsey & Company
59	The mind-set and aspiration of the PSM personnel and the CPO is high (culture of excellence and entrepreneurial thinking).	2	1	1	Stolle (2008); EFQM
60	The PSM team participates in external trainings and/or conferences to bring external knowledge to the company and the PSM department.	2	1	1	Bemelmans et al. (2013); ICG

Table 26: Key evaluation points "Talents & Skills"

A *cross-functional training and skill management for PSM employees* that prepares the PSM team for their current and future tasks is the most frequently mentioned maturity aspect in this category. Internal/in-house and external training, job rotation and structured training plans might be measures and indicators for this KEP.

Having a *clear and transparent career path for the PSM personnel* for personal professional advancement is another aspect of high maturity. Also important are *clear targets and a standardised feedback process for the personnel* in the form of regular (e.g. quarterly or annual) meetings or feedback questionnaires.

Leadership competence of the CPO and of other PSM team members with personnel responsibility (e.g. project leaders, sub-team leader, lead buyers) is another highly important issue for maturity in PSM. Generally, the analysed models emphasise on specific (but not homogenous) competencies with particular relevance (see also chapter 5.1.1): As example *negotiation, process management, project management, technical knowledge about products and components (specification/blueprint reading), quality management or ICT skills* are frequently named relevant hard skills. *Interpersonal communication skills, conflict resolution, team work* or *self-motivation* are regularly defined as relevant soft skills. Finally, mature PSM organisations may convince with *structured integration programmes for new personnel*. This can be achieved in the form of a mentoring programme, clear job profiles, checklists for the first working period or job rotation programmes to become more familiar with other relevant areas, departments and stakeholders of the firm.

2.2.3.6 Process Excellence & ICT

No.	Key Evaluation Points	#	#SCI	#MAN	Exemplary references
61	Powerful ICT support (e.g. ERP, SRM) for routine tasks.	29	17	12	Heß (2015), Reyes/Giachetti (2010), Monczka et al. (2010), Schiele (2007), Dobler/Burt (1996); Aberdeen, Roland Berger
62	Clear documentation of core PSM processes (e.g. purchasing manual) which fulfils the recommendations of professional process management (e.g. process notation, defined process owner) and compliance guidelines.	24	13	11	Bemelmans et al. (2013), van Weele (2010), Stolle (2008), Sysons (1994), Freeman/Cavinato (1990); Horváth & Partners, IMP

No.	Key Evaluation Points	#	#SCI	#MAN	Exemplary references
63	PSM is actively involved in the demand planning process (product life-cycle management/forecasting).	13	5	8	Heß (2015), Schiele (2007), Netland (2007), Sysons (1994), Burt/Doyle (1994); A.D. Little, SCORmark
64	The role of PSM in the inventory management process (e.g. safety stock management, optimising inventory level) is clear.	8	4	4	Reyes/Giachetti (2010), Netland (2007), Burt/Doyle (1994), Monczka/Trent (1991/92); Mercer, SCORmark
65	Next to direct purchasing, there is also a clear and defined process for purchasing services, non-inventory items or CAPEX (indirect spend).	7	4	3	Übeda (2015), van Weele (2010), Burt et al. (2003), Burt/Doyle (1994); Aberdeen, McKinsey & Company
66	A process map provides a clear structure and overview of the core and supporting process in PSM.	3	2	1	Heß (2015), Wildemann (2009); OptiAchats
67	Professional e-Auction and RFQ usage.	1	0	1	OptiAchats
68	Clear responsibilities and templates ensure professionalism in master data management.	1	0	1	ICG

Table 27: Key evaluation points "Process Excellence & ICT"

Having powerful ICT support for routine tasks is the central element of maturity in the category "Process Excellence & ICT", followed by a *clear documentation of core PSM processes* that fulfil the recommendations of professional process management (e.g. process ownership, clear and uniform notation) and compliance guidelines (e.g. approval steps, 4-eyes-principle). *PSM is actively involved in the demand planning process* and *the role of PSM in the inventory management process is clear* are two further key evaluation points frequently mentioned in this category. Another important aspect is to have a *clear and defined process also for the indirect spend* as services, non-inventory items or CAPEX and not simply focusing on managing the direct spend.

2.2.3.7 Innovation & Methods

No.	Key Evaluation Points	#	#SCI	#MAN	Exemplary references
69	Intensive use of strategic spend and cost management methods (LPP, TCO, CBD/Open Book, investment appraisal).	22	11	11	Hartman et al. (2012), van Weele (2010), Cousins et al. (2006), Burt/Doyle (1994), Monczka/Trent (1991/92); Horváth & Partners, Roland Berger
70	Carry out benchmark studies, learning journeys or internal benchmarking to continuously improve the PSM function (e.g. best- practice sharing).	17	9	8	Reyes/Giachetti (2010), Schiele (2007), Stolle (2008), Wildemann (2009); Bhote (1989); A.T. Kearney, EFQM
71	Make-or-Buy decisions are triggered or only carried out by integrating PSM.	14	9	5	Übeda et al. (2015), van Weele (2010), Schiele (2007), Burt et al. (2003), Monczka/Trent (1991/92); H&Z, ICG
72	PSM takes a driving role in creating new business opportunities and bringing innovations into the firm due to the expertise about global supplier markets (e.g. ingredient branding, trend scouting).	11	5	6	Hartman et al. (2012), Bemelmans et al. (2013), van Weele (2010), Stolle (2008), Wildemann (2009); IMP, OptiAchats
73	A knowledge-pool (e.g. lessons-learned database, PSM-wiki) about past projects or success factors of negotiations is available and increases the efficiency and effectiveness of future activities.	6	2	4	Wildemann (2009); Burt/Doyle (1994); EFQM, ICG
74	A continuous improvement initiative is in place, so ideas can be handed in from the PSM team and will be handled in a structured way.	5	2	3	Sysons (1994), Bhote (1989); A.T. Kearney, Roland Berger
75	Projects for reducing complexity within processes, the procurement portfolio or the PSM structure are carried out (e.g. value engineering)	3	2	1	Bemelmans et al. (2013), Wildemann (2009); SCORmark
76	For the internal communication diverse media channels (e.g. PSM webpage, newsletter, wiki, social media) are available.	2	1	1	Bemelmans et al. (2013); OptiAchats
77	The company draws on the services of external consultants or universities for innovative and methodological advice if necessary.	1	0	1	Aberdeen

Table 28: Key evaluation points "Innovation & Methods"

Using strategic spend and cost management methods (e.g. Linear performance pricing (LPP), Total Cost of Ownership (TCO), cost break downs/open book (CBD), investment appraisal) is the most frequently mentioned key evaluation point in this category. Another determining aspect of maturity in the category "Innovation & Methods" is to regularly *carry out (external) benchmark studies and internal benchmarking* for best- practice sharing and continuously improving the PSM function. Furthermore, *triggering or being an integral part of make-or-buy analyses* as well as taking the role in *creating new business opportunities and bringing innovations to the firm* (e.g. ingredient branding, trend scouting) are two further factors of a mature PSM department and might underline the entrepreneurial role of PSM in the company.

2.2.3.8 Sustainability & Ethics

No.	Key Evaluation Points	#	#SCI	#MAN	Exemplary references
78	Corporate social responsibility issues (e.g. green procurement, considering social activities when selecting a new supplier) are part of the PSM strategy.	10	4	6	Heß (2015), van Weele (2010), Netland (2007), Burt et al. (2003); Aberdeen, EFQM
79	A dedicated person or group in PSM take care of promoting sustainability programmes.	3	2	1	Heß (2015), van Weele (2010); OptiAchats
80	Diversity management (mix of cultures and gender) is considered a relevant topic in the company.	2	1	1	van Weele (2010); IMP
81	PSM is playing an active role in continuously optimising the waste management.	1	1	0	Netland (2007)
82	PSM is playing an active role in continuously optimising the global footprint (e.g. transport efficiency).	1	0	1	EFQM

Table 29: Key evaluation points "Sustainability & Ethics"

In this dimension, a distinctive factor of maturity is to *include corporate social responsibility issues into the overall PSM strategy*. This can happen by nominating a dedicated person or group of PSM to take care of *promoting sustainability programmes* like *increasing transport efficiency* (e.g. CO_2-reduction) or *optimising waste management.* Next to the environmental issues, also to actively foster diversity (e.g. including gender, cultural diversity or religion) is named as an aspect for progressive PSM.

Overall, the most determining KEPs of PSM maturity are listed in the following table, taking their number of mentions as the main indicator for importance.

No.	Key Evaluation Points	Category	Mentions
1	KPIs for critical processes and goals are defined and are regularly reviewed (e.g. ability to delivery, on-time-delivery).	CONTROLLING & PERFORMANCE MANAGEMENT	38
2	A cross-functional training and skill management for PSM employees prepare the PSM team for their tasks (e.g. internal and external education/ training, job rotation, training plans).	TALENTS & SKILLS	33
3	Strategic supplier (relationship) management is defined as an important asset in the company. A closed supplier management cycle is established from supplier analysis and selection, assessment and development.	SUPPLIER MANAGEMENT & EXTERNAL INTERFACES	32
4	There are clear interfaces and communication structures in the company (e.g. R&D for new product ideas, standardisation issues/ production planning for forecasting issues/ logistics for delivery planning/ sales/business units for budgeting issues). It is clearly defined when PSM has to be involved (in a cross-functional team).	ORGANISATION & INTERNAL INTERFACES	31
5	The strategy and technology roadmap of the supplier is considered when working on the own PSM strategy and product development.	SUPPLIER MANAGEMENT & EXTERNAL INTERFACES	30
6	Based upon a corporate strategy, PSM develops short-, mid- and long-term plans and goals (e.g. negotiation targets, process goals, supplier goals) as well as an overall PSM strategy in a structured way (strategy alignment, roadmap approach).	STRATEGY & PLANS	29
7	Powerful ICT support (e.g. ERP, SRM) for routine tasks.	PROCESS EXCELLENCE & ICT	29
8	Concepts of process- and/or IT Integration with (relevant) suppliers for efficient and effective operations are established (e.g. EDI, SRM).	SUPPLIER MANAGEMENT & EXTERNAL INTERFACES	27
9	Clear documentation of core PSM processes (e.g. purchasing manual) that fulfil the recommendations of professional process management (e.g. process notation, defined process owner) and compliance guidelines.	PROCESS EXCELLENCE & ICT	24
10	By applying a (multi-dimensional) purchasing controlling it is possible to link the purchasing's influence on firm's performance (e.g. scorecard).	CONTROLLING & PERFORMANCE MANAGEMENT	24
11	The PSM department and its employees know or (better) are part of creating the corporate goals and budgets and consider the strategic goals of the company in their actions.	STRATEGY & PLANS	23
12	Formulated and differentiated sourcing strategies (per category and/or supplier) are established based upon a structured process (e.g. using portfolio-technique; strategic importance of products, risk factors, availability).	STRATEGY & PLANS	23
13	Intensive use of strategic spend and cost management methods (LPP, TCO, CBD/Open Book, investment appraisal).	INNOVATION & METHODS	22
14	Risk and market monitoring is established as integrated part of the PSM operations (e.g. anticipate trends, SWOT).	STRATEGY & PLANS	22
15	The PSM department is at a senior hierarchical level in the company (part of the management or directly in the first reporting line to the executive management).	ORGANISATION & INTERNAL INTERFACES	21
16	There is a clear career path for professional advancement in the PSM department.	TALENTS & SKILLS	19
17	Roles and responsibilities for specific tasks and approval steps are clearly defined (e.g. mandates, job descriptions and requirement profiles).	ORGANISATION & INTERNAL INTERFACES	19
18	Structured policies and documented procedures for the core phases in the supplier management process are in place, as well as clear responsibilities.	SUPPLIER MANAGEMENT & EXTERNAL INTERFACES	19
19	Clear and suitable commodity structure based upon an agreed commodity code classification with defined responsibilities is in place.	STRATEGY & PLANS	18
20	There is a TOP-Management commitment for PSM strategies, goals and actions.	ORGANISATION & INTERNAL INTERFACES	17

Table 30: Ranking of the twenty most important key evaluation points based upon total mentions

In the following two tables those scientific and management-oriented models that cover the highest number of references for the presented key evaluation points are listed.

Scientific Purchasing Maturity Models	Number of covered or related KEPs
WILDEMANN (2009): Reference model purchasing & supply management	32
BURT/DOYLE (1994): American Keiretsu	32
MONCZKA/TRENT (1991/92): Towards purchasing excellence/MSU	31
BEMELMANS et al. (2013): Quick scan purchasing maturity tool	28
HEß (2015): 15M maturity model	27
STOLLE (2008): Conceptual model of drivers of PSM evolution	27
SCHIELE (2007): Supply management maturity model	25
VAN WEELE (2010/1998): Purchasing and supply development model	23
NETLAND et al. (2007): Supply Chain Maturity Assessment Test	23
BURT/STARLING (2002): World Class Supply Management	21

Table 31: Total mentions of key evaluation points in the scientific maturity models

At this point it has to be noted that a high number of references must not necessarily be associated with better (scientific) quality but rather with usefulness for deriving the KEPs for the PSM^{2}F. Some of the articles which also emphasised an empirically validation *(e.g. Cousins et al., 2006; Paulraj et al., 2006; Lockamy/McCormack, 2004)* usually covered less criteria and tried to link it to the firm's performance. Others provided detailed lists of criteria in the appendix of the paper *(e.g. Bemelmans et al., 2013; Netland et al., 2007; Schiele, 2007)*. If a model was (also) published in a book *(e.g. Heß, 2015; Wildemann, 2009); Burt/Doyle, 1994)* that automatically leads to more room for details.

Management-oriented Purchasing Maturity Models	Number of covered or related KEPs
OPTIACHATS: Purchasing maturity model	40
A.T. KEARNEY: Assessment of Excellence in Procurement	39
ICG: Procurement Maturity Model	36
H&Z: Management-oriented purchasing analysis	35
IMP: Procurement Performance Excellence	34
McKINSEY & Company: Stages of purchasing sophistication/…	33
EFQM: Framework for managing external resources	31
A.D.LITTLE: Purchasing Performance Excellence/Purchasing Value Excellence/CELL Consulting/University St. Gallen	27
ROLAND BERGER: Purchasing EmPowerment	24
ABERDEEN: Best-in-class maturity framework	22
HORVATH: 360° Procurement Performance Analysis	22

Table 32: Total mentions of key evaluation points in the management-oriented maturity models

It might certainly be possible that the maturity models used for this content analysis sometimes cover further KEPs as described in the respective journal paper or white paper provided from the consulting company. This is evidenced by the (open) statement of some authors that they only present an excerpt of their model in the paper *(e.g.*

Schiele, 2007), or the fact that the majority of authors often use the terms "for example" or "such as" when explaining the details of their model.[47]

RESEARCH NOTE

Taking the descriptive and content-related findings in this chapter as a basis, and applying the *academic framework for evaluating a discipline* as a reference *(Harland et al., 2006, p.736)* on purchasing maturity research, the discussion would currently fit best to level 3 out of 4.

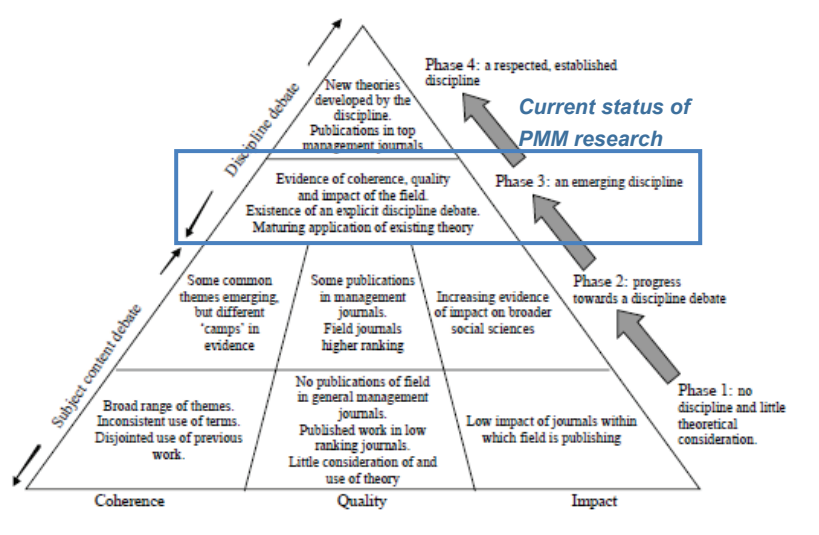

Figure 10: Positioning of the PMM research in the academic framework for evaluating a discipline

As already mentioned in chapter 2.2.1, a more intensive discussion about maturity models in PSM is currently observable in the scientific community. Main focus is a stronger content-related but also structural deepening and foundation, which may positively contribute to a further advancement of this research stream in the future.

2.2.4 Further relevant sources about maturity aspects of PSM

As mentioned in chapter 2.1, the detailed content analysis of maturity models in PSM was the primary focus and inner kernel of literature research. Not only due to content-related contradictions of the analysed PMMs (chapter 2.2.2), it seems both plausible and reasonable to also take a closer look to management frameworks as well as studies about future trends and challenges in the purchasing field. By doing so, selection bias

[47] This is comprehensible especially for the management-oriented PMM offered from consulting companies, which primarily are not an end in itself, but follow the goal to sell consulting projects. That's why not all relations, contents and details concerning (self-) application are accessible for free *(Jahns, 2005).* Also for process management maturity models there is the critique that in most of the publications there are often only exemplary descriptions of assessment criteria. *"Well structured and easily applicable assessment checklists" […] that support "self assessments by adopters from industry"* are mainly missing *(Röglinger et al., 2012, p.340).*

can be reduced to a minimum and thus can lead to a better scientific foundation of the derived KEPs of PSM maturity as one central content-related element of the PSM²F.

2.2.4.1 Frameworks in PSM

Taking the overview of management framework in PSM from *Ortner/Schweiger (2010, p.128)* as a basis (seven models), it was possible to extend this list by carrying out the above described literature review up to 20 frameworks. These frameworks divide the PSM function into multiple abstraction levels and hence offer a comprehensive and structured view on the aspects a company has to take into consideration for a well-managed PSM function *(Ortner/Schweiger, 2010)*. This highlights their relevance as valid counter-check as well as complementary source for working on a best-practice database of determining maturity factors in PSM.

No.	Name of PSMF	Author(s)/Publication	Year
1	Power in Procurement System	Bräkling/Oidtmann, Power in Procurement, Wiesbaden	2012
2	The CIPS procurement and supply management model	CIPS, Lysons/ Farrington, Purchasing and Supply Chain Management, 8.Edition, Harlow	2012
3	SCOR Model 11	Supply Chain Council (SCC), The Supply Chain Operations Reference SCOR Modell	2012
4	Management of Requirements in Collaborations	Ortner et al., Management of Requirements in Collaborations, Graz	2011
5	3 layer model of SRM	Appelfeller/Buchholz, Supplier Relationship Management, 2.Edition, Wiesbaden	2011
6	Integrated PSM Process	Benton, Purchasing and Supply Chain Management, 2.Edition, New York	2010
7	Four enablers of good purchasing management	Monczka et al., Purchasing & Supply Chain Management, 4.Edition, Hampshire	2010
8	15M architecture of supply strategy	Heß, Supply-Strategien in Einkauf und Beschaffung (EN: Supply strategies in Purchasing and Procurement), 2.Edition, Wiesbaden	2010
9	Cycle of holistic purchasing management	Schweiger et al., Roadmap to procurement excellence, Vienna	2009
10	Potential Analysis in Purchasing	Wildemann, Einkaufspotentialanalyse (EN: Analysis of purchasing potential), Munich	2008
11	Framework of purchasing activities	Schentler, Beschaffungscontrolling in der kundenindividuellen Massenproduktion (EN: Purchasing controlling in customer-specific mass production), Graz	2008
12	The Strategic Supply Wheel	Cousins et al., Strategic Supply Management, Essex	2008/2002
13	Procurement Event Monitoring	Bäck et al., Einkauf optimieren (EN: Optimisation of purchasing), Graz	2007
14	House of Sourcing and Supply Management	Eßig, Perspektiven des Supply Managements (EN: Perspectives of Supply Management), 1.Edition, Berlin	2005
15	Supply Management Navigator	Jahns, Einkauf und Supply Management (EN: Purchasing and Supply Management), 1.Edition, Berlin	2005
16	The 21st Century Logistics framework	Closs/Mollenkopf, Industrial Marketing Management, Vol.33, No.1, pp. 37-44	2004
17	PSM: a conceptual framework	Kaufmann, Handbuch industrielles Beschaffungsmanagement (EN: Handbook of purchasing management), 2.Edition, Wiesbaden	2002
18	Integrated St. Galler purchasing management approach	Schober et al., Beschaffung aktuell, No.2, pp.38-41	2001
19	Supply Chain Management Excellence Model	Kanji/Wong, Total Quality Management, Vol.10, No.1, pp.1147-1168	1999/2003
		Bowersox et al., 21st century logistics: making supply chain integration a reality, Oak Brook.	1999
20	Global Supply Chain Forum Framework	GSCM/Cooper et al., The International Journal of Logistics Management, Vol.8, No.1, pp.1-14	1997

Table 33: List of selected frameworks in PSM

Only models containing at least two or more areas of holistic PSM (e.g. Strategy & Plans *and* Organisation & Internal Interfaces *or* Processes Excellence & ICT, or Organisation & Internal Interfaces *and* Processes Excellence & ICT *or* Performance Management) were considered for the in-depth analysis. Models that only focus on single *aspects (e.g. Framework for low-cost country sourcing by Kusaba et al. (2011), Forward Sourcing by Appelfeller and Buchholz (2011) or Framework of Purchasing Competence by Gonzales-Benito (2007))* were excluded.

In the following paragraph, three exemplary and well-documented PSM frameworks from highly regarded and active scholars within the German-speaking *(Jahns)* and international PSM community *(Cousins et al., Monczka et al.)* will be introduced and briefly discussed to gain a better understanding about their fundamental logic and structure to clarify their impact for the pursued research goals.

Name of framework	Author(s)	Year
Supply Management Navigator	Jahns	2005
Strategic Supply Wheel	Cousins et al.	2008
Four enablers of good purchasing management	Monczka et al.	2010

Table 34: Selected PSMF for detailed explanation

Supply Management Navigator *(Jahns, 2005)*

The *Supply Management Navigator* by *Jahns* (Figure 11) is based upon general systems theory *(Jahns, 2005, p.50f)* and provides an overview of the most relevant management tasks that he considers necessary for holistic PSM. It has its origins in the "St. Galler Management Navigator" *(Stolle, 2008)* and comprises eight management modules, one core module and six support modules *(Jahns, 2005, p.70)*.

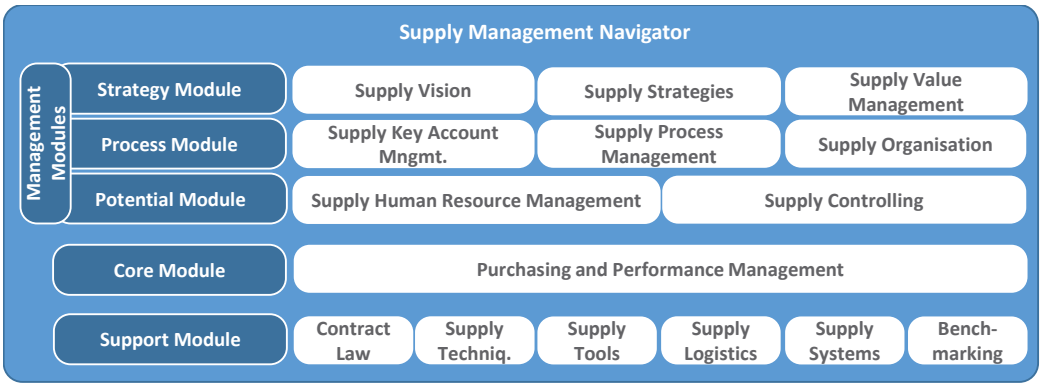

Figure 11: Supply Management Navigator (Jahns, 2005)

Working on a "Supply Vision", elaborating a "Supply Strategy", or establishing a powerful "Supply Organisation" and "Supply Controlling" are sub-categories of the management modules *(Jahns, 2005, p.148ff)*. These are complemented by a core module "Purchasing and Performance Management" as well as six supportive modules in the area of "Contracting", "Logistics" or "Benchmarking". By separating the management

tasks from the operational and supportive tasks, it should be made clear that progressive PSM cannot be achieved simply by optimising the operational purchasing.

Strategic Supply Wheel *(Cousins et al., 2008)*

Originally introduced by *Cousins* in 2002 and subsequently refined over the years, this framework defines six main dimensions that are related to holistic supply management *(Cousins et al., 2008).* The scientific basis for deriving the Strategic Supply Wheel is a three-year research study examining 750 firms across private and public sectors, as well as 25 expert interviews to confirm the model's validity *(Cousins et al., 2008, p.5).*

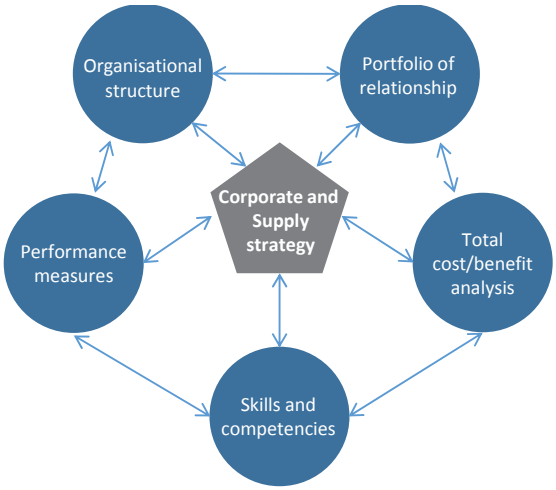

Figure 12: Strategic Supply Wheel (Cousins et al., 2008)

The framework is deliberately designed as a wheel to show that each element cannot or better formulated should not be considered in isolation. At the centre is the development of the *supply strategy* that has to be aligned with the corporate vision and strategy, and to be successfully implemented, aligned with the five central elements, which are also interrelated and connected. To make it more transparent, *Cousins et al. (2008)* provide the example that having the perfect strategy but not the personnel or the infrastructure to deliver it makes the strategy worthless.[48] Next to a proper *organisational structure* – which should enhance rather than hinder strategic PSM and foster the information flow with all relevant internal stakeholders – the authors also highlight the need for structured and *differentiated supplier relationship management* (from transactional focus to partnership). *Total cost and benefit analysis* is the third wheel of the model and should always be carried out when working on a strategic decision or change. Also in this model the appropriate skill set is addressed: (1) Strategic planning, (2) communication, (3) financial skills/cost accounting, (4) technical and (5) team-building skills are highlighted as the most *relevant competencies* for shifting PSM towards a more strategic orientation *(Cousins et al., 2008, p.118).* Finally, effective monitoring

[48] This aspect is closely related to the *"minimum maturity point",* proposed from Schiele (2007) and discussed in chapter 2.2.1

and *performance measurement* mechanisms are a necessary means to control the level of strategy implementation and performance in PSM.

Four enablers of good purchasing management *(Monczka et al., 2010)*

In their framework *Monczka et al. (2010)* outline four central enablers that lead to mature purchasing and supply (chain) management strategies. They state that *"Human resources, organizational design, information technology (IT) and measurement are all needed to achieve purchasing excellence." (Monczka et al., 2010, p.29)*

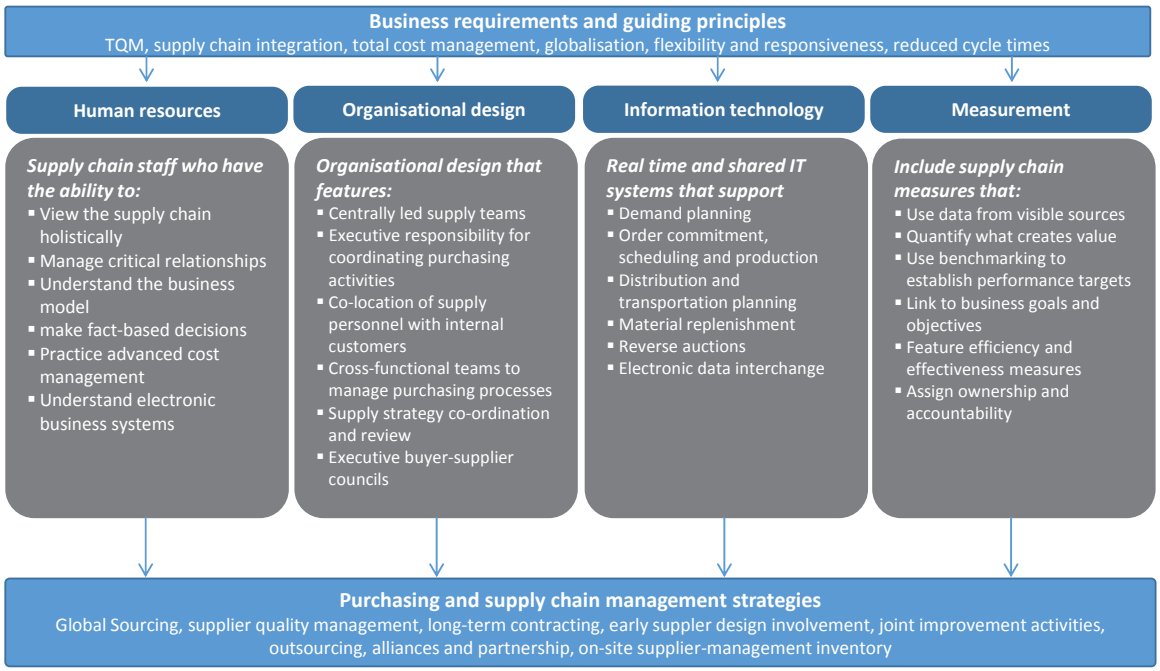

Figure 13: Four enablers of good purchasing management (Monczka et al., 2010, p.30)

The central idea of this framework is the hypothesis that PSM needs *guiding principles* from the corporate level as well as transparency about the business requirements to develop and implement goal-oriented purchasing and supply chain management strategies.[49] Moreover, the model outlines core tasks and activities in the four enabling dimensions (Figure 13) as well as strategies that characterise a mature PSM function.

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Although only single management frameworks *(e.g. Strategic Supply Wheel, The 21st Century Logistics framework, Supply Chain Management Excellence Model)* have been validated empirically, they – in analogy to the PMM – promote a profound understanding about progressive PSM by providing a transparent and comprehensible systematisation

[49] These guiding principles might differ due to the (external) contingency variables of a firm. Thus, *Monczka et al.* bring in a sort of flexibility into their framework by stating, that based on these principles the four enablers might be set up differently, in order to cope with the challenges and goals.

of a *"comprehensive set of PSM practices" (Stolle, 2008, p.26).* This makes them a valuable source for a content-related matching with the KEPs already derived from the PMM to gain new insights for developing the PSM²F.

Applying the same coding scheme than for the PMM, it becomes obvious that almost all frameworks cover all dimensions, apart from Sustainability & Ethics (see Table 35).

	STRATEGY & PLANS	ORGANISATION & INTERNAL INTERFACES	PROCESS EXCELLENCE & ICT	SUPPLIER MANAGEMT & EXTERNAL INTERFACES	CONTROLLING & PERFORMANCE MANAGEMENT	TALENTS & SKILLS	INNOVATION & METHODS	SUSTAINABILITY & ETHICS
BRÄKLING/OIDTMANN_Power in Procurement System (2012)	✓	✓	✓	✓	✓	✓	✓	✓
SCC_SCOR MODEL 11 (2012)	✓	✓	✓	✓	✓	✓	✓	
ORTNER ET AL._Management of Requirements in Collaborations (2011)	✓	✓	✓	✓	✓	✓	✓	
APPELFELLER_Buchholz_3 layer model of SRM (2011)	✓		✓	✓	✓	✓	✓	
BENTON_Integrated PSM Process (2010)	✓	✓	✓	✓	✓	✓	✓	
MONCZKA_Four Pillars of Purchasing and SCM Excellence (2009/10)	✓	✓	✓	✓	✓	✓	✓	
HEß_15M architecture of Supply Strategy (2009/10)	✓	✓	✓	✓	✓	✓	✓	✓
SCHWEIGER et al._Cycle of holistic Purchasing Management (2009)	✓		✓	✓	✓	✓	✓	
WILDEMANN_Potential Analysis in Purchasing (2008)	✓	✓	✓	✓	✓	✓	✓	
SCHENTLER_Framework of Purchasing Activities (2008)	✓	✓	✓	✓	✓	✓	✓	
COUSINS et al._Strategic Supply Wheel (2008)	✓	✓	✓	✓	✓	✓	✓	
BÄCK ET AL._Procurement Event Monitoring (2007)	✓	✓	✓	✓	✓	✓	✓	
EßIG_House of Sourcing and Supply Management (2005)	✓	✓	✓		✓	✓	✓	
JAHNS_Supply Management Navigator (2005)	✓	✓	✓	✓	✓	✓	✓	
CLOSS/MOLLENKOPF_21st century logistics framework (2004)	✓	✓	✓	✓	✓	✓	✓	
CIPS_Procurement and supply management model (2003)	✓	✓	✓	✓	✓	✓	✓	
KANJI/WONG_SCM Excellence Model (2003/1999)	✓	✓	✓	✓	✓	✓	✓	
KAUFMANN_PSM: A conceptual framework (2002)	✓	✓	✓	✓	✓	✓	✓	
SCHOBER_Integr. St. Galler Purchasing management approach (2001)	✓	✓	✓	✓	✓	✓	✓	
COOPER ET al._GSCM Framework (1997/98)	✓	✓	✓	✓	✓	✓	✓	

Table 35: Coding of frameworks in PSM according to the main maturity categories

In addition to a conformation of the main categories of maturity presented in chapter 2.2.3, the analysis of the frameworks also provided some new or deepening issues for some of the eight main maturity categories (Figure 9). In the dimension *Strategy & Plans,* the aspects *"based on a corporate strategy, PSM develops an overall PSM strategy in a structured way as well as short-, mid- and long-term plans"* (20 mentions), *"clear and suitable commodity structure based on an agreed commodity code classification with defined responsibilities is in place"* (10 mentions) and *"global sourcing strategies are evaluated and if relevant put into practice in a structured way."* (9 mentions) showed high accordance (see chapter 2.2.3.1). Moreover the following further key evaluation points could be derived:

Further key evaluation points for "Strategy & Plans"		**#**	**Exemplary references**
1	The specific norm-strategies for sourcing and supplier management (based upon e.g. portfolio-technique) are known and applied based upon contextual aspects.	12	Ortner et al. (2011), Benton (2010), Monczka et al. (2010), Eßig (2005)
2	Regular cross-check and adaptation of pre-defined strategies based upon market changes.	9	SCC (2012), Heß (2010), Jahns (2005), Cooper et al. (1997)
3	In the PSM team there is a strong commitment to strategies and goals.	4	SCC (2012), Appelfeller/ Buchholz (2011), Eßig (2005); Kanji/Wong (1999)
4	Before starting with the strategy implementation a gap-fit-analysis ensures if the own maturity level and the maturity level of the supplier (e.g. processes, ICT-level) is suitable and sufficient.	2	Ortner et al. (2011), CIPS (2003)
5	The definition of PSM goals follows the main rules of the SMART-logic.	2	Ortner et al. (2011), Cousins et al. (2008)
6	By guaranteeing a high level of autonomy, the PSM team is motivated and creative in working out the detailed plans for reaching the goals.	1	Cousins et al. (2008)

Table 36: Further key evaluation points for "Strategy & Plans"

In the category *Organisation & Internal Interfaces* there is a high level of consistency with the criteria derived from the PMM (see chapter 2.2.3.2). Especially the aspects of *"having clear interfaces and communication structures"* (17 mentions), *"regularly check and if necessary develop the different options of organising the PSM department in a structured way"* (12 mentions) and *"provide valid purchasing guidelines"* (8 mentions) could be confirmed as determining aspects of high PSM maturity.

"Strategic supplier (relationship) management is defined as an important asset in the company and a closed supplier management cycle is established" (20 mentions), *"a multidimensional supplier selection including all relevant stakeholders in a steering-committee is installed"* (14 mentions), as well as *"structured policies, responsibilities and suitable procedures ensure professionalism in the core phases in the supplier management process"* (13 mentions) are the main matches in the dimension *Supplier Management & External Interfaces.* Furthermore, the following issues can be added to the best-practice database of KEPs due to the in-depth analysis of the PSM frameworks.

Further key evaluation points for "Supplier Management & External Interfaces"		**#**	**Exemplary references**
7	The most important sources (primary and secondary) are known for searching for appropriate suppliers.	9	Heß (2010), Wildemann (2008), Schentler (2008)
8	Pre-defined and clear supplier profiles (based upon the necessary requirements for delivering a specific category) are available as basis for the supplier evaluation and final selection.	3	Ortner et al. (2011), Schweiger (2009), Bäck et al. (2007)
9	In the regularly held (e.g. annual) supplier meetings/workshops/ supplier councils, ideas for improving the partnership are discussed and defined in written form.	3	Monczka et al. (2010), Wildemann (2008), CIPS (2003)
10	Defined supplier motivation and recognition programmes are in place (e.g. provide incentives for suppliers in the form of new projects, higher quotes, supplier award).	3	Wildemann (2008), Schentler (2008), CIPS (2003)

Table 37: Further key evaluation points for "Supplier Management & External Interfaces"

In the dimension *Controlling & Performance Management* (see chapter 2.2.3.4) the strongest matches are: *"multidimensional purchasing controlling/performance management is in place."* (16 mentions), *"linking the purchasing's influence on firm's performance"* (4 mentions) and *"the purchasing controlling comprises of well-balanced quantitative and qualitative KPIs"* (3 mentions). Moreover, the following issues were identified and can be added to the best-practice database of KEPs.

Further key evaluation points for "Controlling & Performance Management"		**#**	**Exemplary references**
11	Purchasing performance management is strongly linked with the monitoring of the strategy implementation and the status of target achievement.	11	SCC (2012), Cousins et al. (2008), Closs/ Mollenkopf (2004)
12	There are defined KPIs for each goal to monitor the efficiency/effectiveness of planned actions.	5	Schweiger (2009), Eßig (2005), Jahns (2005)
13	The defined KPIs in PSM encourage cross-functional team work.	3	SCC (2012), Cousins et al. (2008), Cooper et al. (1997)
14	Clear defined rules for measuring KPIs prevent manipulation and ensure comparability.	1	Cousins et al. (2008)

Table 38: Further key evaluation points for "Controlling & Performance Management"

The aspect of having a *"well managed hard- and soft-skill portfolio in PSM"* (19 mentions) is also frequently mentioned in the frameworks as well as the aspect that *"the CPO as well as relevant PSM team-members with personnel responsibility have leadership competence"* (4 mentions). Next to these two issues, the following criteria can be proposed as further KEPs for the category *Talents & Skills*.

Further key evaluation points for "Talents & Skills"		#	Exemplary references
15	A culture of collaboration and constructive feedback is established to foster organisational learning.	7	Cousins et al. 2008), Bäck et al. (2007), Cooper et al. (1997)
16	Future challenges and competence requirements are anticipated for developing HR.	5	Jahns (2005), Schober et al. (2001), Kanji/Wong (1999)
17	The PSM team knows the products, customers and industry-specific market requirements and business models.	4	SCC (2012), Monczka et al. (2010), Kanji/Wong (1999)

Table 39: Further key evaluation points for "Talents & Skills"

"Clear documentation of core PSM processes which fulfills the recommendations of professional process management and compliance guidelines" (17 mentions) and *"powerful ICT support (e.g. ERP) for routine tasks"* (13 mentions) are the main matches in the dimension *Process Excellence & ICT* (see chapter 2.2.3.6). Furthermore, the following three aspects can be added to the best-practice database due to the analysis of the PSM frameworks.

Further key evaluation points for "Process Excellence & ICT"		#	Exemplary references
18	The processes and internal rules/policies (e.g. approval steps) are aligned with the criticality and corporate impact of the individual business case.	9	Bräkling/Oidtmann (2012), Ortner et al. (2011), Kaufmann (2002)
19	Concepts of materials-, demand- and inventory management are applied (e.g. MRP, JIT, Lean Management) for fostering process excellence.	9	Benton (2010), Wildemann (2008), Bäck et al. (2007)
20	Process automation (e.g. workflows) for routing tasks (e.g. x-articles) is primarily used for stabilising the processes and securing more time for strategic issues than for cutting costs.	4	Ortner et al. (2011), Bäck et al. (2007), Jahns (2005)

Table 40: Further key evaluation points for "Process Excellence & ICT"

Next to *"carry out benchmark studies and internal benchmarks to continuously improve the PSM function" (10 mentions), "professional level of internal communication (e.g. PSM webpage, newsletter, wiki)"* (8 mentions), *"intensive use of strategic spend and cost management methods"* and *actively trigger and execute make-or-buy analysis and decisions"* (7 mentions), the following additional aspect was derived as additional key evaluation point for the dimension *Innovation & Methods*.

Further key evaluation point for "Innovation & Methods"		#	Exemplary references
21	For the continuous improvement and development of the PSM function, the team is trained in creativity techniques.	3	Benton (2010), Wildemann (2008)

Table 41: Further key evaluation points for "Innovation & Methods"

The notion that *"Corporate Social Responsibility initiatives are part of the PSM strategy"* was also mentioned as a relevant maturity element by *Bräkling/Oidtmann (2012)* and *Heß (2010)*. The other analysed frameworks waived a deeper investigation of the dimension *Sustainability & Ethics*.

2.2.4.2 Studies about challenges and trends in PSM

Next to the presented maturity models and frameworks in PSM, studies about challenges and trends covering a time-period from 2000-2015 are the third and last source to complete the research step of deriving *key evaluation points of progressive and mature PSM (research goal 1.2)*. The intention of including also studies into the analysis was to identify KEPs which are (possibly) not covered from the available models in literature and to bring a future perspective into the research. The following studies were selected.

Name of Study	Author(s)/Source	Year
The CPO's (Economic, Talent & Technical) Agenda	Aberdeen, Analyst Insight, Online	2014
The CPO Agenda	Roland Berger, Summary of Study, Online	2014
Past, present and future trends of purchasing and supply management	Spina et al., Industrial Marketing Management, Vol.42, No.8, pp.1202-1212	2013
Total Supplier Management	Dust/BME, Summary of Study, Online	2013
Purchasing as value adding partner	Ernst Young/ Fraunhofer IPT, Summary of Study, Online	2012
Procurement Leaders	A.T. Kearney, Summary of Study, Online	2011
Future of Purchasing - Trends in Purchasing and Supply Management	Spring Procurement/ University of Economics Vienna, Summary of Study, Online	2010
An analysis of research into the future of purchasing and supply management	Zheng et al., Journal of Purchasing & Supply Management, Vol.13, No.1, pp.69-83	2007
Succeeding in a Dynamic World: Supply Management in the Decade Ahead	Carter et al./A.T. Kearney/CAPS/ISM: CAPS Research, Summary of Study	2007
Supply management strategies for the future	Ogden et al., The Journal of Supply Chain Management, Vol.41, No.3, pp.29-48	2005
The Future of Purchasing and Supply	Carter et al., The Journal of Supply Chain Management, Vol.36, No.4, pp.14-26	2000

Table 42: List of selected studies about future trends in PSM

In the following three tables the main trends and challenges a mature PSM function has to effectively cope with are displayed. For a better overview the eleven studies are grouped in three pre-defined time-frames: *">2010", "2006-2010", "2000-2005"*. Furthermore, the reference to one of the derived eight maturity dimensions (chapter 2.2.3) will be established[50] and it will be highlighted if the criterion has already been covered from the analysed PMM or PSMF ("Y" for yes, "N" for no).

Studies published > 2010			
Name of study	*Mentioned trends and challenges*	*Reference*	
The CPO's (Economic, Talent & Technical) Agenda (2014)	Manage risk and continuous market monitoring (e.g. early warning systems, check for LCC options, risk sharing with suppliers)	Y	STRAT
	Apply suitable strategies in category and supplier management (e.g. transactional VS partnership; risk reduction; cost optimisation)	Y	
	Use innovative power of suppliers through partnership (e.g. early involvement)	Y	SUP
	Carry out internal marketing for showing the strategic impact of PSM for company	Y	ORG
	Advanced talent management: Recruit, integrate, develop, diversity	Y	TAL
	Cost- and spend management (e.g. savings, working capital, target costing)	Y	INNO

[50] STRAT stands for "Strategy & Plans", SUP for "Supplier Management & External Interfaces", CON for "Controlling & Performance Management", TAL for "Talents & Skills", INNO for "Innovation & Methods", PROC for "Process Excellence & ICT", SUS for "Sustainability & Ethics" and ORG for "Organisation & Internal Interfaces".

Name of study	*Mentioned trends and challenges*	*Reference*	
The CPO Agenda (2014)	Manage risk and continuous market monitoring (e.g. early warning systems, check for LCC options, risk sharing with suppliers)	Y	STRAT
	Use innovative power of suppliers through partnership (e.g. early involvement)	Y	SUP
	Carry out internal marketing for showing the strategic impact of PSM for company	Y	ORG
	Change mind-set to total value of ownership & entrepreneurial thinking	Y	TAL
	Cost- and spend management (e.g. savings, working capital, target costing)	Y	INNO
	Regular Make-or-Buy scan	Y	
	Complexity management and focus on critical materials & suppliers	Y	
Past, present and future trends of purchasing and supply management (2013)	Manage risk and continuous market monitoring (e.g. early warning systems, check for LCC options, risk sharing with suppliers)	Y	STRAT
	Active partnership and collaborations with suppliers	Y	SUP
	Thinking in supply network (not just 1st tier)	Y	
	Professionalism in contract management	Y	
	Purposeful use of ICT in PSM (e.g. workflow, automatic ordering)	Y	PROC
	Regular Make-or-Buy scan	Y	INNO
	Give sustainability a focus next to cost, time and quality issues	Y	SUS
Total Supplier Management (2013)	Manage risk and continuous market monitoring (e.g. early warning systems, check for LCC options, risk sharing with suppliers)	Y	STRAT
	Use innovative power of suppliers through partnership and alliances (e.g. integrating technology roadmap of supplier)	Y	SUP
	Establish a closed loop from supplier evaluation, assessment and development	Y	
	Carry out internal marketing for showing the strategic impact of PSM for company	Y	ORG
	Ensure high transparency of performance/spend via metrics (KPIs)	Y	CON
	Purposeful use of ICT in PSM (e.g. workflow, automatic ordering)	Y	PROC
Purchasing as value adding partner (2012)	Manage risk and continuous market monitoring (e.g. early warning systems, check for LCC options, risk sharing with suppliers)	Y	STRAT
	Cross-functional teams & early involvement of PSM	Y	ORG
	Use innovative power of suppliers through partnership (e.g. integrating technology roadmap of supplier)	Y	SUP
	Intensify supplier development	Y	
	Position PSM as entrepreneur/innovative partner	Y	INNO
	Cost- and spend management (e.g. savings, working capital, target costing)	Y	
	Complexity management and focus on critical materials & suppliers	Y	
Procurement Leaders (2011)	Apply suitable strategies in category and supplier management (e.g. transactional VS partnership; risk reduction; cost optimisation)	Y	STRAT
	Alignment of PSM strategy with corporate strategy	Y	
	Manage risk and continuous market monitoring (e.g. early warning systems, check for LCC options, risk sharing with suppliers)	Y	
	Cross-functional teams & early involvement of PSM	Y	ORG
	Establish alliances with universities or research organisations	***N***	***SUP***
	Work on incentive programmes with suppliers (awards, preferred status)	Y	
	Advanced talent management: Recruit, integrate, develop, diversity	Y	TAL
	Cost- and spend management (e.g. savings, working capital, target costing)	Y	INNO
	Position PSM as entrepreneur/innovative partner	Y	

Table 43: Studies about trends and challenges for the period >2010

Next to a very high congruency with the already-derived KEPs based upon PMM and PSMF, *"establish alliances with universities or research organisations"* is one further determining element of progressive PSM that can be added to the best-practice database *(dimension "Supplier Management & External Interfaces").*

Studies published between 2005-2010			
Name of study	*Mentioned trends and challenges*	*Reference*	
Future of Purchasing: Trends in Purchasing and Supply Management (2010)	Ensure security of supply	Y	STRAT
	Alignment of PSM strategy with corporate strategy	Y	
	Cross-functional teams & early involvement of PSM	Y	ORG
	Limit Maverick Buying to a minimum	Y	
	Ensure high transparency of performance/spend via metrics (KPIs)	Y	CON
	Advanced talent management: Recruit, integrate, develop, diversity	Y	TAL
	Purposeful use of ICT in PSM (e.g. workflow, automatic ordering)	Y	PROC
	Green procurement	Y	SUS

Name of study	*Mentioned trends and challenges*	*Reference*	
An analysis of research into the future of purchasing and supply management (2007)	Manage risk and continuous market monitoring (e.g. early warning, LCC options)	Y	STRAT
	Alignment of PSM strategy with corporate strategy	Y	
	Regularly rethink appropriate structural/organisational options	Y	ORG
	Cross-functional teams & early involvement of PSM	Y	
	Establish alliances with universities or research organisations	***N***	***SUP***
	Establish a closed loop from supplier evaluation-assessment and development	Y	
	Active competence management (e.g. competence portfolio management)	Y	TAL
	Purposeful use of ICT in PSM (e.g. workflow, automatic ordering)	Y	PROC
	Regular Make-or-Buy scan	Y	INNO
Supply Management: A decade ahead (2007)	Alignment of PSM strategy with corporate strategy	Y	STRAT
	Apply suitable strategies in category and supplier management (e.g. transactional VS partnership; risk reduction; cost optimisation)	Y	
	Manage risk and continuous market monitoring (e.g. risk sharing with suppliers)	Y	
	Regularly rethink appropriate structural/organisational options	Y	ORG
	Cross-functional teams & early involvement of PSM	Y	
	Use innovative power of suppliers through partnership and alliances.	Y	SUP
	Establish a closed loop from supplier evaluation-assessment and development	Y	
	Thinking in supply network (not just 1st tier)	Y	
	Advanced talent management: Recruit, integrate, develop, diversity	Y	TAL
	Purposeful use of ICT in PSM (e.g. workflow, automatic ordering)	Y	PROC
	Position PSM as entrepreneur/innovative partner	Y	INNO
	Cost- and spend management (e.g. savings, working capital, target costing)	Y	
	Regular Make-or-Buy scan	Y	
	Green procurement	Y	SUS

Table 44: Studies about trends and challenges for the period 2006-2010

No further KEPs could be derived based upon the analysis of the trend studies published between 2006 and 2010.

Studies published between 2000-2005			
Name of study	*Mentioned trends and challenges*	*Reference*	
Supply management strategies for the future (2005)	Cross-functional teams & early involvement of PSM	Y	ORG
	Use innovative power of suppliers through partnership and alliances	Y	SUP
	Active sharing of information with supplier (e.g. forecast)	Y	
	Ensure high transparency of performance/spend via metrics (KPIs)	Y	CON
	Active competence management (e.g. TCR, competence portfolio management)	Y	TAL
	Purposeful use of ICT in PSM (e.g. workflow, automatic ordering)	Y	PROC
The Future of Purchasing and Supply (2000)	Alignment of PSM strategy with corporate strategy	Y	STRAT
	Apply suitable strategies in category and supplier management (e.g. transactional VS partnership; risk reduction; cost optimisation)	Y	
	Regularly rethink appropriate structural/organisational options	Y	ORG
	Cross-functional teams & early involvement of PSM	Y	
	Early supplier involvement for product development and innovative issues	Y	***SUP***
	Establish a buying consortium to pool demand	**N**	
	Change mind-set to Total Value of Ownership & entrepreneurial thinking	Y	TAL
	Active competence management (e.g. defined responsibilities)	Y	
	Purposeful use of ICT in PSM (e.g. workflow, automatic ordering)	Y	PROC
	Cost- and spend management (e.g. savings, working capital, target costing)	Y	INNO
	Regular Make-or-Buy scan	Y	INNO
	Continuously carry out benchmarking studies	Y	INNO

Table 45: Studies about trends and challenges for the period 2000-2005

Finally, *"establish a buying consortium to pool the demand"* can be added to the database of key evaluation points after reviewing the studies from 2000-2005. For all other identified trends and challenges, corresponding KEPs were already deduced in the course of the analysis of the PMM and PSMF.

By completing this research step, it was on the one hand possible to theoretically verify the coding scheme of the eight main dimensions of maturity in PSM (chapter 2.2.3).

Furthermore, it was possible to complete the research step of theoretically deriving the KEPs of high PSM maturity by including *maturity models*, *management frameworks* as well as *studies about trends and future challenges* in the PSM domain.

RESEARCH RESULT

Overall, 104 KEPs in eight main categories were formulated as determining best-practice recommendations for assessing PSM maturity but also as a set of response variables to changing contingencies a company can choose from. These KEPs represent the ***first content-related core element of the Purchasing and Supply Management Maturity Framework*** *(chapter 3).*

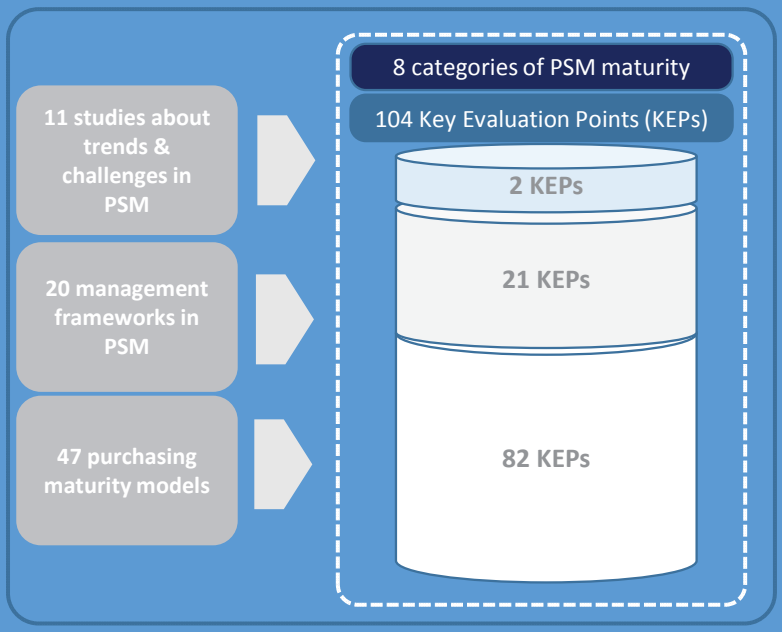

Figure 14: Best-practice database of key evaluation points in PSM

82 KEPs were formulated taking the purchasing maturity models as a basis, 21 were added based upon the analysis of the PSM frameworks (67 KEPs in total; 71% congruency) and 2 other KEPs, taken from the studies (28 KEPs in total; 93% congruency), completed the best-practice database.

2.2.5 PSM and Change Management

In this chapter the theoretical basis for the *factor model of supportive elements on maturity improvement initiatives (research goal 1.3)* as second content-related core element of the PSM^{2}F will be presented. Although scholars in the change management and organisational development field agree that a successful and sustainable transformation can only be achieved by taking the (1) *structural* (e.g. strategies, policies, organisation, processes technologies), (2) the *cultural* (e.g. values, symbols) and (3) *individual change* aspects (e.g. attitudes, emotions, expectations, abilities) into account *(e.g. Lysons/Farrington, 2012, p.172; Lauer, 2014, p.8; Bititci et al., 2006,*

p.1332; see also Staehle, 1999 and Carlsson/Sarv, 1997), the research about maturity models and frameworks is strongly and almost exclusively focusing on the structural change.

In general, the literature about change, transformation and designing improvement programmes with special focus on PSM is remarkably silent *(Andreasen, 2012; Stolle, 2008, Lysons/Gillingham, 2003). Atilgang/McCullen (2011)* and *Stentoft Arlbjørn et al. (2006)* highlight that contributions with a change management focus are also very rare in the supply chain management and operations field.[51] This is a serious negligence, thinking about reports that speak about a failure rate of 40-70% of change projects *(Lauer, 2014, p.47; Steinle, 2009, p.6, 2008; see also Beer/Nohria, 2000).* You can certainly find isolated recommendations in some purchasing maturity models like *"change management skills are necessary", "ensure leadership competence"* or *"having high knowledge and skills in project management"* (category "Talents & Skills", chapter 2.2.3.5), which are closely connected with an effective and efficient transformation. Sporadically, you can also find some attempts in academic textbooks or anthologies in the PSM field addressing this topic. For example, *Monczka et al.* (2010) dedicate (only) one page (out of more than 500) on the transformation aspect by pointing out eleven necessary aspects *"for improving purchasing efficiency"(p.44).*[52] The *Association Material Management, Purchasing and Logistics (BME)* published an anthology in 2008 with case studies about specific change initiatives in PSM (*Best Practice in Einkauf und Logistik*; EN: Best Practice Purchasing and Logistics). Although these reports from firms prove valuable insights into concrete change projects (e.g. re-organisation, more strategic orientation, implementation of knowledge management) and point out some single cultural and individual determining factors for an effective change aspects which were helpful for the respective firms (e.g. target group oriented communication, promoting trust, change coaching), they do not offer a coherent, well-structured and conclusive summary of determining factors that foster change management initiatives in PSM giving the human and behavioural dimension more room next to structural elements. This is surprising, becoming aware that it is

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51 Vice versa it is not different. A cross-check of the keywords "Purchasing", "Procurement" and "Supply" (Abstract) in two relevant change management journals (1994-2015) provided the following result (08/2015): Journal of Change Management (Purchasing: 1 mention, Procurement: 1, Supply Management: 8; Journal of Organizational Change (Purchasing: 1, Procurement: 1, Supply Management 16).

52 *(1) Make everyone aware that procurement needs to improve; get senior management support, (2) examine current operations identify problems and weaknesses, (3) use benchmarking, (4) identify special areas for improvement, (5) design better purchasing operations, (6) discuss the proposal and get commitment by the affected people, (7) design an implementation plan, (8) if necessary, change systems and structures; give training, set goals, (9) implement the change, (10) monitor progress; (11) remain committed to the new methods and continually looking for further improvements*. The rest of the book is covered with conventional topics about purchasing strategy, organisation, policies, supplier management, negotiation or law and ethics.

ultimately the employee and the team that needs to adapt its habits and working behaviours for an effective and efficient transformation, whereby business objectives and a higher maturity level can be finally realised *(Hiatt/Creasey, 2012, p.1)*.

When the change and transformation aspect is addressed in a PSM publication at all, the authors often refer to the same two general change management models to explain the necessary aspects of transforming the PSM function *(e.g. Lysons/Farrington, 2012; Agndal et al., 2005)*. One of these two models is the model of *Lewin (1951/2012)*. *Lewin* is named as one of the founders of change management in modern science *(Albach, 2015)*. In his work, he conceptualised a transformation following three successive phases *(Lysons/Farrington, 2012, p.172; Carnall, 2007, p.70; Deuringer, 2000, p.41)*:

1. *Unfreezing: Enabling people or organisations to be willing to change*
2. *Changing/Moving: Selecting and testing techniques to implement change*
3. *Refreezing: Reinforcing and supporting the change (e.g. new behaviours, skills, attitudes) so that it becomes a permanent part within the organisation*

In the first phase, convincing the affected people that a change is necessary is the most important issue. It can be seen as a preparation step enabling the organisation to move upwards on the maturity ladder. Hence it is important being open for questioning ("unfreeze") the actual structures, habits and attitudes *(Cacaci, 2006)*. The theoretical concept behind is the *force field analysis, Lewin* was researching on during the late 1940s and early 1950s *(Lauer, 2010)*.

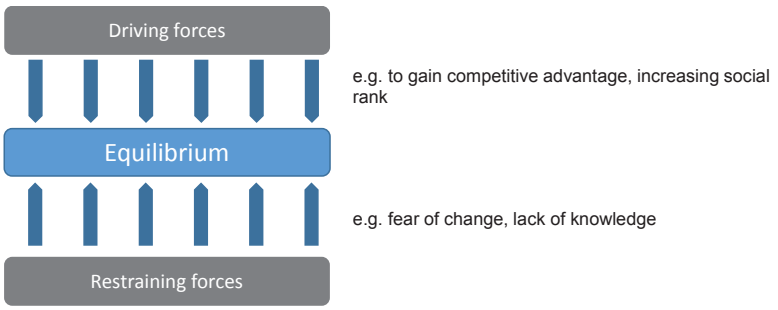

Figure 15: Field force analysis by Lewin

According to this theory, there are two opposing forces that influence the motivation to change *(Lauer, 2010)*. On the one side, there are the driving factors that encourage an individual to change (e.g. gain competitive advantage, increasing social rank in the company, more money, less work). For ensuring an "unfreeze" of the organisation, these factors have to outweigh the factors against the change (restraining factors; e.g. fear of change, lack of knowledge/abilities, more work after change; *Morrison, 1998)*. *Lewin* also highlights that a company should always try to balance these two forces. If the "restraining forces" are too strong, a change would never be successful and a

company cannot grow and improve. If the "driving forces" are too strong the organisation would never come to rest and might become instable *(Vahs, 2012).*
In the second phase ("changing/moving") the organisation works on concrete initiatives and projects to make the intended transformation happen. According to the model, it is recommended to ensure an active participation of the affected people and that the management creates an innovative climate (e.g. acceptance of making mistakes, flat hierarchies, free space for working on creative solutions), which may lead to the so-called *"buy-in"* of the team. New structures or processes are defined and tested whereby the employees concerned become used to it *(Vahs, 2012).* In this phase of the change, it is important to allow the people time to reflect, provide coaching and training and that the responsible management team is visible and available for questions.
The final stage of the model ("refreeze") is about establishing stability once the (structural) changes have been made. People might accept the changed structures and processes and apply them in their daily routine. Thus, it is important to allow necessary modifications where necessary and rebalance the forces so the company can stabilise, without fall-back to a situation of stiffness and stagnation *(Vahs, 2012).*

The second highly influential work is the *eight step model* of *Kotter (1995),* which has become one of the most highlighted and seminal contributions in the domain of change management *(Lysons/Farrington, 2012; Rock/Page, 2009; Carnall, 2007).* This model – presented in detail in *Kotter's* book *Leading Change (1996) – "suggests an eight-step process for the successful implementation of change" (Lysons/Farrington, 2012, p.172).* *Kotter (1996)* builds up his model on his consulting practice with 100 different organisations going through change *(Cameron/Green, 2009),* and converted his insights and experiences into eight core elements and steps which are necessary to ensure a stable and successful transformation *(Kotter, 2012, p.47ff; Agndal et al., 2005; Kotter, 1996, p.35ff; Kotter, 1995, p.60ff):*

1. *Create a sense of urgency:*
   In analogy to the model of *Lewin*, *Kotter* proposes to initially establish a perception in the organisation that a change is necessary. This can be supported by market research or studies about the activities of competitors. *Kotter* also defines obvious crisis or "transparent opportunity windows" on the market that can increase pressure and spark the driving forces.
2. *Creating a guiding coalition:*
   The main issue in this phase is forming a (cross-functional) team which is committed to change and which is able to think and behave differently than in the past. This coalition should have the lead to motivate and support the organisation to work on the transition. Accordingly, leadership competence, diversity in the team and high acceptance and trust of the members in the group are very important.

3. *Developing a vision and strategy:*
   In this step a clear vision of the future state (when the transformation is accomplished) has to be elaborated, followed by a subsequent strategy that sets the direction for detailed action plans. To have the necessary creative power for working on the vision and the strategies, the accepted urgency and a proper mix of personalities and competencies in the team are further relevant preconditions.

4. *Communicating the change vision:*
   After having a consensus about the vision and overall strategy within the guiding team, the communication to the affected employees is the next step. This should be carried out on a regular basis using different available communication media.[53] The main goal here is to create awareness of the vision, the strategy and clarify the impact on the individuals to secure cooperation and involvement *(see also Lysons/Farrington, 2012).* It is recommended never to avoid potential fears, contrary positions or a lack of understanding regarding the intended change of the team *(Agndal et al., 2005)* but rather pro-actively ask for it.

5. *Enable action by removing barriers:*
   To empower people to take part in the change is the core issue in step five. Therefore, it is often necessary to remove barriers such as inefficient processes, systems or hierarchies, to rework the job descriptions or assign novel roles to organisational members and ensure that the affected parties have all the information they need to work on the transformation.

   In this step, it is also important to recognise and reward people who are very pro-active and motivated in making the change happen. By contrast, identifying and frankly communicating with people who are resisting the intended change is another highly relevant issue that demands for leadership skills.

6. *Generating short-term wins:*
   Kotter (2015) defines quick-wins as the *"molecules of results"* that *"must be collected, categorized, and communicated early and often to track progress and energize […] volunteers to drive change" (Kotter, 2015, p.22).* These short-term wins can be actively planned in advance by creating short-term targets that can be easily reached. This might subsequently encourage people in their efforts to attain longer-term goals *(Lysons/Farrington, 2012).*

7. *Consolidate and create more changes:*
   Based upon interim success and short-term wins, it is substantial to bring the sense of urgency back into the mind of the organisation and ensure that people do not fall-back to old behaviours, or that they are (too) satisfied with the realised interim improvements. Following *Kotter* it is also recommended to use every (intermediate) success for an analysis about what went right and what needs to be improved for further actions (lessons-learned).

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[53] *"Kotter emphasizes the need to communicate at least 10 times the amount you expect to have to communicate." (Cameron/Green, 2009, p.113)*

8. *Anchoring new approaches in the culture:*
   In the last step, changes have to be consolidated and *"anchored in the organisation's culture" (Agndal et al., 2005, p.48)*. This means that successful change stories should become part of the organisation's identity to motivate new organisational members. *Kotter (2015)* also highlights that it is highly relevant to clarify and communicate the link between the changed behaviours and structures and the organisation's success. Furthermore, motivating the leading team to keep on supporting the change in particular right after its implementation (when the change project is over), is another crucial factor according Kotter's approach.

Next to these two (linear) change models,[54] there is another central construct in the change management debate that can bring further valuable insights into the development of the factor model of the PSM²F. Having its origin in the psychology and medical work of *Kuebler-Ross (1969)*, an intensive discussion about typical phases and feelings of an individual and a group within a transformation processes started *(individual changing curve, Figure 16)*. This discussion was transferred also to organisational and management issues in the 1990s *(Grensing, 1991; Grant, 1996; Henderson-Lonely, 1996; Schneider/Goldwasser, 1998)*, and it became increasingly apparent that understanding the basic and typical patterns within a change process of individuals and to use this knowledge for planning the transformation project accordingly can be a crucial advantage for managing a successful change in larger teams and entire organisations *(Kostka/Mönch, 2009)*.

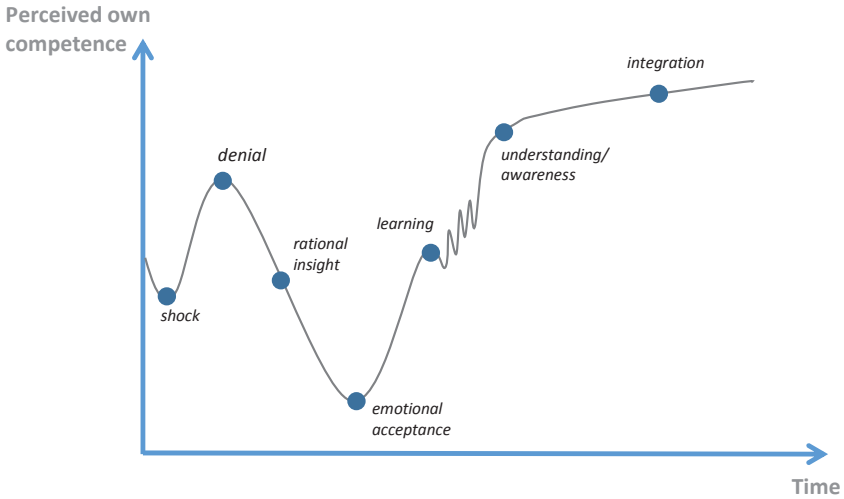

Figure 16: Individual changing curve (Kostka/Mönch, 2009, p.13)

54 *Armenakis/Bedeian (1999), Elrod/Tippett (2002)* as well as *Cameron/Green (2009)* are offering a profound overview and summary of change management models including these two presented models here, but also further influential models of the last decades like: *Bullock/Batten (1985), Beckhard/Harris (1987), Judson (1991), Senge (1993), Jaffe et al. (1994), Galpin (1996), Nadler/Tushman (1997)* or *Shaw (2002)*.

The above illustrated individual changing curve describes the typical path of a change and the related perceived competence level of an individual or a team over time. Accordingly, in the first phase of the change, the typical reaction is *shock and surprise*, especially for those people who were not actively involved right from the beginning. Receiving the information that a change is necessary normally leads to a decrease of the perceived own competence given that the skill set and working habits are apparently no (longer) suitable *(Kostka/Mönch, 2009). Elrod/Tippet (2002)* highlight that although *"the vast majority of the published works about the changing behaviour of individuals indicate that people generally do not anticipate change and thus tend to resist it when it comes",* some works *(e.g. Kegan, 1994)* explain that as people mature, they develop a more global viewpoint and understand change as a natural progression.
Denial is the next typical stage, and is characterised by employees or entire groups/teams who do not really accept that a change of the personal procedures is ultimately necessary *(Klug, 2009).* This also goes along with an increase of the perceived competence level in a specific situation. This phase is followed by a *rational insight* that the change is necessary and that resistance does not make sense. In phase four the affected people also *emotionally accept* the need for change and are open for questioning their habits, processes, daily routines and starting to try out new things. This phase of *learning* and having first interim success and better results with the new routines is crucial and leads to a rebound of the perceived competence level. The more time is spend on learning and trying out new things, the faster the level of *understanding* and *awareness* will rise. Finally the new ways of thinking and behaving are *integrated* in the daily routines.

A second change curve, published by *Schneider/Goldwasser (1998),* focus on the change-performance link in organisations. The authors analysed typical transformation patterns in firms, and raised the awareness that a loss of performance is highly probable in the intermediate stages of the process (Figure 17).

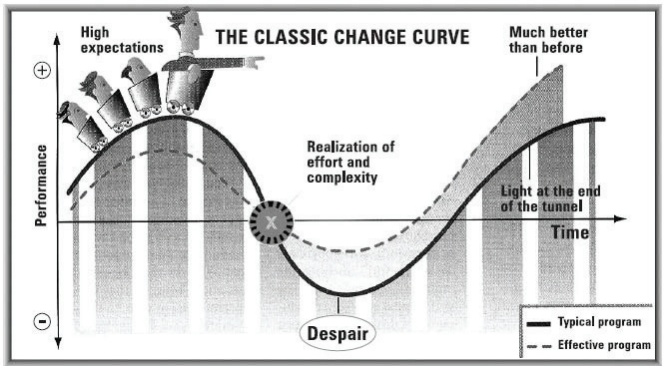

Figure 17: Classic change curve (Schneider/Goldwasser, 1998, p.41)

Hence, it is crucial to anticipate this knowledge for planning concrete interventions to optimise the course of the curve. To investigate these supportive elements and

interventions that might contribute to an effective and efficient maturity transformation with special focus to PSM, the result of the keyword search presented in chapter 2.1 was taken as a basis for the textual analysis. Starting with the total number of 64 (see Table 5, Business Source Premier), the following articles were selected for content analysis after analysing the titles and abstracts of the contributions.

No.	Author(s)/Year	Title	Journal
1	Park/Koh (2015)	Effect of change management capability in real-time environment: an information orientation perspective in supply chain management	Behaviour & Information Technology, Vol.34, No.1, pp.94-104.
2	Ellinger/Ellinger (2014)	Leveraging human resource development expertise to improve supply chain managers' skills and competencies	European Journal of Training & Development, Vol.38, No.1/2, pp.118-135.
3	Pandey/Jaiswal (2014)	Change Management: A Case of State Power Utility in India	Asian Case Research Journal, Vol.18, No.1, pp.61-80.
4	Bernon/Mena (2013)	The evolution of customised executive education in supply chain management	Supply Chain Management, Vol.18, No.4, pp.440-453.
5	Milliken (2012)	The importance of change management in supply chain	Journal of Business Forecasting, Vol.31, No.2, pp.4-9.
6	Schneider/ Wallenburg (2012)	Implementing sustainable sourcing: Does purchasing need to change?	Journal of Purchasing & Supply Management, Vol.18, No.4, pp.243-257.
7	Atilgan/McCullen (2011)	Improving supply chain performance through auditing: a change management perspective	Supply Chain Management, Vol.16, No.1, pp.11-19.
8	Van Hoek et al. (2010)	Changing chains: Three case studies of the change management needed to reconfigure European supply chains	The International Journal of Logistics Management, Vol.21, No.2, pp.230-250.
9	Banwet/Pramod (2010)	SAP-LAP Hills: A new approach for strategic change management	Global Journal of Flexible Systems Management, Vol.11, No.3, pp.11-20.
10	Schimmel/ Muntslag (2009)	Learning barriers: a framework for the examination of structural impediments to organizational change	Human Resource Management, Vol.48, No.3, pp.399-416.
11	Johson/ Leenders (2009)	Changes in supply leadership	Journal of Purchasing & Supply Management, Vol.15, No.1, pp.51-62.
12	Yacovone (2007)	Organizational design for a supply chain transformation: Best Practice at Johnson & Johnson Health Care Systems Inc.	Organization Development Journal, Vol.25, No.3, pp.103-109.
13	Stentoft Arlbjørn et al. (2006)	Improved change readiness through supply chain competency development	Industrial & Commercial Training, Vol.38, No.3, pp.128-136.
14	Johnson/Leenders (2006)	A longitudinal study of supply organizational change	Journal of Purchasing & Supply Management, Vol.12, No.6, pp.332-342.
15	Day/Atkinson (2004)	Large-scale transitional procurement change in the aerospace industry	Journal Of Purchasing & Supply Management, Vol.10, No.6, pp.257-268.
16	Johnson/Leenders (2004)	Implementing organizational change in supply towards a decentralization	Journal of Purchasing & Supply Management, Vol.10, No.4, pp.191-200.
17	Carlsson/Sarv (1997)	Mastering logistics change	The International Journal of Logistics Management, Vol.8, No.1, pp.45-54.

Table 46: Selected papers for further analysis

After initially reading through these articles, the following articles (displayed in Table 47) were finally identified for the in-depth analysis due to covering and discussing aspects and factors of transformation or change initiatives in PSM.[55]

[55] The remaining papers were excluded: The article from *Park/Koh (2015)* has a too narrow view on Real-Time Enterprise and SCM, *Ellinger/Ellinger (2014)* and *Bernon/Mena (2013)* deal more with a skill-set in PSM but not with factors of change initiatives (naming change management as one central skill). The papers from *Pandey/Jaiswal (2013)* and *Schimmel/Muntslag (2009)* have no real PSM connection. Although *Schneider/Wallenburg (2012)* highlight some general supportive aspects of a change, like communication or integrating internal and external stakeholders, the focus is rather on the sustainability issue and not on the overall PSM transformation aspect. *Banwet/Pramod (2009)* point out the necessity of learning for being prepared for a change, but do not offer a structured overview of further determining factors of a successful change. *Johnson/Leenders* deal with the topic of replacement of CPOs and reporting lines (2009) as well as presenting their findings about changes of the organisation structure of PSM in North American supply organisations (2006), but without addressing the cultural and individual aspect of transformation.

No.	Author(s)/Year	Title	Journal
1	Milliken (2012)	The Importance of Change Management in Supply Chain	Journal of Business Forecasting, Vol.31, No. 2, pp.4-9.
2	Atilgan/McCullen (2011)	Improving supply chain performance through auditing: a change management perspective	Supply Chain Management, Vol.16, No.1, pp.11-19.
3	Van Hoek et al. (2010)	Changing chains: Three case studies of the change management needed to reconfigure European supply chains	The International Journal of Logistics Management, Vol.21, No.2, pp.230-250.
4	Yacovone (2007).	Organizational Design for a Supply Chain Transformation: Best Practice at Johnson & Johnson Health Care Systems Inc.	Organization Development Journal, Vol.25, No.3, pp.103-109.
5	Stentoft Arlbjørn et al. (2006)	Improved change readiness through supply chain competency development	Industrial & Commercial Training, Vol.38, No.3, pp.128-136.
6	Day/Atkinson (2004)	Large-scale transitional procurement change in the aerospace industry	Journal Of Purchasing & Supply Management, Vol.10, No.6, pp.257-268.
7	Johnson/Leenders (2004)	Implementing organizational change in supply towards a decentralization	Journal of Purchasing & Supply Management, Vol.10, No.4, pp.191-200.
8	Carlsson/Sarv (1997)	Mastering logistics change	The International Journal of Logistics Management, Vol.8, No.1, pp.45-54.

Table 47: Selected papers for final in-depth analysis

Next to the eight selected journal contributions with PSM focus, also the meta-analysis about general change management models from the 1980s and 1990s published from *Armenakis/Bedeian (1999),* the selected academic and management textbooks about change management[56] (see Table 6, chapter 2.1) as well as four recent studies about this topic *(Capgemini, 2015; Jorgensen et al., 2014; Sedlacek, 2010; Houben et al., 2007)* were finally used as core theoretical sources for deriving a well-structured summary of determining factors that may foster change management initiatives to reach higher PSM maturity (research goal 1.3, *second content-related core element of PSM²F*).

In accordance to the presented methodology in 2.2.3, also here a systematic mapping study was carried out. As a result, 45 determining criteria in seven main categories were theoretically derived, which might foster an effective and efficient transformation in PSM (Figure 19).

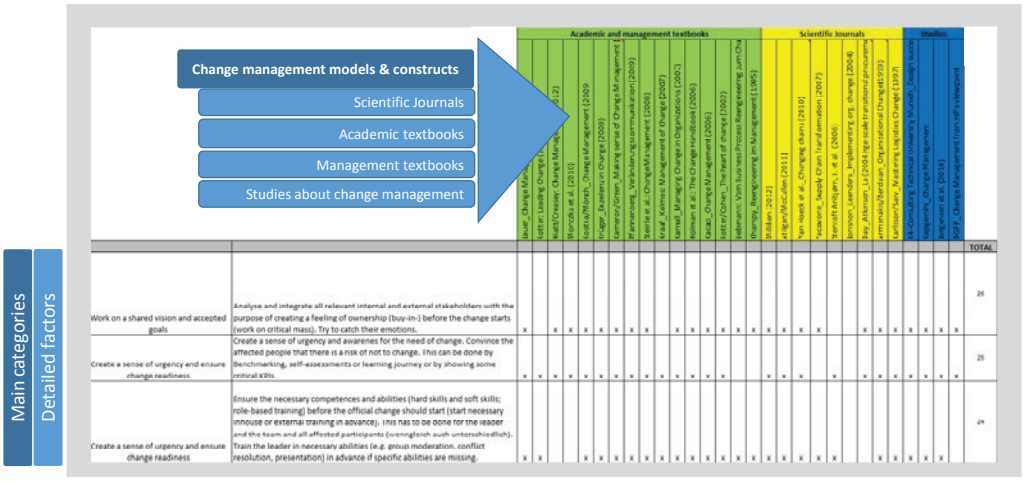

Figure 18: Content analysis & coding of supportive factors for maturity improvement initiatives in PSM

[56] Also the above mentioned eleven aspects for "improving purchasing efficiency" from *Monczka et al. (2010, p.44)* were considered.

Given that managing a transformation is normally characterised by *"many stops and starts and much side-tracking along the way" (Carnall, 2007, p.69),* the approach presented here will not be designed as a linear-model but rather as a factor model for *increasing change management capability* following systems theory *(Carnall, 2007).*

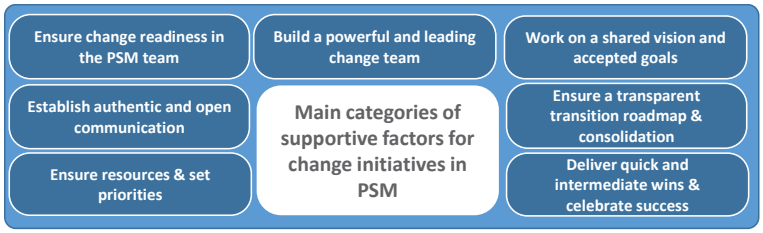

Figure 19: Main categories of supportive factors for change initiatives in PSM

In the following section the result of the coding process for each of the categories is presented. For each category a table with the main supportive factors sorted by descending order of total number of mentions and exemplary references is displayed, followed by a brief description of the top-ranked factors.

2.2.5.1 Ensure change readiness in the PSM team

No.	**Supportive factors for an effective and efficient PSM transformation**	#	Exemplary references
1	Create a sense of urgency and awareness for the need of change (long) before the actual transformation projects start. Convince the affected people that there is a risk of not changing the old habits and structures.	25	Lauer (2014), Jorgensen et al. (2014), Kotter (2012), Milliken (2012)
2	Ensure the necessary competencies and abilities (hard skills and soft skills) before the actual change project starts to build up confidence and reduce fear of change.	23	Capgemini (2015), Atilgan/McCullen (2011), Kostka/Mönch (2009), Cameron/Green (2009)
3	Ensure a culture of lifelong learning and an inner desire to become continuously better.	22	Krüger (2009), Cacaci (2006), Day/Atkinson (2004), Sedlacek (2010)
4	Create a culture of trust and being supportive.	11	Capgemini (2015), Houben et al. (2007), Kotter (2012), Pfannenberg (2009)
5	Foster a culture that risk taking/making errors is allowed to boost creativity and innovation.	5	Lauer (2014), Kostka/Mönch (2009), Carnall (2007), Champy (1995)

Table 48: Supportive change factors "Ensure change readiness in the PSM team"

The authors agreed that convincing and motivating the people to actively join and support the change project/programme is crucial for success. This might be achieved by making them aware that it is urgent to change *(sense of urgency)* and that there is a major risk staying in the old patterns. Benchmarking, self-assessments or learning journeys are concrete actions that might be undertaken to support this issue. Having a *culture of lifelong learning* is directly connected with willingness to change and openness for new methods, processes, structures or systems. There are studies proving that ensuring the necessary competencies and abilities of the affected employees and the person in charge of the change (e.g. CPO) before the transformation starts, is positively related with better change readiness and faster transformation speed *(e.g. Stentoft Aribjørn et al., 2006; see also "minimum maturity point" from Schiele, 2007).*

2.2.5.2 Build a powerful and leading change team

No.	Supportive factors for an effective and efficient PSM transformation	#	Exemplary references
6	Decide for (a) strong leader(s) and leading team with change experience.	23	Jorgensen et al. (2014), Hiatt/Creasey (2012), Steinle et al. (2008), Yacovone (2007)
7	Work on suitable roles within the team for the change period and for the time after the transformation according their (probable) commitment.	13	Capgemini (2015), Cameron/Green (2009), Kotter/Cohen (2002), Armenakis/Bedaian (1999)
8	Having transparency about the different "players" in the change initiative concerning their commitment (e.g. first mover, early followers, late followers, blockers, change agents).	10	Jorgensen et al. (2014), Pfannenberg (2009), Steinle et al. (2008), van Hoek et al. (2010)
9	Be open for diversity to learn and benefit from different personalities and their strengths.	10	Capgemini (2015), Lauer (2014), Kostka/Mönch (2009), Holmann et al. (2006)
10	Ensure clear responsibilities and commitment to the tasks in the change team.	9	Jorgensen et al. (2014), Cameron/Green (2009), Hiatt/Creasey (2012), van Hoek et al. (2010)
11	Actively plan team-building measures in advance to have a powerful team when the change starts (e.g. outdoor training, regular relaxed meetings across hierarchies).	9	Sedlacek (2010), Atilgan/ McCullen (2011), Graaf/Kolmos (2007), Carlsson/Sarv (1997)
12	Give the involved people space for self-organisation (empowerment).	8	Capgemini (2015), Lauer (2014), Krüger (2009), Holman et al. (2006)
13	Understand that an organisational change needs a change of the team and a change of a team needs a change of individuals.	4	Capgemini (2015), Cameron/Green (2009), Houben et al. (2007), Kotter/Cohen (2002)
14	Ensure flat hierarchies and eliminate status and rank in the creative process of ideas generation.	2	Carnall (2007), Liebmann (1997)

Table 49: Supportive change factors "Build a powerful and leading change team"

Having a *strong leading person as well as a motivated leading team* for the intended change is the most frequently mentioned factor in this category. This/these leader(s) should be able to inspire others, motivate the team, should be self-reflected (e.g. accepting that he/she is not the expert in every aspect of the change and needs a strong and willing team) and should take the role as a good-example. Next to the core team of the transformation – which will be formed out of the PSM team – it makes sense to temporarily expand the team with experts of other functional teams (e.g. quality management, production), as well as involving people from outside the department (and possibly also outside of the firm) who have (deliberately) the least connection and bias to the topic. They can provide external views and help to think outside the box. Furthermore, the authors propose being *open for diversity* and actively taking care of the fit of the different typologies within the team (e.g. Belbin's team types, Myers Briggs Type Indicators, DISC Model). Moreover, it is suggested to use the *knowledge about the different typologies* as well as the *probable commitment within the change* (e.g. first mover, early follower, blockers, change agent) of each team member when defining specific roles for the transformation and beyond.

2.2.5.3 Work on a shared vision and accepted goals

No.	Supportive factors for an effective and efficient PSM transformation	#	Exemplary references
15	Analyse and integrate all relevant internal and external stakeholders with the purpose of creating a feeling of ownership (buy-in) before the change starts (work on critical mass, early involvement).	25	Jorgensen et al. (2014), Milliken (2012), Monczka et al. (2010), Steinle et al. (2008)

No.	Supportive factors for an effective and efficient PSM transformation	#	Exemplary references
16	Ensure top management commitment for the intended change and visibility of the management during the change.	22	Capgemini (2015), Kotter (2012), van Hoek et al. (2010), Johnson/Leenders (2004)
17	Work on and create a shared vision for the organisation, the team and the individual. Try to make it visible, easy to understand and clear (see-feel-change).	17	Milliken (2012), Krüger (2009), Cameron/Green (2009), Holman et al. (2006)
18	Transfer the overall vision of the change from a corporate view to clear individual goals for each employee.	9	Jorgensen et al. (2014), Kotter (2012), Steinle et al. (2008), Stentoft Aribjørn (2006)
19	Giving affected people sufficient time to reflect and think about the intended change. Allow feedback and discussion and accept that there are multiple constructs of reality, values (right/wrong) and problems. Legitimate the expression of feelings.	7	Lauer (2014), Atilgan/ McCullen (2011), Carnall (2007), Champy (1995), Carlsson/Sarv (1997)

Table 50: Supportive change factors "Work on a shared vision and accepted goals"

In this dimension, to ensure the so-called *"buy-in" of the affected stakeholders* is mentioned as the most relevant factor. Therefore, a concrete strategy might be to jointly work with the people concerned on a transparent and *easy understandable vision* and transfer the overall goals of the change to individual goals of each employee. Initial *management commitment* but also *visibility* of the executive management during the transformation, indicate support and appreciation and are further mentioned determining factors of an effective change. A buy-in of employees that goes along with the acceptance of the intended goals of the change may be supported by *giving the team sufficient time to reflect and provide feedback about the intended change*. According to the analysed sources, management should not make the mistake to believe that their reality, values and views about the transformation equals those of their employees, and they should permanently demonstrate the willingness of stepping into a (also controversial) discussion about the change with the affected personnel.

2.2.5.4 Establish authentic and open communication

No.	Supportive factors for an effective and efficient PSM transformation	#	Exemplary references
20	Ensure clarity, honesty and authenticity in the change communication.	22	Jorgensen et al. (2014), Lauer (2014), Kotter (2012), Pfannenberg (2009)
21	Ensure a culture of early and open communication (feedback/lessons-learned). Create multiple ways of providing (two-way) feedback.	17	Capgemini (2015), Cameron/Green (2009), Steinle et al. (2008), Day/Atkinson (2004)
22	Accept and actively motivate people to take a critical approach towards the change plan. This feedback can shed new light on the original plan, and can make it better.	17	Hiatt/Creasey (20012), Sedlacek (2010), Monczka et al. (2010), Armenakis/ Berdaian (1999)
23	Ensure a target group oriented communication plan (who receives which information when and in which form: e.g. roadshow, conference, wiki, social media, mailing, personal)	11	Kostka/Mönch (2009), Krüger (2009), Pfannenberg (2009), Cameron/Green (2009)
24	Establish or use a lessons-learned cycle to benefit from good and bad practices and experiences from previous change initiatives.	6	Sedlacek (2010), Carnall (2007), Holman et al. (2006), Cacaci (2006)
25	Work on a clear elevator pitch about the intended change which is transparent and easy to understand and remember.	4	Jorgensen et al. (2014), Lauer (2014), Pfannenberg (2009), Kotter/Cohen (2002)
26	Start with the communication long before the start of the change and avoid a cold start.	4	Capgemini (2015), Hiatt/Creasey (2012), Carnall (2007), Holman et al. (2006)

Table 51: Supportive change factors "Establish authentic and open communication"

Working on a *clear, honest and authentic communication style* is the most frequently mentioned aspect in this dimension. Honesty also includes actively communicating on an individual basis which employee is likely to lose what,[57] who can expect a new (challenging) role during or after the transformation is accomplished, as well as addressing possible risks and uncertainties. Furthermore, this *culture of open communication* has proven to motivate a team to provide (positive *and* critical) feedback about things that work out fine or about issues that need to be improved. This is very valuable and might be used to adjust the initial plan to achieve an overall better result. Moreover, thinking about different waves and ways of conveying the messages using different media might distinguish a good from a poor communication strategy. The more critical and drastic the intended change will be, the more time should be spent on planning and executing thoughtful communication.

2.2.5.5 Ensure a transparent transformation roadmap and consolidation

No.	Supportive factors for an effective and efficient PSM transformation	#	Exemplary references
27	Ensure clear KPIs and controlling-loops for status control (e.g. BSC, steering meeting).	18	Jorgensen et al. (2014), Lauer (2014), Milliken (2012), Monczka et al. (2010)
28	When starting the change, ensure a clear transition roadmap that can be explained easily.	15	Atilgan/McCullen (2011), Kostka/Mönch (2009), Steinle et al. (2008), Holman et al. (2006)
29	Accept and actively consider phases of "inefficiency" in the overall plan (typical change curve, learning dip) and plan interventions.	11	Capgemini (2015), Kotter (2012), van Hoek et al. (2010), Carnall (2007)
30	Ensure professionalism in project management (e.g. planning, controlling, closure) for each of the concrete change initiatives, and keep an eye on other change projects in the firm that might affect the intended change (multi-project-management).	12	Jorgensen et al. (2014), Lauer (2014), Krüger (2009), Armenakis/Berdaian (1999)
31	Institutionalise the changed procedures and habits by e.g. new process or job descriptions, clear responsibilities, updated business cards or by carrying out road-shows for promotional purpose.	11	Cameron/Green (2009), Steinle et al. (2008), Day/ Atkinson (2004), Kotter/Cohen (2002)
32	When working on the plan, discover the future in diverse perspectives and scenarios (e.g. best case, worst case). Integrate the management view and the view from the employees from the middle-management and from the shop floor.	8	Monczka et al. (2010), Carnall (2007), Houben et al. (2007), Holman et al. (2006)
33	Do not stick to the plan just because it is a plan. Allow adaptations based upon arising (new) contingent factors (e.g. changing goals, market indicators) and reasonable criticism or feedback.	7	Cameron/Green (2009), Steinle et al. (2008), Holman et al. (2006), Carlsson/Sarv (1997)
34	Plan a pilot-phase (trial run) to check if a new approach works.	6	Capgemini (2015), Krüger (2009), Graaf/Kolmos (2007), Liebmann (1997)
35	Don't promote the closure of the change too early.	1	Kostka/Mönch (2009)

Table 52: Supportive change factors "Ensure a transparent transformation roadmap & consolidation"

Having clarity about the status of the intended transformation applying *key performance indicators or reports* is mentioned as relevant aspect from the reviewed change management literature. When triggering the actual transformation, *a clear change roadmap* that can be easily explained to the team is a necessary basis and should also *contain phases of "ordinary inefficiencies"*. Furthermore, *a plan for institutionalising*

[57] It is also important to think about possible compensations first (e.g. new job/role in the firm, outplacement, buy-out), before stepping into such a conversation.

the changed procedures is suggested. This might happen by updating process or job descriptions, defining clear responsibilities or carrying out internal road-shows for informational and promotional purpose. Motivating the teams of already-finished (sub-) projects to act as role-models for the other (new) colleagues, is mentioned as another supportive factor to maintain the motivation, as well as the driving forces for further changes high.

2.2.5.6 Ensure resources and set priorities

No.	Supportive factors for an effective and efficient PSM transformation	#	Exemplary references
36	Guarantee the necessary resources (budget, time) and ensure the availability and visibility of a change leader/agent.	13	Capgemini (2015), Jorgensen et al. (2014), Hiatt/Creasey (2012), Atilgan/McCullen (2011)
37	Making priorities, taking decisions and shifting tasks and responsibilities if necessary.	13	Sedlacek (2010), Krüger (2009), Steinle et al. (2008), Carnall (2007)
38	Change the conditions (e.g. technology, systems) and infrastructure when promoting the intended change.	13	Jorgensen et al. (2014), Monczka et al. (2010), Cacaci (2006), Johnson/Leenders (2004)
39	Be open for and consider external input from consultants, universities or other external experts when useful.	12	Lauer (2014), Pfannenberg (2009), Kotter/Cohen (2002), Day/Atkinson (2004)
40	Convince top management with clear KPIs or benchmark studies that a change is necessary.	3	Krüger (2009), Liebmann (1997), Champy (1995)
41	Use top-down pressure to overcome some critical phases to make the intended change happen.	1	Jorgensen et al. (2014)

Table 53: Supportive change factors "Ensure resources and set priorities"

Being motivated or ready to change is one thing, having the *necessary resources* (in particular time and budget) is something different. As responsible manager, guaranteeing this, is – in this dimension – as important as *making priorities* and if necessary *shifting tasks and responsibilities* so defined persons can enter their (new) role within the change project (e.g. change agent). If the intended change is blocked by technology, policies or organisational structures, these issues might be changed first by the management.

2.2.5.7 Deliver quick- and intermediate wins and celebrate success

No.	Supportive factors for an effective and efficient PSM transformation	#	Exemplary references
42	Ensure incentives and rewards for (interim) success. Make stories out of it and spread it out to the company as motivation.	15	Capgemini (2015), Jorgensen et al. (2014), Lauer (2014), Yacovone (2007)
43	Actively plan quick- and intermediate wins especially for these people that are critical in the beginning but crucial for the success of the transformation.	15	Kotter (2012), Atilgan/ McCullen (2011), Steinle et al. (2008), Carnall (2007)
44	Use the quick and intermediate wins as "magic moments" for introducing new change steps.	4	Kotter (2012), Krüger (2009), Pfannenberg (2009), Kotter/Cohen (2002)
45	Celebrate the "real heroes" and not just the team leader or overall change manager.	4	Hiatt/Creasey (2012), Cameron/Green (2009), Carnall (2007), Holman et al. (2006)

Table 54: Supportive change factors "Deliver quick- and intermediate wins and celebrate success"

Given that a transformation project usually has a mid- to long-term horizon and needs much effort and resources from the affected employees, a positive basic attitude is important. Accordingly, *incentives* as well as *quick- and intermediate wins* are

mentioned as crucial aspects that might be actively planned in a change project. Furthermore, it is recommended to use interim success to motivate the people and introduce necessary further change steps. *Giving the praise to the person or team in charge* for the interim result and not (only) to the team leader or overall change manager is another supportive factor to foster change initiatives based upon the analysed change management literature.

Summarising, the most relevant factors for an effective and efficient PSM transformation are listed in the following table, taking their number of mentions as the main indicator for importance.

No.	Supportive factors for an effective and efficient PSM transformation	Category	#
1	Analyse and integrate all relevant internal and external stakeholders with the purpose of creating a feeling of ownership (buy-in-) before the change starts (work on critical mass, early involvement).	Work on a shared vision and accepted goals	25
2	Create a sense of urgency and awareness for the need of change (long) before the actual transformation projects start. Convince the affected people that there is a risk of not changing the old habits and structures.	Ensure change readiness in the PSM team	25
3	Ensure the necessary competencies and abilities (hard skills and soft skills) before the actual change project starts to build up confidence and reduce fear of change.	Ensure change readiness in the PSM team	23
4	Decide for (a) strong leader(s) and leading team with change experience.	Build a powerful and leading change team	23
5	Ensure TOP-Management commitment for the intended change and visibility of the management during the change.	Work on a shared vision and accepted goals	22
6	Ensure clarity, honesty and authenticity in the change communication.	Establish authentic and open communication	22
7	Ensure a culture of lifelong learning and an inner desire to become continuously better.	Ensure change readiness in the PSM team	22
8	Ensure clear KPIs and controlling-loops for status control (e.g. BSC, steering meeting).	Ensure a transparent transition roadmap & consolidation	18
9	Work on and create a shared vision for the organisation, the team and the individual. Try to make it visible, easy to understand and clear .	Work on a shared vision and accepted goals	17
10	Ensure a culture of open communication (feedback/lessons-learned). Create multiple ways of providing (two-way) feedback.	Establish authentic and open communication	17
11	Accept and actively motivate people to take a critical approach towards the change plan. This feedback can shed new light on the original plan, and can make it better.	Establish authentic and open communication	17
12	Ensure incentives and rewards for (interim) success. Make stories out of it and spread it out to the company as motivation.	Deliver quick- and intermediate wins & celebrate success	15
13	Actively plan quick- and intermediate wins especially for these people that are critical in the beginning but crucial for the success of the transformation.	Deliver quick- and intermediate wins & celebrate success	15
14	When starting the change, ensure a clear transition roadmap that can be explained easily.	Ensure a transparent transition roadmap & consolidation	15
15	Guarantee the necessary resources (budget, time) and ensure the availability and visibility of a change leader/agent.	Ensure resources & set priorities	13
16	Making priorities, taking decisions and shift tasks and responsibilities if necessary.	Ensure resources & set priorities	13
17	Change the conditions (e.g. technology, systems) and infrastructure when promoting the intended change.	Ensure resources & set priorities	13
18	Work on suitable roles within the team for the change period and for the time after the transformation according their (probable) commitment	Build a powerful and leading change team	13
19	Be open for and plan external input from consultants, universities or other external experts when useful.	Ensure resources & set priorities	12
20	Ensure professionalism in project management (e.g. planning, controlling, closure) for each of the concrete change initiatives, and keep an eye on other change projects in the firm that might affect the intended change (multi-project-management).	Ensure a transparent transition roadmap & consolidation	12

Table 55: Ranking of the twenty most important factors for a successful change based on total mentions

RESEARCH RESULT

After finishing this research step, 45 supportive factors of maturity improvement initiatives in seven categories were identified, to be applied as the ***second content-related core element of the Purchasing and Supply Management Maturity Framework*** presented in the following chapter. These factors might be understood as a valuable summary of aspects for minimising the likelihood of unfavourable employee reactions to change initiatives as well as determining factors that positively influence an effective and efficient change initiative in PSM. From the overall 45 factors, 18 factors were covered by the selected journal papers (Table 47), 33 by the (academic and management) textbooks (Table 6), and 32 factors were also mentioned in the four selected studies *(high congruency)*.

Together with the derived determining factors of high (structural) maturity in PSM, represented in the form of KEPs (chapter 2.2.3-2.2.4), these two content-related core elements of the PSM²F are proposed as *"dynamic capabilities of PSM"*. Accordingly, it is hypothesised, that knowledge and expertise in these two domains are central abilities of a PSM team to reconfigure and adapt to address changing internal and external circumstances.

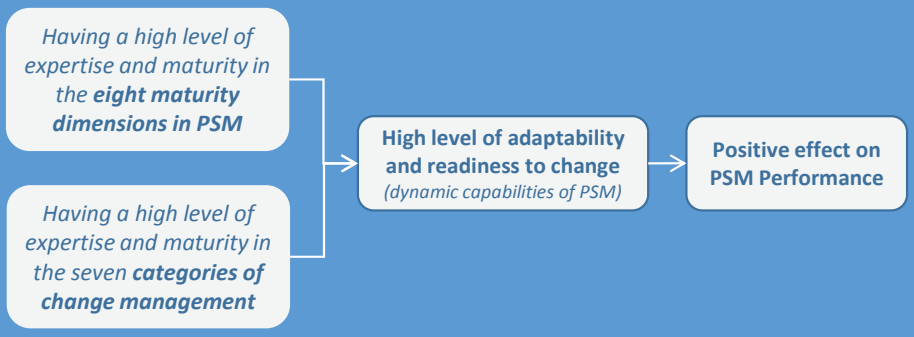

Figure 20: Dynamic capabilities in PSM

3 Deduction of a situational Purchasing and Supply Management Maturity Framework

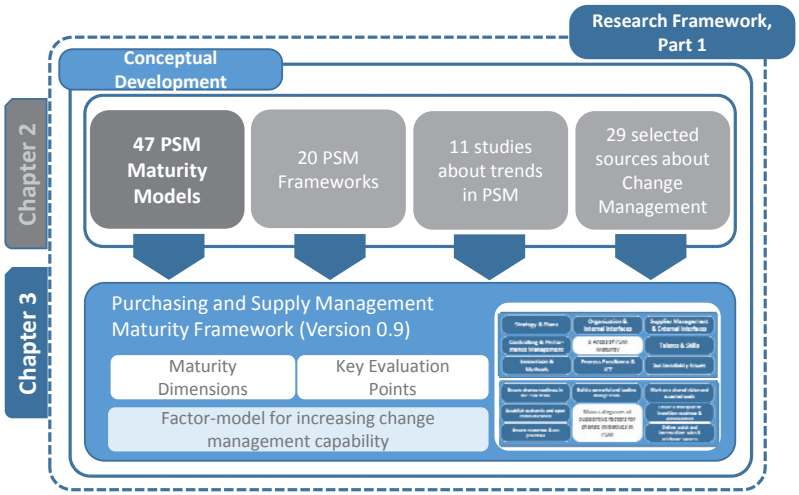

Figure 21: Research Framework, Conceptual Development (II)

The Purchasing and Supply Management Maturity Framework (PSM^2F) presented here is designed as a strategic management instrument for purchasing executives or team members who are dedicated for a maturity improvement initiative in the PSM field. As regards content, the framework is based upon the preliminary findings and results presented in the previous chapters: The inner kernel is formed by the key evaluation points *(chapter 2.2.3; first content-related core element focusing on the question "what to do to reach higher maturity and to react appropriately to the changing conditions and contingencies" (structural elements))* and the factor-model for increasing change management capabilities (2.2.5; *second content-related core element focusing on the question "what to keep in mind for an effective and efficient transformation" (cultural and individual/behavioural elements))*. Finally, in this chapter, a proposal for concrete maturity reports, summarising analysis enabling a transparent representation of the gathered data and for continuous monitoring of the progress within the transformation process and templates that support the action planning will be introduced as *third content-related core element of the PSM^2F* (chapter 3.3).

RESEARCH NOTE

Consequently, the approach presented here intends bringing together well-founded and condensed theoretical findings from two central disciplines (purchasing and supply management & change management), whose interconnected and joint consideration as interlinked dynamic capabilities might have a positive impact on an effective and efficient transformation of the PSM function in a firm.

Addressing the critics about a lack of methodological clarity of the PMMs already highlighted in chapter 2.2.2, and following the request from *Röglinger et al. (2012)* to develop more *"ready-to-use instruments for maturity assessment and improvement"* (p.342) or from *Cocca/Alberti (2010)* to provide concrete advice *"towards actions and improvement" (p.187)*,[58] strong emphasis will be placed on *"clarity and simplicity" (Garengo et al., 2005, p.35)* when explaining and providing recommendations concerning how to apply the framework presented here in a self-application setting. Thus, companies shall be placed in the position to directly apply the developed findings with purpose of further developing their PSM function.

Essentially, the framework is conceptually designed comprising three core modules, embedding the actual maturity assessment in an upstream *(preparation phase)* and a downstream module *(maturity reporting & action planning)*. These successive modules are accompanied by supportive interventions to foster the transformation (Figure 21) during the process. After presenting these modules in chapters 3.1 to 3.3, the framework will be empirically applied and validated in a multiple case study approach (chapter 4) to derive content-related as well as methodological potentials for improvement and refinement (chapter 5).[59]

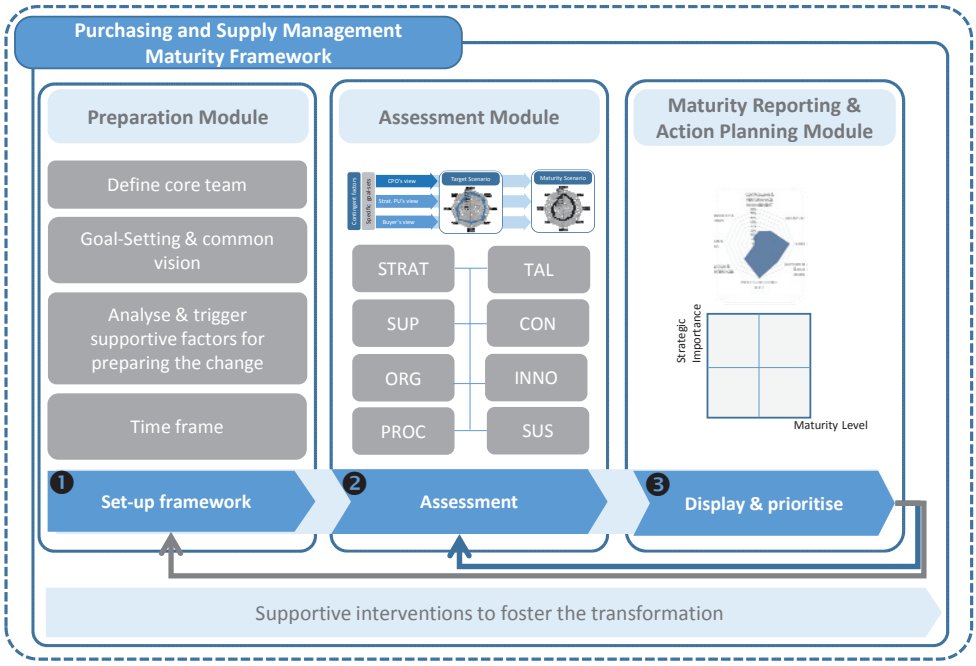

Figure 22: Purchasing and Supply Management Maturity Framework

[58] Also *Van de Ven/Johnson (2006)* state that there is an increasing criticism and obvious problems concerning the applicability and rate of implementation and transfer of results from academics into practice. See also *Starkey/Madan (2001)* and *Beer (2001)*.

[59] According a meta-analysis about articles dealing with maturity models in general, *Wendler (2012)* found out, that the *development* of maturity models (49%) was the most followed research objective. 35% described the *application* of a maturity model, only 14% a *validation* of the model and 6% focussed on theoretical issues on maturity models in form of *meta-articles (Wendler, 2012, p.1324)*.

3.1 Preparation module

The first module, referred to as *"preparation module",* is intended to be applied whenever a new transformation initiative in PSM starts, due to changed contingent factors and goals that demand a new setup of strategies and measures in PSM. In a first step, the *(1) core team* for managing the planned transformation (including preparation, assessment, data analysis/reporting, action planning) has to be defined.[60] Although the CPO might usually have the overall lead for such an initiative, the PSM²F approach proposes to actively involve at least one representative with a more strategic role (e.g. lead buyer, supplier manager) and one with a more operational role (e.g. buyer) into the process as well (Figure 23). This might enhance the probability of integrating the most comprehensive and diverse views about the contextual variables of the firm and what needs to be done (e.g. change processes, develop dynamic capabilities, implement new policies) to become more mature in the relevant dimensions.

RESEARCH NOTE

This mandatory requirement of the PSM²F concept to integrate members of all hierarchical levels of the PSM function is one distinctive feature in comparison to the other maturity models presented and discussed in chapter 2. Therefore, the term *"triangulation rule of participation"* is introduced. The positive effects of an active and conscious involvement of participants from all hierarchy levels in PSM, may be manifold:

(1) Use and integrate diverse perspectives for a suitable target maturity profile for reaching the pre-defined goals in an effective and efficient way (Figure 23).

(2) Use and integrate diverse perspectives *(swarm intelligence)* on possible strategies that are necessary to reach the intended maturity level from experts throughout all hierarchy levels in PSM (fosters robust strategies)

(3) Encourage autonomy and entrepreneurial thinking (positive effect on personnel development)

(4) Supporting the necessary "buy-in" of affected team members (may lead to positive group dynamics and driving forces for change).

The variety of PSM goals, which might be associated with "better performance" or "higher maturity", is rather diverse why a (2) *clarification of the objectives and a common vision* is crucial in advance: *Van Weele (2010)* defines *cost reduction, risk management and value improvement* (p.55), *Axelsson et al. (2005b)* define *reduction of*

60 When forming the team, it is relevant to pay attention on the homogenity and structure of the different sourcing- or category groups (e.g. electronics, mechanics, plastics). If there are big differences (e.g. goals, market requirements, supplier structure), sub-groups are recommended in order to apply the PSM²F on the respective sourcing group to finally come up with a representative assessment and practicable measures.

direct material cost, reduction of inventory, reduction of quality costs, product standardisation, contributing to product design and innovation, increasing flexibility and *fostering purchasing synergy* (p.17) and *Caniato et al. (2014)* devide "purchasing performance" in the sub-categories *cost, time, quality, flexibility, innovation* and *sustainability (p.6)*. So do *Ortner et al.* (2011) who are mentioning a mix of goals covering *time, cost, flexibility, quality* and *sustainability issues* (p.6) or *Hartmann et al. (2012)* who only choose the three sub-categories *cost, quality* and *innovation* (p. 24). Out of that, the following six main goal dimensions of maturity initiatives in PSM can be concluded, which – so the hypothesis – all request for a different level of maturity within the eight pre-defined categories (Figure 9):

- *Reducing & optimising costs*
- *Reducing risks & secure the supply*
- *Increasing flexibility*
- *Improving quality*
- *Improving innovation*
- *Improving sustainability*

Hence, starting a transformation project, the PSM team might focus on *one* or a *set of different goals* in parallel.[61] These goals – primarily triggered by internal and external contingent factors (e.g. sudden market changes, governmental regulations, financial crisis or an insolvency of one or more important suppliers) – are the main input and *guiding principles (Monczka et al., 2010),* for setting the target maturity scenario (SDTMS, module 2) which needs to be reached to fulfil or better cope with the defined goals based upon the opinion of the affected group (Figure 23).

Figure 23: From contingent factors to the target maturity scenario (SDTMS)

Given that a high percentage of maturity improvement initiatives fail due to unclear goals or missing change management skills or *(e.g. Lauer, 2014; Steinle, 2009)*, the core team might start with a compelled *(3) analysis and active engagement with the factor model with its 45 supportive elements for an effective and efficient transformation* (see chapter 2.2.5, a concrete example using the factor model as

[61] As it will be shown in chapter 4, the companies – taking the ten case firms as reference – usually focus on a mix of goals in parallel.

reference is presented in chapter 5.3) before announcing or directly "stumbling" into a transformation programme.[62] This step of considering the supportive factors of a transformation initiative from diverse perspectives as initial step, and not after the assessment and shortly before the actual change project(s) might start was deliberately chosen, to trigger a parallel, or if necessary an upstream, programme of interventions focusing on behavioural as well as cultural factors *(Bititci et al., 2015)* to increase the *driving forces (see chapter 2.2.5)* and well prepare the team or organisation for the structural, process-oriented or technical changes (Table 56). In this approach, these two balanced elements complement each other and might *"co-exist in a symbiotic manner" (Elrod/Tippet, 2002, p.287).*

Ensure change readiness in the PSM team (chapter 2.2.5.1)	***Derived strategies and actions for fostering the driving forces for the transformation***
Create a sense of urgency and awareness for the need of change (long) before the actual transformation projects start. Convince the affected people that there is a risk of not changing the old habits and structures.	▪ … ▪ …
…	▪ …
Building a powerful change team (chapter 2.2.5.2)	
Decide for (a) strong leader(s) and leading team with change experience.	▪ … …
Work on suitable roles within the team for the change period and for the time after the transformation according their (probable) commitment.	▪ … …
…	▪ …

Table 56: Template for defining firm-specific strategies to foster transformation

Finally, (4) an *overall and first estimation of the timeframe and plan* for the next steps of the transformation programme to improve the PSM maturity should be established together with the team and in accordance with the management. This intended *timeline* is directly linked with the (short-, mid- and long-term) need for resources, why commitment from the management (e.g. approving budget for overtime hours, external support) but also from the participating team is essential at this early stage. *Höfler et al. (2013)* recommend resisting the temptation to present the (at that time unknown) overall change plan to "artificially" demonstrate "strong" and consistent management skills, why a well-conceived two-level communication strategy is proposed (Figure 24):

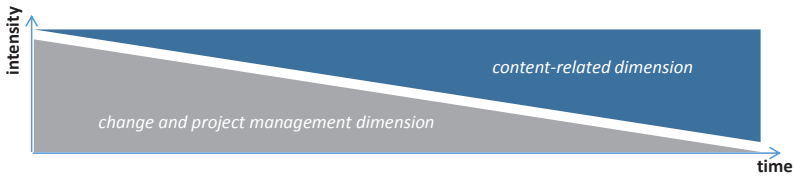

Figure 24: Two-level communication strategy in the PSM²F approach

62 Depending on the experience and change capabilities of the respective person in charge (e.g. CPO, defined change manager), the elements of the factor-model might be seen as a confirmation of pre-existing knowledge or as a well-founded guideline for building up the change strategy for the respective situation.

Consequently, in the beginning and before the actual (structural) change initiatives start, great emphasis might be put on the change and project management dimension by providing relevant background information *(e.g. Why there is now a need to change? Who was involved until now? What happened thus far?)* and explaining the basic conditions *(e.g. invitation to participate, will of open communication and feedback, guaranteed management support)* as well as overall structure of the intended transformation *(e.g. maturity assessment, prioritisation, action plan, resource allocation).*[63] In the course of the further process steps and especially after the maturity assessment is done, the content-related dimension of the transformation might be clearer and hence should get more time and room in the communication.

3.2 Assessment module

Due to the hypothesis that the contingency variables and defined PSM goals from a firm are associated with a specific but not uniform requirement set of maturity in the respective maturity categories presented in chapter 2, the distinguishing feature of the maturity assessment in the PSM²F approach is to enable the participants to weight the key evaluation points according their perceived relevance for the respective goals (see Figure 23) and to better cope with the current or anticipated contingency factors, *before* the actual maturity assessment. For this context-specific definition of the intended state of maturity in PSM, the term *self-defined and targeted maturity scenario (SDTMS)* was introduced (see also chapter 2.2.2). Furthermore, it is proposed at this stage to define those KEPs that might be "irrelevant" for the respective business model or industry (see Figure 25).[64] Subsequently, the actual maturity assessment can be performed.

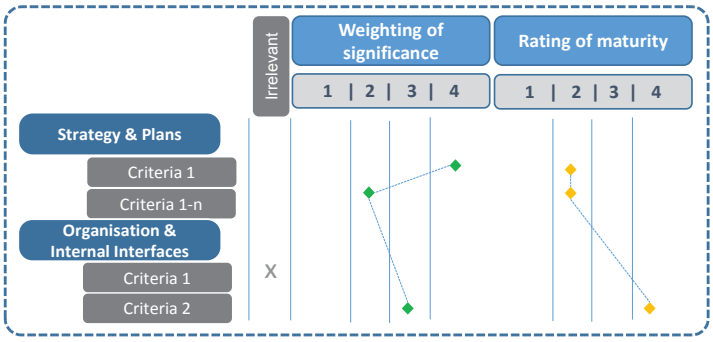

Figure 25: Concept of the assessment module

This possibility to weight (or exclude) KEPs that are particularly relevant (or not) for the intended goal(s) or suitable for the branch or business model is the key element of

63 It is also recommended to praise the employees for their achievements so far and not giving the impression that the habits, procedures and work of the team were not satisfying. It might rather be advisable to explain the need for change with the changing external and internal environment.

64 Alternatively, the firm can decide to benchmark against the theoretical highest maturity scenario (THMS). In that case, no weights for the KEPs have to be assigned.

contextualisation *("organizational choice", Carnal, 2007),* and thereby addressing the request for offering more research in the area of situational maturity models *(Jording/Sucky, 2015; Röglinger et al., 2012; Mettler/Rohner, 2009).*

The eight categories of high PSM maturity with its 104 key evaluation points (see chapters 2.2.3 to 2.2.4) are the textual kernel of this module. Following the proposal of *Ramsay/Croom (2008)* based upon their critique about the linearity *(unidirectional path from left to right)* of traditional PMMs, the assessment module can be visualised better with the PSM function in the centre of eight core categories of maturity that are more or less relevant at different points in time (self-defined targeted maturity scenario t0, self-defined targeted maturity scenario t1) due to changing contextual aspects and goals.

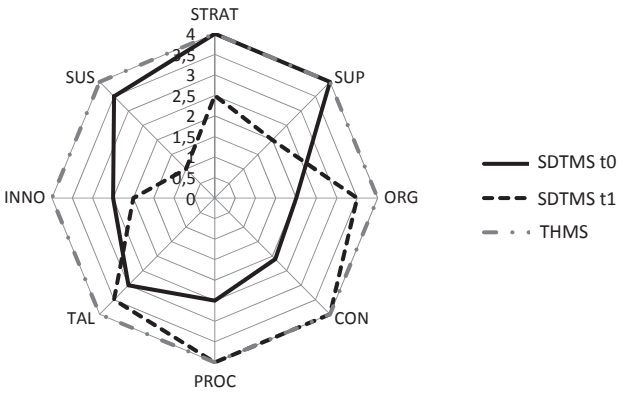

Figure 26: Setting the (agreed) target scenario

To define the firm-specific target scenario (SDTMS), each of the KEPs (see Table 22-Table 29 and appendix) from the respective dimension (e.g. Strategy & Plans, Organisation & Internal Interfaces, Innovation & Methods) has to be weighted (or excluded) first according the subjective view of each participants (following the *triangulation rule of participants*)[65] concerning the estimated connection *(significance value)* of the KEP with the intended goals using a four-digit Likert scale in combination with pre-defined anchor phrases (Table 57).[66]

Significance Level	***Anchor Phrase***
not important/low (1)	The KEP has no or just an indirect impact on the intended goal(s) or intended future state of the PSM function.
medium (2)	The KEP has a noticeable impact on the intended goal(s) or intended future state of the PSM function.
high (3)	The KEP has a significant impact on the intended goal(s) or intended future state of the PSM function.
very high (4)	The KEP is a core element of reaching the intended goal(s) or the intended future state of the PSM function.

Table 57: Scale for defining the significance level of the PSM²F

65 The higher the participation rate, the more significant and robust the results might be. Since this also leads to higher internal costs, the company has to decide individually if and how extensively further team members (next to the core team) are going to be involved.

66 The average value of all evaluated KEPs for a single dimension (e.g. Strategy & Plans) determines the position on the axis on a scale from 0-4.

By doing this, the company defines the sequence of relevant key evaluation points for each category in parallel: The higher the significance of the KEP, the higher is also the recommended priority in working on its improvement *(dynamic maturity path)*. The even number of assessment options was deliberately chosen so the participant has to decide whether the particular aspect has a *rather high* or *rather low* impact on the intended goal, and not being allowed to choose the "golden mean".[67] Due to the possibility (and hypothesised high probability) of different target scenarios from the participants (❶) it is necessary to discuss the main deviations in the group, and finally derive one final and *agreed target scenario* for the entire PSM department as robust basis for the transformation initiative (❷, Figure 27). Subsequently, the actual maturity assessment can be conducted.

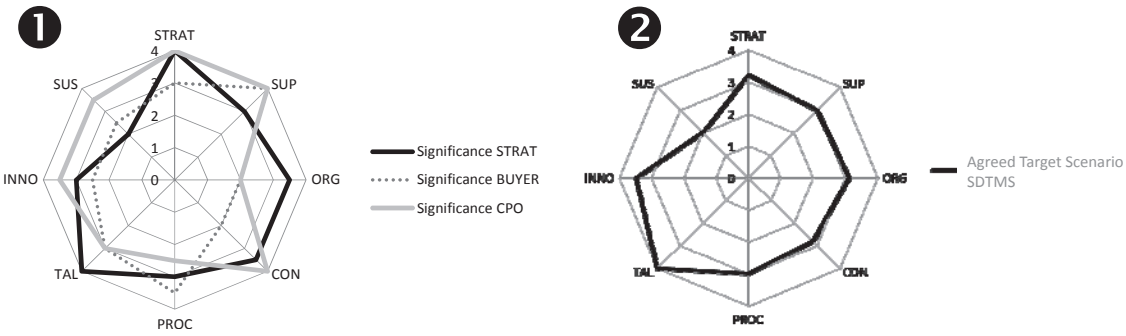

Figure 27: Transferring the individual views to one agreed target scenario

RESEARCH NOTE

From a methodological point, the Delphi method – developed by the Rand Corporation in the 1950s *(Linstone/Turoff, 2011; Okoli/Pawlowski, 2004)* – might be proposed to achieve a reliable consensus among the PSM team. In general this method involves the iteration of three activities *(Reyes/Giachetti, 2010, p.416)* to finally come up with a robust solution:

1. Gathering the individual opinions of a group of experts.
2. Synthesise and statistically summarise these opinions.
3. Provide feedback, so the participants can update their judgements to finally come up with a more robust result.

Given that SMEs should also be motivated to use the framework for the continuous improvement of their PSM function,[68] great emphasis is placed on clarity,

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67 *Cocca/Alberti (2010)* describe three main possibilities for making a self-assessment (p.194-195): (1) Binary *yes* and *no* responses, (2) Likert-type scale (strongly disagree to strongly agree) and (3) Likert-type scale using anchor phrases describing performance at each level of the scale.

68 *Moultrie et al. (2007)* state that SMEs usually lacking of time and (financial) resources, what often block strategic improvement initiatives *(see also Bititci et al., 2012; Garengo/Bititci, 2007; Garengo et al., 2005)*.

comprehensibility and an easy (self-)applicability without the compelling need of third-party support to keep (external) costs at a minimum. Therefore, one core element is the *uniform maturity assessment scheme*, using standardised anchor phrases based upon CMMI (Capability Maturity Model Integration) and SPICE/ISO-IEC 15504[69] (Software Process Improvement and Capability Determination).

Purchasing and Supply Management Maturity Framework (PSM²F)		**Applied references for defining the four maturity levels**	
Maturity Level	*Anchor Phrase*	*CMMI*	*SPICE*
low (1)	On a scale from 0-100%, the implementation level of the KEP is between 0-15%. Incomplete or initial activities without noticeable structure and no clear defined processes and responsibilities.	Incomplete	Not achieved (0-15%)
medium (2)	On a scale from 0-100%, the implementation level of the KEP is between >15 and 50%. Defined basic structure and clear responsibility.	Performed	Partially achieved (>15-50%)
high (3)	On a scale from 0-100%, the implementation level of the KEP is between >50 and 85%. The defined structure, responsibility and policies are connected with good results.	Managed	Largely achieved (>50-85%)
very high (4)	On a scale from 0-100%, the implementation level of the KEP is between >85 and 100%. High repeatable performance and continuous improvement.	Defined	Fully achieved (>85-100%)

Table 58: Maturity assessment scale of the PSM²F

The hypothesis is that such an approach promotes a faster and easier assessment than by using – what the majority of the reviewed PMM presented in chapter 2 does – different pre-defined and fully (partly artificially or unclearly; see chapter 2.2.2) formulated maturity levels for each KEP.

RESEARCH NOTE

The framework can of course be executed with 3rd party support. This support might be always beneficial when there is a lack of competence or experience in doing such kind of analysis *(e.g. Heß, 2015; Netland et al., 2007)*. Especially for the first cycle of the assessment, a third-party support might make sense. *Heß (2015)* highlights that this external support and advisory function might also be recommendable whenever there is a certain risk of "false modesty" or "exaggeration" of the participants (p.43).

Taking four KEPs from Table 30 as an example, the following table illustrates the scheme of the maturity assessment. In this example the three single assessments (CPO, strategic purchasing/STPU, buyer) are juxtaposed for transparency reason. Of course, each participant completes the maturity assessment by him-/herself in order not to be influenced by the results of the others.

[69] Originally planned solely for assessing software processes, it is now also used for the determination of maturity levels of general business processes.

	CPO Significance				CPO Maturity Rating				STPU Significance				STPU Maturity Rating				Buyer Significance				Buyer Maturity Rating			
Rating/Maturity Level	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Key performance indicators for critical processes and goals are defined and are regularly reviewed.				x				x			x				x					x		x		
A cross-functional training and skill management for PSM employees prepares the PSM team for their tasks.			x				x					x		x				x					x	
Strategic supplier (relationship) management is defined as an important asset in the company. A closed supplier management cycle is established from supplier analysis and selection, assessment and development.				x	x							x		x					x			x		
There are clear interfaces and communication structures in the company. It is clearly defined when PSM has to be involved (in a cross-functional team).			x					x			x		x						x				x	

Table 59: Exemplary assessment using the PSM²F

In this brief example it becomes apparent that next to the motivational effect due to early involvement, this triangulation rule of participation might also be a valuable approach for revealing different views on the current (maturity) situation and estimations of the team, to *reduce subjective bias* or the *risk of self-enhancement (Ansbacher/Ansbacher, 1982; Storbeck, 2008)* of the responsible manager.

Heß (2015) suggests carrying out the completion of the assessment within a one or two-days (strategic) workshop. Alternatively, it is possibility to define a fixed time-period until when the participants have to hand in their results.[70] In that case, the participants can carry out the assessment when the motivation level is high, which leads to better and deliberate results. In both cases the main structural logic of the assessment needs to be explained by a dedicated person (CPO, internally announced change agent, 3rd party) in advance to ensure a common understanding among the participants.

[70] For an automated aggregation of the data of each individual form, it is recommended that every participant does the assessment directly in a (computer-based) spread-sheet application.

RESEARCH RESULT

The assessment approach presented in this chapter attempts to overcome the rigid and hence inflexible structure of traditional PMM with fixed pre-defined levels of maturity that need to be achieved to be mature. The main objective is to allow the company greater flexibility in the creation of its *individual and dynamic maturity target/path (fit for purpose).* Accordingly, corporate strategic goals, resources and further contextual aspects can be considered in a better way, than by strictly following a pre-defined maturity ladder.

3.3 Maturity reporting and action planning module

In the third module of the PSM^{2}F, the data of the assessment needs to be analysed and summarised in reports as basis for further discussion and planning the necessary actions and measures for the intended maturity improvement. The core element of the maturity reporting are compiled standard analysis *(third content-related core element of the PSM^{2}F),* which allow a dicing from the overall picture of maturity to more detailed data to foster an open discussion among the participants which might have a positive impact on organisational learning *(e.g. Garvin et al., 2008; Senge, 2006; Yang et al., 2004).* The overall intention of this step is to conclude with a joint understanding about the current state of PSM maturity *(agreed maturity situation)* and with a common sense of urgency concerning the most critical KEPs that need to be improved.

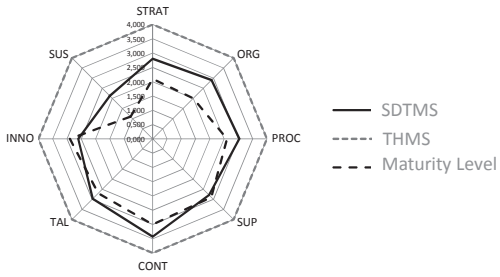
RESEARCH NOTE

If requested or intended to compare the company's maturity level also to the relevant industry benchmark (RHMS: relevant highest maturity scenario), this would require a database-driven (web-based) application. This application could be hosted by a neutral PSM organization (e.g. IPSERA) or by a university to ensure a sustainable use without a primary focus on monetisation. Over the time, this database might grow larger by adding new KEPs based upon further research as well as company-specific data. This would enable deepening analysis about typical target settings, transformation paths or core PSM strategies in specific industries or categories in relation to the company's goals or changes in the external environment. Following the basic idea of the PIMS study in the 1960s *(e.g. Buzzell/Gale, 1987),* this could subsequently make it possible to initiate a long-term study about the performance impact of procurement strategies (PIPS). Alternatively, it might be possible to motivate a consortium of companies[71] to join a PSM maturity benchmark initiative to exchange the results of the maturity assessment and learn from each other.

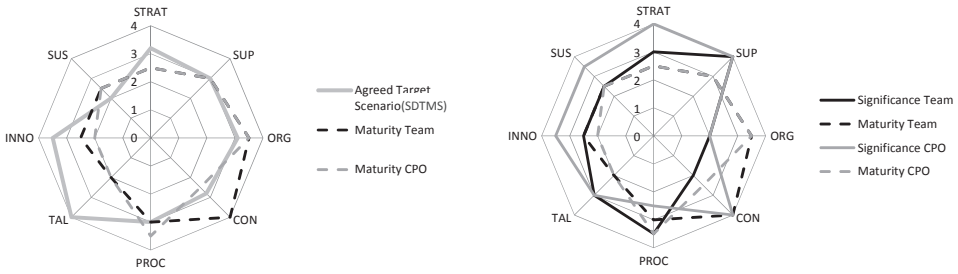
[71] (Nearly) every branch is offering several industry or professional associations, which can be a useful network for searching for potential benchmarking partners.

The following *summarised analysis and reports* are proposed:

1. *Overall maturity level in each dimension in comparison to the agreed target scenario or the theoretical highest maturity scenario:* The position of the significance or maturity value on the respective axis is determined by the average value of all evaluated KEPs for a single dimension (e.g. Strategy & Plans) and following the assessment scheme in Table 57 and Table 58. The THMS represents the highest significance value for all KEPs (value 4 out of 4 on the Likert scale). This report[72] provides a first and consolidated (team-wide) impression of the current status of the maturity of the PSM function in comparison to the intended and self-defined maturity scenario (SDTMS).



2. *Comparison of the maturity estimation from the CPO in comparison with the estimation from the PSM team:* In this analysis, it is displayed in which dimension there are deviations and conformities between the CPO/purchasing manager and the team in terms of *perceived current maturity state* (maturity level), as well as in terms of the *importance of the maturity dimension* for the pre-defined goals (significance value, SDTMS). This report might trigger and encourage a deeper discussion (on a KEP basis) within the PSM team to reach a common and agreed picture of the actual situation and intended future state.



3. *Comparison of the maturity estimation based upon hierarchy and areas of responsibility:* In this analysis, each curve is representing one functional or hierarchical group of the PSM team, to display the main deviations and conformities between the participating roles in the assessment. For comparison and discussion purposes, also the illustration of the individual target scenarios (significance values) of the participating groups[73] might be helpful. For the sake of clarity, it might be proposed to choose two separate figures for this purpose.

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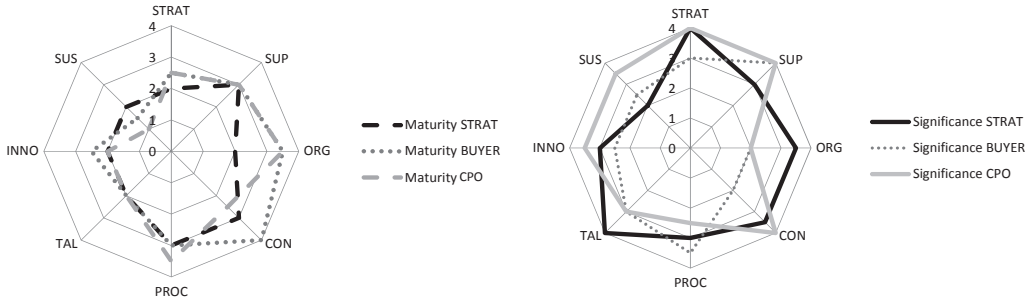
72 Radar charts are very common and proven reports in maturity assessment *(e.g. Netland, 2007, A.T. Kearney, IMP).*

73 A possible extension would be to insert the agreed target scenario (SDTMS) as further curve.



4. *Most relevant KEPs sorted by the agreed significance value (SDTMS):* The reports 4-7[74] are suggestions for presenting and highlighting the detailed results of the most relevant KEPs in different sorting.

Key Evaluation Points	Dimension	Agreed SDTMS	Ø Maturity
Clear and suitable commodity structure based upon an agreed commodity code classification with defined responsibilities is in place.	STRAT	4	2,5
A cross-functional training and skill management for PSM employees prepare the PSM team for their tasks (e.g. internal and external education/training, job rotation, training plans.	TAL	4	2
Key performance indicators for critical processes and goals are defined and are regularly reviewed (e.g. ability to delivery, on-time-delivery).	CON	4	2
…	…	…	…

5. *Most relevant KEPs sorted by the average maturity value*

Key Evaluation Points	Dimension	Ø Maturity	Agreed SDTMS
Integration programmes for new personnel (e.g. job rotation, job profiles, checklists, mentoring, feedback, team-building) helps to easily integrate new employees.	TAL	4	2
Based upon a corporate strategy, PSM develops short-, mid- and long-term plans and goals (e.g. negotiation targets, process goals, supplier goals) as well as an overall PSM strategy in a structured way (strategy alignment, roadmap approach).	STRAT	3,5	3,5
Powerful ICT support (e.g. ERP, SRM) for routine tasks.	PROC	3,5	4
…	…	…	…

6. *Most relevant KEPs sorted by maturity dimension and corresponding (agreed) significance value (SDTMS)*

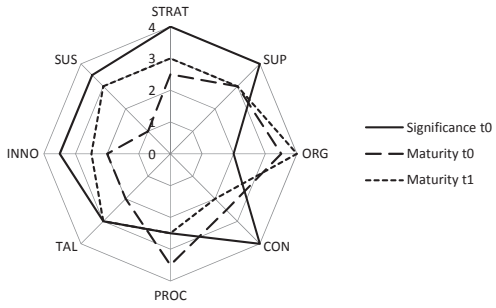
	Strategy & Plans	Agreed SDTMS	Ø Maturity
1	Clear and suitable commodity structure based upon an agreed commodity code classification with defined responsibilities is in place.	4	2,5
2	Formulated and differentiated sourcing strategies (per category and/or supplier) are established based upon a structured process (e.g. using portfolio-technique; strategic importance of products, risk factors, availability).	3,5	1,5
3	Contingency plans for disruptions in the supply chain are available.	3,5	1
	Talents & Skills		
1	A cross-functional training and skill management for PSM employees prepare the PSM team for their tasks (e.g. internal and external education/training, job rotation, training plans).	4	2
2	There is a clear career path for professional advancement in the PSM department.	3	3
3	Clear targets and a standardised feedback process for personnel (e.g. annual meeting, feedback-questionnaire) are in place.	2,5	2

[74] A possible extension would be to insert the separate views from the CPO, the buyer and the strategic purchaser.

7. *Most relevant KEPs sorted by maturity dimension and corresponding (agreed) maturity value*

	Strategy & Plans	**Ø Maturity**	**Agreed SDTMS**
1	Based upon a corporate strategy, PSM develops short-, mid- and long-term plans and goals (e.g. negotiation targets, process goals, supplier goals) as well as an overall PSM strategy in a structured way (strategy alignment, roadmap approach).	3,5	3,5
2	Risk and market monitoring is established as integrated part of the PSM operations (e.g. anticipate trends, SWOT) to secure the supply.	3,5	2
3	The derived strategies are continuously reviewed and if necessary adapted (on a global and/or category level).	3	3
	Talents & Skills		
1	Integration programmes for new personnel (e.g. job rotation, job profiles, checklists, mentoring, feedback, team-building) helps to easily integrate new employees.	4	2
2	Adequate level of remuneration according industry standards.	3,5	3,5
3	The PSM team participates in external trainings and/or conferences to bring external knowledge to the company and the PSM department.	3,5	2,5

8. *Change of maturity level (increase/decrease) in comparison to initial assessment and agreed target maturity scenario (SDTMS):* This analysis can be used for controlling the progress of an initiated transformation programme. Taking the defined and agreed target value (significance/SDTMS t0) as well as the originally evaluated maturity value (t0) as a basis, another maturity assessment after a pre-defined time (t1) can indicate whether there was a maturity improvement. Furthermore, this analysis should be accompanied by a discussion whether the increase of maturity also correlates with the level of goal achievement (defined in module 1), or if a new setup of the SDTMS is necessary.



9. *Range value and level of congruency of maturity assessment:* The statistical range value on a scale from 0-4 can be used here as an indicator for the overall as well as dimension-specific deviation of the participants' evaluation *(level of congruency)*. Therefore, it is a central step towards working on an agreed maturity level as precondition for an effective and efficient transformation initiative. The range value can be calculated for a single KEP or for the overall maturity dimension.[75] Taking the four-digit Likert scale as a basis, "0" would mean that all participants rated the KEP with the same value, an range value of "3" would mean that for a single KEP (or in case that the overall average value is also "3" for each KEP of one dimension) at least one participant entirely disagreed

75 The calculation of the range-value as well as the accordance rate might also be used for making the deviations of the different target scenarios of each participant (module 2) transparent. This might foster group discussion which is necessary to finally derive a common agreement in module 2.

with another (one said "1" the other "4"). The higher the value, the lower is the level of congruency. In such a case it is necessary to dice into the data to find the most important disagreements and bring them up for discussion. Next to the range value, the report can also be extended with the "deviation" between the overall evaluation of the CPO and the team (or the specific functions; e.g. buyer, strategic purchasing). A positive value (in the table below) means that the CPO attributes a higher significance or maturity level to the respective dimension than the other participants.

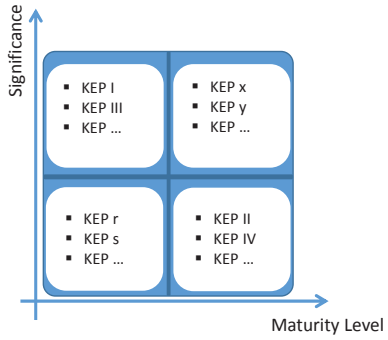
Company				
Maturity				
	CPO	TEAM	Deviation	Range
STRAT	2,565	2,1	0,465	1,8
ORG	3,1	2,8	0,3	1,5
PROC	2,643	3,2	-0,557	2,1
SUP	2,643	2,2	0,443	1,8
CONT	3	2,4	0,6	1,9
TAL	2,84	2,1	0,74	1,7
INNO	2,2	2,3	-0,1	1,1
SUS	2,2	2,1	0,1	1,2
			Overall Range	1,3

Company				
Significance/Weight				
	CPO	TEAM	Deviation	Range
STRAT	2,882	2,765	0,118	1,2
ORG	2,889	2,926	-0,037	1,5
PROC	3,045	3,273	-0,227	1,7
SUP	2,805	2,780	0,024	1,4
CONT	3,286	3,5	-0,214	0,7
TAL	2,949	2,987	-0,038	1,0
INNO	2,727	2,545	0,182	1,4
SUS	1,875	2,25	-0,375	1,6
			Overall Range	1,3

10. *Accordance rate:* Also this report might be an indicator for the *level of congruency.*[58] It indicates the number of KEPs with a range value of "0" sorted by dimension as well as maturity and significance maturity. The higher the percentage value, the higher the level of congruency.

Maturity Dimension	Maturity level	Significance level
Strategy & Plans	70%	60%
Organisation & Internal Interfaces	60%	45%
Supplier Management & External Interfaces	65%	30%
Controlling & Performance Management	55%	70%
Process Excellence & ICT	80%	90%
Talents & Skills	80%	65%
Innovation & Methods	55%	40%
Sustainability & Ethics	80%	65%
TOTAL	**68%**	**58%**

11. *KEP portfolio:* In this portfolio the key evaluation points can be displayed according their maturity and significance level, as basis for further actions *(planning, execution)*.



All KEPs with a significance value from 3-4 and a maturity level from 1-2 are displayed in the top left area sorted by the highest significance value. KEPs with a significance value and a maturity value of 3-4 in the top right area. If the significance level is between 1 and 2, the respective maturity level defines the positioning in the bottom left or right area of the portfolio.

RESEARCH NOTE

It is proposed to make the presentation and discussion of the maturity reports and analysis not too long after the assessment (1-3 weeks), whereby the participants are still aware of their motives for the assessment and their definition of the significance values. Also for this process step, the Delphi method (see module 2) might be suggested to achieve a final maturity-accordance among the participants.

Taking the finally agreed result into account and transferring the evaluated key evaluation points into the *KEP portfolio* might enhance the transparency and may facilitate the process of taking priorities and defining measures and responsibilities for the execution of the transformation initiatives. Finally, it is proposed to document the planned measures, the planned output, the corresponding KEP and correlating goal(s), the responsible person(s) as well as the milestones and due dates.

Key Evaluation Points	Correlating goal(s)	Current Maturity	Intended Maturity	Planned measures & output	Owner-ship	Next Milestone	Due Date
Respective KEP	e.g. reducing/ optimising costs; increasing flexibility	X (1-4)	Y (1-4)	***Short-term actions:*** - … - ***Mid/Long-term actions:*** - …			

Table 60: Action plan template for the transformation

This instrument might be used for action planning *and* controlling. It illustrates these KEPs which should be improved due to a negative maturity-significance-ratio (low current maturity, high significance). Furthermore the planned measures, divided into short-term and mid/long-term actions, the ownership as well as the next milestones and the final due date can be defined. In the course of finalising the overall action plan, it might be expedient for the respective change-owner to go through the factor model of supportive factors for improvement initiatives again to come up with a robust transformation roadmap comprising a (1) *content-related dimension* (What to improve?) and with (2) a *change and project management dimension* (How to plan and execute the transformation and how to ensure the buy-in of the team?). The basic hypothesis is that considering both elements as balanced building blocks of equal importance *(dynamic capabilities of PSM, Figure 20)* can accelerate the *transformation speed* to higher maturity (efficiency) and *perceived quality of the change* by the affected members (effectiveness), illustrated in Figure 28.[76]

[76] Due to the fact that project management is covered as one aspect of the factor model, this topic is not discussed as a separate element in the context of this thesis. Further information about specific methods in project management in particular and project management in general can be found in: *Patzak/Rattay (2014), Turner (2014), Sterrer/Winkler (2009)* or on the website of the *International Project Management Association* or the *Project Management Institute.*

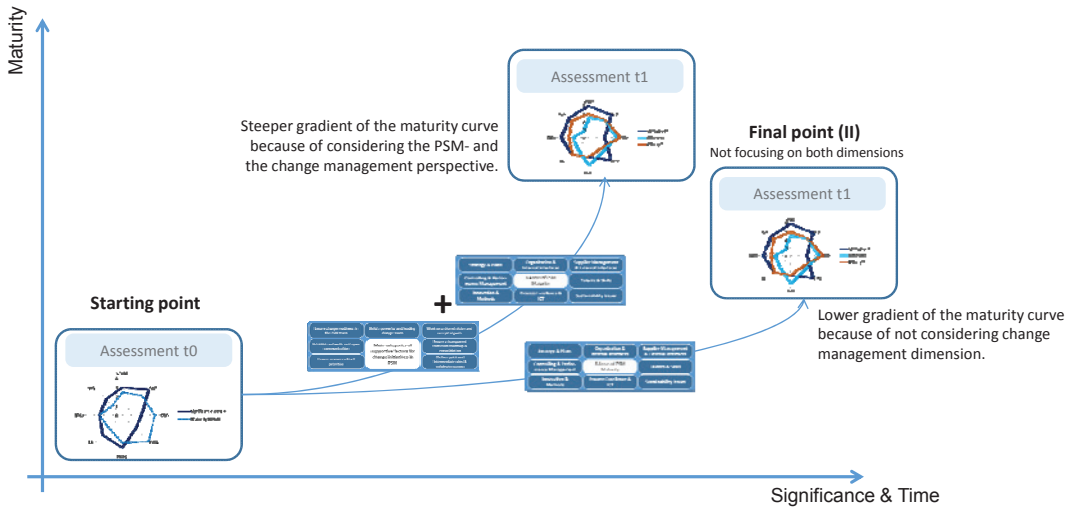


Figure 28: Accelerated change curve in PSM

For example, *Stentoft Arlbjørn et al. (2006)* proved in a study that there is a direct correlation between the willingness to change and an (upstream) active competence development in the respective field (in their case supply chain management). This result is also reflected by the *minimum maturity point (Schiele, 2007; chapter 2.2.1)* as well as the aspect of the *force field analysis* of *Lewin (chapter 2.2.5)* to permanently ensuring driving forces in a team to guarantee a *basic vibration* and *flexibility for change* what ultimately might positively influence the change readiness and finally the transformation success.[77]

The conceptual framework presented here is designed as a strategic management instrument for the maturity assessment as well as for facilitating and controlling maturity improvement initiatives in PSM. This also includes a re-assessment of the maturity level after a certain period to measure the improvement of the maturity level and the concrete effects on the intended goals. *Heß (2015)* defines a cycle of 12 months; Siemens carries out a re-assessment every second or third year *(Schumacher et al., 2008). Saco (2008)* recommends a cycle of 9-18 months (p.15), *Bititci et al. (2015)* a re-assessment every six months. Essentially, the suitable (monitoring) cycle time may depend on the criticality and the defined time line for the maturity improvement programme and its singular projects. If the contingent factors also change, a re-evaluation of the significance values might be expedient; otherwise, an assessment of the changed maturity level might be sufficient.

[77] In popular science change management publications you can regularly find the "change equation" EC = A x B x D, where EC is the energy for change, A is the *felt dissatisfaction* with current situation and B is the *level of knowledge about concrete steps forward* and D is the *common and shared vision (Carnall, 2007, p.210; Beckhard, 1975).*

RESEARCH RESULT

Applying two reference models for determining design and architectural characteristics of a maturity model from *Jording/Sucky (2015)* and *de Bruin et al. (2005), the following attributes can be assigned to the PSM²F:*

Attributes	Proposed options from the two references	PSM²F
Industry Focus	Generic, Specific	**Generic**
Accesibility	Free, User fee, Consulting	**Free**
Design background	Practical, Best Practice, Theory, Combination	**Combination**
Driver of application	Internal or external requirement, both	**Both**
Type of assessment	Maturity Grid, Graded model	**Maturity Grid**
Assessor	Self-assessment, supported assessment, certified practicioner	**Self-assessment**
Respondents	Management, staff, business partners, Auditors	**Management, Staff**
Weightings/Flexibility	Weighting possibility, weighting recommendations, adaptability	**Weighting, adaptability**
Assessment complexity	Low, medium, high, very high	**Low-medium**
Assessment tool	Written form, computer-based, only assessor	**Computer-based (recommended to use spreadsheet application)**
Assessment goal	Evaluation, gap identification, transformation process	**Evaluation, gap identification & transformation process**
Benchmark to	Maturity model, all participants, comparable participants	**Maturity model (THMS), other participants or benchmark consortium**
Defined evolution	Static, dynamic	**Dynamic**
Empirical evaluation	non, case-based, fundamental	**Case based**

Table 61: Design characteristics of the PSM²F

4 Validating the Purchasing and Supply Management Maturity Framework: A multiple case study research

Over the last decades there have been numerous calls or examples for more empirical case and field-based research in the area of operations management in general *(e.g. Stuart et al., 2002; Voss et al., 2002; Meredith/Samson, 2001; Samson/Terziovski, 1999; Meredith, 1998; McCutcheon/Meredith 1993; Swamidass, 1991; Flynn et al., 1990)* and purchasing and supply (chain) management in particular *(e.g. Blome/Schoenherr, 2011; Kähkönen, 2011; Dubois/Araujo, 2007; Camuffo et al., 2006; Ellram, 1996).* The main intention of this claim is to include the dynamics and holistic situations in real (business) life and bridge the gap between what academics were assuming and what the conditions in companies really are. This makes case study research particularly valuable in developing and refining theory and analytically deduced models *(Siggelkow, 2007; Voss et al., 2002; Eisenhardt, 1989; Lee, 1989).*

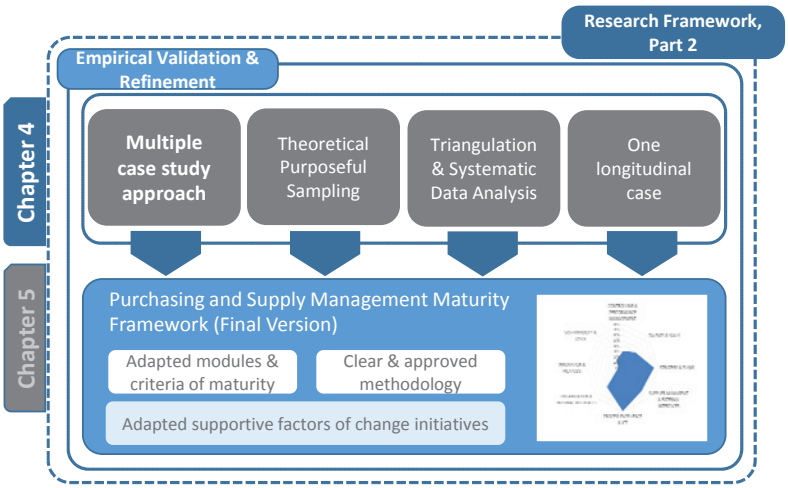


Figure 29: Research Framework, Empirical Validation & Refinement (I)

The above mentioned aspects, and due to the critique that most of the PMMs *"tend to be conceptual and to lack empirical underpinning" (Cousins et al. 2006, p.776),* the conceptually designed framework was introduced and validated in a multiple case study approach *(for other examples and more theoretical background see Bititci et al., 2015; Jia et al., 2014a; Jia et al., 2014b; Blome/Schoenherr, 2011; Rábade/Alfaro, 2006; Camuffo et al., 2006; Howard et al., 2006; George/Bennett, 2005; Quintens et al., 2005; Fernandez/Kekäle, 2005).* The main intention of this research step was to validate and test the framework and its core elements for relevance and rigor *(de Bruin et al., 2005)*, to detect rooms for content-related as well as methodological improvements and to ensure the self-explanatory character of the PSM^{2}F highlighted in chapter 3 *(research goal 1.4).*

According to a meta-analysis about maturity models of *Wendler (2012),* choosing such a qualitative approach for validation is the predominant method. Accordingly, 64% of 70 considered maturity models of diverse disciplines were validated qualitatively (using case studies and action research; *Wendler, 2012, p.1327*). Despite some misconceptions and points of criticism about the scientific reliability of case studies *(Ellram, 1996), Eisenhardt/Graebner (2007)* indicate that "*papers that build theory from cases are often regarded as the most interesting research" (p.25; see also McLoughlin, 2007; Bartunek et al., 2006)* with impact disproportional to their numbers. Based upon cases as a sort of "plausibility probe" *(Eckstein, 1975),* theory can be developed, refined or refuted *(Wendler, 2012; Dubois/Araujo, 2007; Ellram, 1996)* inductively by recognising patterns within and across cases and the correlating logical arguments of the field researcher. A case study is certainly not a valid instrument *(Eisenhardt/Graebner, 2007)* for *statistically* testing pre-defined theoretical concepts, although it is one of the most powerful research methods in operations management, particularly for identifying new variables and relationships (e.g. further KEPs, additional aspects for the factor model and for maturity reports, feedback concerning applicability) not covered from the original theoretical approach *(Meredith, 1998; McCutcheon/Meredith, 1993).* Within a case study, you can also prove whether theories and conceptual ideas that have been generated before (chapters 2 and 3) are able to survive the test of empirical application *(DeHoratius/Rabinovich, 2011; Voss et al., 2002).*

There are certainly some challenges in conducting case study research that have to be taken into consideration. For instance, it is time-consuming due to the requirement of direct observation and investigation in the course of on-site visits, there is a need for skilled interviewers and interviewees, there are access hurdles in entering into contact with suitable case companies, care is necessary in drawing generalisable conclusions from a limited set of cases and ensure rigorous research despite complications of context and temporal dynamics *(Voss et al., 2002; Meredith, 1998).* Another challenge with case-based approaches is to handle the extensive amount of (raw) information, documents and notes and bring them into a convenient format for the final conclusion *(Ahlström, 2007)*.

RESEARCH NOTE

Although *"there are no generally accepted standards for how qualitative research is analysed and presented" (Ahlström, 2007, p.218),* in this thesis the advice of *Miles/Hubermann (1994)* on data representation was followed. Accordingly, exemplary figures and selected examples will be used to summarise the main findings *(see also Eisenhardt/Graebner, 2007)* and to demonstrate the conclusions and the overall procedure *(chapter 5).*

Despite the mentioned challenges and limitations, a case or field study approach allows in-depth analysis of a phenomenon in its natural setting (research *in* and not only *on* an organisation) by observation and having the chance of asking "why" and "how" questions *(Kähkönen, 2011; Meredith, 1998).* This also enables deepening investigation of multi-dimensional issues as well as social and organisational aspects *(Harland et al., 2007; Yin, 2003),* what is an inherent and important issue when dealing with a holistic maturity assessment as well as improvement or transformation initiatives in PSM. The case study approach is also recommended, when contextual conditions are believed to be highly pertinent to the phenomenon of study *(Yin, 2003).* Given that one goal is to validate if different or changing contingent factors in the firms, also going along with different or changing requirements for maturity (represented by different SDTMS) in PSM (see also chapter 2.2.2), makes this case study research approach appropriate.

Eisenhardt (1989) emphasises further strengths such as the likelihood of generating novel theory through case study research or that the resulting hypotheses – which can subsequently be tested by using explanatory research *(Ellram, 1996)* – are likely to be verifiable because the underlying constructs were already validated during the case studies. The resultant theory is thus likely to be empirically valid because the theory-building process was so tied with empirical evidence from the specific case studies.

4.1 Case study design and sample selection

Following the structure from *Eisenhardt (1989)* in terms of generally characterising an inductive case study *(p.535),* the present field research can be summarised as follows:

Study	Schweiger (2014/2015)
Description of cases	10 industrial companies with HQ in Austria but operating on a global level (including one longitudinal case applying action research strategies)
Research Problem/Unit of Analysis	Purchasing maturity assessment and improvement/change initiatives
Data Sources	Interviews with focus groups, questionnaire, archives, documents, facilitated workshops
Investigators	Single investigator
Output	Refined and validated Purchasing and Supply Management Maturity Framework (PSM^2F) including a self-explanatory set of key evaluation points of high maturity, supportive factors for change initiatives in PSM as well as a clear description for (self-)application

Table 62: Case study profile

The case study process is a linear sequence of clear phases and corresponding decisions based upon the research goals *(Piekkari et al., 2010).* Taking the recommendations of

Eisenhardt (1989), Yin (1994), Voss et al. (2002) and *Piekkari et al. (2010)* as references, the underlying case study process comprises eight main phases:

(1) Getting Started: Define research questions/goals
(2) Selecting cases
(3) Crafting instruments and protocols: multiple data collection methods (triangulation)
(4) Entering the field
(5) Collecting and analysing data
(6) Cross-check with theoretically developed framework/comparison with conflicting and similar literature
(7) Shaping hypothesis and defining rooms for further research
(8) Reaching closure

During the process, a case study protocol (see chapter 4.2) was used to ensure consistency between the different cases *(Ellram, 1996).* Taken up the best-practice suggestion of *Piekkari et al. (2010),* theory was developed prior to data collection (chapters 2 and 3) to have a clear purpose and goal concerning key features of the case design. As mentioned above, the research goal was to *validate the conceptually designed Purchasing and Supply Management Maturity Framework from a content-related and methodical perspective*, to derive *rooms for refinement* as well as analysing whether there are *concrete patterns that enable a classification of maturity improvement initiatives or change behaviours* in PSM.

As *Glaser/Strauss (1967)* as well as *McCutcheon/Meredith (1993)* and *Stuart et al. (2002)* recommend, it may be helpful to select several different settings through theoretical sampling (see chapter 4.2). Accordingly, a multiple case study approach was chosen to clarify whether the designed model and its content-related core elements are comprehensible and to gain inputs for necessary refinements from diverse branches to finally derive an adapted version that is applicable across numerous settings (e.g. branches, company sizes). Furthermore, it was decided to accompany one case firm over a longer period of time (10 months) to have the chance to fully apply one cycle of the PSM^2F including its three modules and content-related core elements (see chapter 5.3). Overall target of this research step was to (1) *make the application logic and interaction of the three modules of the framework (chapters 3.1-3.3) clearer* and (2) to give an example of *applying the factor model of supportive elements on one concrete business case. Reyes/Giachetti (2010)* highlighted that such a long-term analysis going beyond the "pure" maturity assessment at a single point of time is still an unexplored area of research. Hence, this paragraph might contribute to a better understanding about how the PSM dimension and the change management dimension might be interconnected to an effective and efficient transformation process. In this longitudinal study, a methodological shift and overlap between the case study method and the action research approach *(e.g. Mathiassen et al., 2012; Müller, 2005; Prybutok et al., 2005;*

Davison et al., 2004) become obvious. Whereas the case study approach primarily focus on observation, interviews and discussions as well as analysis of documents, the action research "allows" more direct collaboration of the researcher with the firms to jointly derive improvements for a specific problem of the firm and for the theoretically deduced instruments and frameworks following the researcher's agenda *(e.g. Baker/Jayaraman, 2012; Coughlan/Coghlan, 2002; Reason, 1999).*[78] This direct collaboration during the longitudinal case study can be seen as a *"live case study" (Coughlan/Coglan, 2002, p.226)* and was reflected by supporting the CPO/purchasing manager in introducing the PSM²F to the firm and support the PSM team during facilitated workshops in establishing a concrete company-specific transformation strategy and action plan (see chapter 5.2). Taking the already mentioned critique into consideration, that the transformation aspect is not covered sufficiently from the available maturity models in PSM (chapter 2.2.2), and due to the fact, that to the knowledge of the researcher there is no scientific publication about concrete and planned measures to enhance the *driving forces for a change* and to foster a transformation of the PSM function with special focus on cultural, behavioural and individual aspects,[79] makes this research step relevant for both scientists and practitioners.

RESEARCH NOTE

It is important to differentiate the action research approach from *consulting (see also Davison et al. 2004; Avison, 1993).* In this regard it is highly relevant not to follow the firm's plan, but to involve *"the client system in the researcher's agenda, even though the client might ultimately be the beneficiary" (Schein, 1995, p.14).* In this regard *Davison et al. (2004)* recommend agreeing on a "*researcher-client agreement (RCA)"* in advance. This agreement *"articulates the relationship between the key stakeholders in the study and is critical to establishing the internal validity of the research findings" (Baker/Jayaraman, 2012, p.1670).* From a textual perpective, this RCA was verbally agreed between the CPO of the respective firm and the field researcher in advance. It was made clear that the overall goal was to validate the theoretical derived constructs by

[78] For another example of combining case study and action research see *Momme/Hvolby (2002), Rozemeijer et al. (2003)* and *Wagner/Kaufmann (2004). Mathiassen et al. (2012)* give an overview of style composition in action research publications based upon a meta-analysis for the period 1982-2000 (p. A5). In information systems research, where maturity models are also very common (see chapter 2.2), the very closely related *(Järvinen, 2007; Cole et al., 2005)* design science approach is intensively used for building and testing maturity models *(e.g. Van Looy, 2014; Wendler, 2012; Hevner, 2007).*

[79] As already mentioned in chapter 2.2.5, the Association Materials Management, Purchasing and Logistics (BME) published an anthology in 2008 with case studies about specific change initiatives in PSM (Best Practice in Einkauf und Logistik; EN: Best Practice Purchasing and Logistics), but without offering a coherent, well-structured and conclusive summary of cultural and behavioural factors which foster change management initiatives in PSM.

involving the firm's system and expertise in the researcher's agenda to gain new insights into the theory-building and validation process *(Ross et al., 2006; Coughlan/Coghlan, 2002; Schein, 1995)*. Furthermore, it was agreed that within the interaction, the main role of the researcher is to act as a moderator and facilitator *(Coughlan/Coghlan, 2002; Koplin 2005)* who makes the planned actions happen, but *"without losing the identity as a scientist" (Koplin, 2005, p.383)* represented by reflection of the observation or stepping out of the system to obtain a broader view *(Schoenherr et al., 2008; Ottosson, 2003)* to finally come up with general findings *(Müller, 2005)*.

In this thesis, the entire continuum of possible interactions of a field-research (Figure 30) was applied to obtain as much empirical evidence and practical reference as possible for refining the theoretically derived elements as well as the overall construct of the PSM^{2}F.

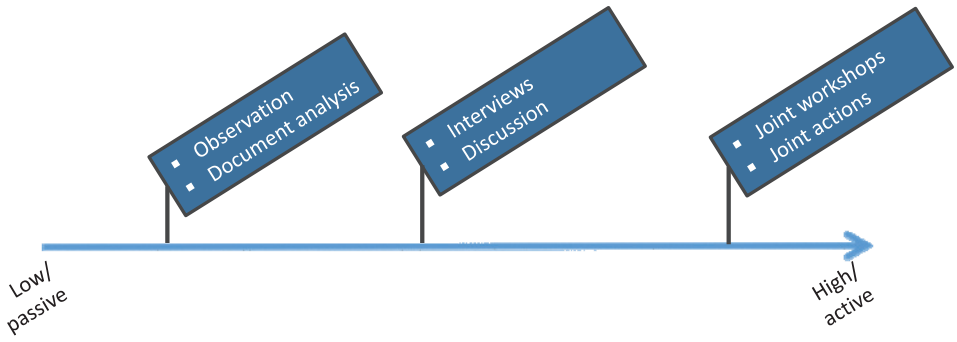


Figure 30: Interaction continuum in the applied case-based research

Based upon the suggestion of *Eisenhardt (1989)* to carry out four to ten cases to generate theory and being able to handle the complexity and volume of the data *(see also Ellram, 1996),* in this multiple case study approach ten companies with at least three people of each company from diverse hierarchy levels in PSM were interviewed and observed.[80] Although this set of cases should not be confused with a sample that allows a *"quasi deduction" (Dubois/Araujo 2007, p.177),* possible patterns based upon within-case yet especially based upon cross-case analysis might allow some generalisations and descriptive statements *(Blome/Schoenherr 2011; Voss et al. 2002; Shaw 1999; Ellram 1996; Eisenhardt 1989).*

Taking up the idea of *Ellram (1996, p.103)* to install an advisory board to identify and enter into contact with companies of potential interest, the purchasing council of the

[80] Including too many cases lead to the risk of losing depth in the data analysis *(Miles/Hubermann, 1994).*

Association for Network Logistics (VNL)[81] served as this kind of contact platform. PSM departments of industrial companies were defined as population. 36 companies were personally contacted by telephone or email to explain the research objectives as well as the intended role of the company and its approximate amount of time each company migth have to spend within the case study process. Following a *purposeful sampling strategy (Poulis et al., 2013)* "*guided more by the firm's potential to help contribute to the research objectives rather than by the concern for randomness" (Stuart et al., 2002, p.426),* the following basic preconditions for narrowing down the *population of industrial purchasing departments* were defined in advance:

(1) *Relevant purchasing volume (>40% of total turnover) or purchasing criticality (e.g. legal requirements, complex components/not only commodities)*
(2) *Headquarters in Austria (primarily due to logistical reasons for the on-site-visits) but operating on a global B2B-level*
(3) *An organisational structure that covers both operational and strategic purchasing tasks (not only buyers)*
(4) *Intrinsic motivation to work on such a topic due to an ongoing or planned maturity improvement programme or experience with transformation in PSM (e.g. Purchasing 2020, Procurement Excellence, Fit4Purchasing)*[82]

Despite the purposeful sampling strategy, particular emphasis was placed on selecting a final sample that was sufficiently heterogeneous *(maximum variation sampling; e.g. Jia et al., 2014b; Fletcher/Plakoyiannaki, 2011; Patton, 2002)* to provide a wide cross-sectional range of perspectives *(Poulis et al., 2013)* about *what is high maturity*, *what affects an effective improvement initiative in PSM* and *gain feedback on the overall clarity and applicability of the PSM²F approach* from diverse views. The qualification process of *"excluding non-fitting firms" (Poulis et al. 2013, p.307)* resulted in a list of 18 companies that fit the criteria and also expressed a willingness to participate in the research project. Given the high number of companies from the automotive and electronics industry, some of them were eliminated to reduce the risk of an industry bias. Finally, the sample comprised ten companies (Table 63 and Table 64) that took part in the case study. Company C3 was chosen for the longitudinal case due to an intended strategic reorientation and overall reengineering of the PSM function.

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81 The VNL is a logistics and supply chain platform for *manufacturing companies*, *trading firms*, *education and research facilities* as well as *service providers* (www.vnl.at).

82 This a priori decision appears to be relevant in terms of having motivated, open and honest participants, that realise a value for themselves in taking part in the case study.

Company	Headcounts Total/Trend	Headcounts in PSM/Trend	TO [EUR]	PVO in % TO	TOP Categories	PSM Structure
Aerospace (C1)	70 (↗)	3 (➔)	12 Mio.	50%	Turned and milled parts, electrical components, castings	Central
Electrical Engineering (C2)	140 (↗)	7 (↗)	22 Mio.	50%	Electrical components, contract manufacturing, mechanical parts	Central
Mechatronics (C3)	180 (↗)	8 (↗)	50 Mio.	45%	Electrical components, plastics, mechanical parts	Hybrid
Automotive (C4)	240 (↗)	6 (↗)	25 Mio.	50%	Metals parts, plastics, electrical parts, services, tooling	Central
Engineering/ Metallurgy (C5)	300 (➔)	8 (↗)	70 Mio.	40%	Hydraulic parts, transformers, contract manufacturing	Hybrid
Chemicals (C6)	320 (➔)	9 (➔)	200 Mio.	45%	Stabilisers, lead, waxes	Hybrid
Pulp & Paper (C7)	380 (➔)	5 (↗)	190 Mio.	50%	Chemicals, CAPEX, energy	Central
Automotive/ Metals (C8)	400 (↗)	5 (↗)	55 Mio.	50%	Raw materials, tooling, lubricants	Central
Energy (C9)	450 (➔)	11 (➔)	540 Mio.	26%	Transformers, switchgears, construction work	Hybrid
Automotive (C10)	510 (↘)	4 (➔)	130 Mio.	60%	Raw materials, assembly parts, CAPEX, working materials	Hybrid

Table 63: Case study companies, Structure (1/2)

In order to reach acceptance and understanding for the PSM^{2}F especially in small and medium sized companies as economic backbone of the European Union representing 99% of all businesses,[83] the selected cases had on average fewer than 300 employees.[84] All firms have their headquarters in Austria but are operating globally on a B2B level. The components are sourced by the selected companies from diverse sourcing markets and range from *turned and milled parts, lubricants, chemicals, tooling, ladle furnaces, remelting facilities, energy, diverse raw material* to *services*. The purchasing volume (PVO) of the case companies varies between EUR 5 Mio and EUR 250 Mio per year. Overall, the companies represent an overall purchasing volume of approximately EUR 750 Mio per year and a turnover (TO) of approximately 1.3 Bio per year. Five companies have a hybrid organisational structure with a split of responsibilities between a central and several decentralised units, the other five are organised centrally.

Company	No. of direct suppliers	Distribution of suppliers (in % of PVO)	Power structure with suppliers	Knowledge about any PMM
Aerospace (C1)	120	100% EU	Supplier	No
Electrical Engineering (C2)	150	90% EU, 6% Asia, 4% RoW	Supplier	EFQM
Mechatronics (C3)	170	50% EU, 40% Asia, 10% RoW	Supplier	Schiele, A.T. Kearney
Automotive (C4)	500	96% EU, 4% RoW	Balanced	No
Engineering/ Metallurgy (C5)	1.200	90% EU, 6% Asia, 4% RoW	Buyer	No
Chemicals (C6)	200	90% EU, 8% Asia, 2% RoW	Balanced	No
Pulp & Paper (C7)	1.200	98,5% EU, 1,5% RoW	Buyer	Caniato et al./ eProcurement Maturity
Automotive/ Metals (C8)	1.300	85% EU, 15% RoW	Supplier	Wildeman
Energy (C9)	1.100	99% EU, 1% RoW	Balanced	No
Automotive (C10)	900	94% EU, 6% Asia	Supplier	No

Table 64: Case study companies, Structure (2/2)

83 http://ec.europa.eu/growth/smes/

84 Following the definition of "SME" provided by the European Union, this category is made up of enterprises which employ fewer than 250 persons (EC, 2003). In Germany the upper limit is 499 employees (IfM, 2015).

The number of suppliers ranges from 120 to 1.300. Five companies described having to face a supplier-driven market, two a buyer-driven market and three a balanced power situation on the supply market (Table 64). This again underlines the maximum variation of the defined sample.

RESEARCH NOTE

Due to the circumstance that only four companies already had experience with maturity models in PSM, it was also possible to validate whether the introduced framework is also clear and comprehensible when there is no explicit experience in this context.

4.2 Case study protocol, data collection and data analysis

For planning the on-site visits as well as the data collection, a case study protocol was used as a guideline, and was prepared right after the definition of the basic case study strategy (cross-sectional multiple case studies, theoretical sampling, one longitudinal study; see chapter 1.2 and chapter 4.1). It mainly contains the case study procedure (preparation phase, on-site-visits, refinement-loops; see Figure 31) and the interviewing guide (see chapter 5 and appendix) to ensure a replication of the procedure in each company with the goal to provide new insights for answering the research questions initially mentioned, as well as gaining new ideas for refining the preliminary version of the PSM^{2}F (chapter 3).[85]

Feedback on the content and structure of the interview guide as well as the overall case study procedure was given by academic peers from the University of Udine and from the University of Applied Sciences Joanneum in Kapfenberg. Furthermore, two pilot visits at company C1 and C4 took place, to test whether the planned procedure (e.g. scope, duration, clarity of interviewing guide) for the on-site visits was clear and consistent *(Poulis et al., 2013; George/Bennett, 2005)*. The advisory board also provided some recommendations for the duration of the on-site visits as well as the amount of time that each participant can probably spend on such a research project next to their daily work (for each company and participant, two working days were estimated as appropriate time frame). One further piece of advice was to plan the case study in a way whereby each participant can work on the intended questions or topics when there is time and not focus too much on the on-site sessions. These sessions were thus primarily used for observation, receiving relevant documents, explaining and presenting the goals, the questions and tasks and defining a date when the participants had to hand in their comments, feedback and answers. At a later stage of the case research, the

[85] For a very profound example of a case study protocol see *Ellram (1996)*.

following on-site visits were used to present the consolidated results and to step into a deepening discussion with the firms. Between the on-site visits all participants had the possibility of asking questions or making comments over the telephone or by email. Overall, the case studies were planned from 06/2014 to 06/2015 (considering also the longitudinal case, the overall procedure lasted until the 08/2015) and included two on-site visits as well as self-application phases for each firm (Figure 31).

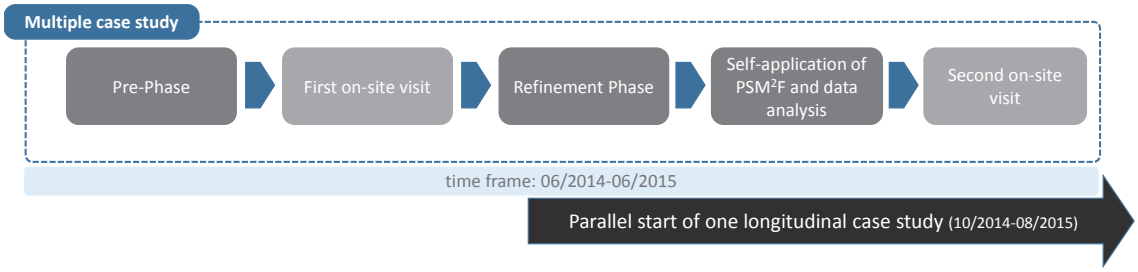

Figure 31: Time frame and phases of the multiple case studies

Especially in the pre-phase and the first on-site visit it was necessary to build trust of the firm's participants that is according to *Stuart "vital for success" (2002, p.427; see also van de Ven/Johnson, 2006; Rynes et al., 1999)* and ensures an active and serious participation of the companies. In order to build trust, it might be crucial that the participants accept the researcher as a (co-)expert in the respective subject area. Therefore, the interviewer must convince with a quite similar level of competence as the key informants or can credibly convey the specific expertise *(Bogner/Menz, 2005)*. Whereas the participants from the companies certainly have more practical knowledge about the company, the respective industry and the contingent factors, the researcher needs to highlight the well-founded theoretical knowledge about the respective topic *(Trinczek, 2005; Liebold/Trinczek, 2002)*. In this specific case, it was very helpful (as the field researcher) to refer to a ten years' experience in the PSM field from diverse perspectives (academia, consulting, industry) and perform an initial presentation containing a profound insight into the research activities thus far (e.g. overview of analysed maturity models, frameworks and studies; overview of the preliminary version of the PSM^{2}F), what promoted the credibility and acceptance of the competence level.

For each firm, the CPO/purchasing manager[86] was defined as central "*informant" (Voss et al., 2002, p.206)*. After explaining the objective and purpose of the case study as well as the planned overall time schedule and estimated time amount each participant will probably have to spend during the case, the participants were nominated. Following the suggestion form *Eisenhardt/Graebner (2007)* to use *"numerous and highly*

[86] In this thesis the term *chief procurement officer (CPO)* will be used for the person in charge of the whole PSM activities of the firm, *purchasing manager* will be used when the participant is responsible for as specific branch/business unit of the company.

knowledgeable informants who view the focal phenomena from diverse perspectives" (p.28) and due to the proposed *triangulation rule of participation* when applying the PSM²F (see chapter 3.1), each company had to nominate (at least) two purchasing employees next to the CPO from different hierarchical levels (e.g. strategic purchasing, lead buyer, buyer). Overall goal was to validate whether the different functions in PSM (e.g. CPO/purchasing management, strategic purchasing, buyer) have a different view *(hierarchy pattern)* on those KEPs (e.g. processes, structures, policies, capabilities) that need to be improved to finally reach the intended SDTMS (Figure 23). Involving multiple levels of the PSM function might also help to detect further *KEPs for a mature purchasing function,* further relevant *maturity reports* or *further factors which foster an effective and efficient transformation initiative* that might be missing in the conceptually designed preliminary version of the PSM²F *(enhancement of content validity; de Bruin et al., 2005).*

Another precondition was to involve participants, who were (to date) at least three years or more in the company (Table 65) and are (likely) willing to participate in an open and critical way *(focus group)*. Besides, this enhances validity and reliability of the collected data *(Yin, 2003; Voss et al. 2002; chapter 4.3).*

Company	Role of participants
Aerospace (C1)	CPO, Strategic Purchasing, Buyer (3)
Electrical Engineering (C2)	CPO, Strategic Purchasing, Buyer (3)
Mechatronics (C3)	CPO, Strategic Purchasing, Lead Buyer (3)
Automotive (C4)	Purchasing Manager, Buyer, Lead Buyer (3)
Engineering/ Metallurgy (C5)	CPO, Strategic Purchasing, Buyer (3)
Chemicals (C6)	CPO, 3 x Strategic Purchasing, Buyer (5)
Pulp & Paper (C7)	CPO, Strategic Purchasing, 2 x Lead Buyer (4)
Automotive/Metals (C8)	CPO, Lead Buyer, Buyer (3)
Energy (C9)	CPO, 3 x Lead Buyer (4)
Automotive (C10)	Purchasing Manager, Strategic Purchasing, Buyer (3)
TOTAL Participants	**34**

Table 65: Key informants for case study[87]

Overall, 34 experts from 10 companies took part in the case studies.[88] In literature, the reported number of experts covers a wide range depending on the purpose of the research. For example, *Holsapple/Joshi (2000)* use 31, *Akkermans et al. (2003)* use 23, *Okoli/Pawlowski (2004)* use 18, and *Hayes (2007)* uses 20. According to *Turoff (1970),* the most recommended values are between 10 and 50. This active involvement of so

[87] Not all case firms could nominate a strategic purchaser *and* a buyer next to the CPO due to their internal organisational structure and functional job profiles (i.p. C4, C8, C9). However, also their nominated participants covered both strategic and operational tasks in PSM (in one functional role) what makes them to suitable informants for the research goals.

[88] Company (C6), (C7) and (C9) actively asked to nominate more than the minimum three participants.

many firms and practitioners as experts during the case study process[89] was particularly chosen, following the opinion of *van de Ven/Johnson* that *"scholars can significantly increase the likelihood of advancing knowledge for theory and practice when they interact with practitioners" (2006, p. 810; see also Jahns, 2005).*

4.3 Validity and reliability

Numerous measures were undertaken in each stage of the case study process to address the concerns regarding validity and reliability *(e.g. Blome/Schoenherr 2011; Piekkari et al. 2010; Yin 2003; Stuart et al. 2002; Ellram 1996 and Eisenhardt 1989).* Although the exploratory research strategy only demands for three of them *(Ellram, 1996),* several strategies have been adopted to stand the tests of *construct validity, external validity, reliability* and *internal validity*:

Test	Strategies & Actions
Construct validity	▪ Multiple and diverse sources of evidence were used (primary, secondary sources).[90] ▪ Combination of qualitative and quantitative data: interviews, questionnaire, observation and archival records ▪ Having an advisory board as well as a research team to review the case study protocol and the chain of evidence. ▪ Obtaining the approval of informants about the accuracy of the facts in the case study report by conducting status presentations during the on-site visits to validate the findings.
External validity	▪ Replicating case studies and verifying commonalities and differences across cases. ▪ The selection of cases based upon theoretical-purposeful sampling. ▪ Validating if the design characteristics as well as the covered areas of maturity and change management are sound and fit to the needs of diverse settings.
Reliability	▪ Apply a case study protocol to guide field research and analysis. ▪ Maintain a case study database containing field notes, questionnaires and all archival data. ▪ Carrying out two qualitative pilot studies to get feedback if there is a need to refine the procedure (e.g. duration, clarity of purpose).
Internal validity	▪ Case by case pattern matching against the opinion about mature PSM according analysed theoretical as well as management-oriented maturity models in PSM. ▪ Comparison with conflicting and similar literature. ▪ Logical Analysis

Table 66: Reliability and validity

Further methodological steps and extracts from the case study protocol, which finally led to the conclusions and findings for refining and extending the Purchasing and Supply Management Maturity Framework will be presented in chapter 5.

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89 *Van de Ven/Johnson (2006)* define this collaborative form of inquiry between academics and practitioners aiming at exchanging different perspectives on a subject in order to coproduce knowledge as *"engaged scholarship"* (p.803). For a critical discourse about this approach see *McKelvey (2006).*

90 This important technique of data triangulation ensures to get the most accurate picture of each specific case *(e.g. Poulis et al., 2013; Blome/Schoenherr, 2011; Piekkari et al., 2010; Stuart, 2002; Voss et al., 2002; Meredith, 1998; Ellram, 1996).*

5 Refinement of the PSM²F: Findings and results of the case studies

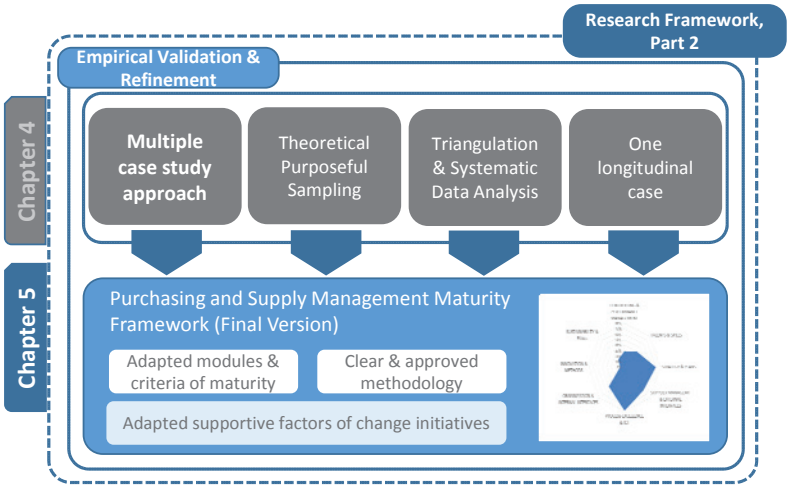

Figure 32: Research Framework, Empirical Validation & Refinement (II)

In this chapter, the main results and insights of the case study research will be presented. The results will be structured according the central *findings for refining and extending the proposed content related and architectural core elements (i.p. key evaluation points and scheme for maturity assessment, triangulation rule of participation, SDTMS, maturity reporting, factor model of supportive elements for maturity transformation initiatives in PSM) of the PSM²F (chapter 5.1),* findings concerning the *applicability and the interaction logic of the modules of the PSM²F (chapter 5.2)* and findings *concerning patterns and possible classifications of maturity transformation initiatives and change behaviours (chapter 5.3).*

5.1 Findings for refining and extending the content related and architectural elements of the PSM²F

5.1.1 Validation of the content-related basis of the maturiy assessment

To obtain feedback on the theoretically-derived KEPs (see chapter 2.2.3) as content-related basis of the (self-)assessment module of the maturity assessment of the PSM²F, the participants were asked to answer the following questions by themselves (and deliberately not in group-work) to guarantee the widest variety of opinions:

a) *Are the areas of maturity suitable and exhaustive for identifying the (overall) purchasing and supply management maturity of a specific company?*
b) *Is there any specific KEP or maturity dimension missing for an overall evaluation of the PSM maturity?*
c) *Is any single criterion (KEP) unclear for you?*

Following the recommendation of the advisory board to give the participants the opportunity to work on these questions when there is time and a high motivation level (what is hypothesised leading to a more intense analysis and better quality of the response), the questions were provided in the form of a questionnaire and the assessment module was also forwarded in the form of a spreadsheet application, whereby the participants had the chance to put in their answers and remarks directly, which made the consolidation of the results easier. Furthermore, all participants were invited to directly and permanently contact the researcher by email or over telephone to ask questions or hand in their feedback verbally. This individual feedback loop had also the advantage to *"guard against placing too much emphasis in the few dramatic instances (or forceful personalities)"* in a company *(Stuart 2002, p.428),* and to gain the most honest feedback from the participants. On average, this feedback loop took four weeks. The content-related and methodological feedback was subsequently used to refine the PSM²F (Figure 33) and conducting within- as well as cross-case analysis to search for patterns of similarities and differences among the ten case study firms to derive descriptive statements.

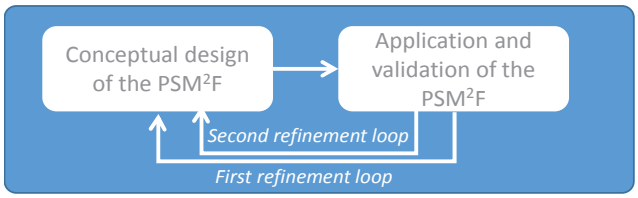

Figure 33: Feedback & refinement loops

Sorted by companies, the comments of the firms concerning unclear aspects of the assessment module as well as ideas for further maturity dimensions or KEPs are summarised in the following table. The main intention of this step was to obtain as many practical inputs as possible *"from the perspective of those involved" (van de Ven/Johnson, 2006, p.816)* and using this input for matching it with the scientific and conceptual findings presented in chapters 2 and 3 to finally derive a robust final scope of key evaluation points for a self-explanatory maturity assessment.

Company	Unclear aspects within the assessment module of the preliminary version of the PSM²F	Statements concerning ideas for further (or stronger emphasis on) maturity dimensions or KEPs
Aerospace (C1)	-	*"However the aspect of 'good communication' is covered in one KEP about soft skills, I would suggest adding one KEP that is dealing with the communication quality between the CPO and the team."* *"It might make sense to have the chance as a company to choose from a proposed set of skills/capabilities and have the chance to add some skills that are relevant for the industry."*
Electrical Engineering (C2)	"due-diligence phase of an M&A"	*"It is an interesting aspect to know what the sourcing strategies of the competitors are."* *"A stronger emphasis on supplier assessment and development would be important."*

Company	Unclear aspects within the assessment module of the preliminary version of the PSM²F	Statements concerning ideas for further (or stronger emphasis on) maturity dimensions or KEPs
Mechatronics (C3)	"pooling demand" "ingredient branding" "the aspect of clear interfaces and early involvement should be divided into seperate KEPs"	*"It is important to have a clear procedure for the ramp-up and ramp-down-phase of a product-life-cycle to ensure the security of supply as well as a proper inventory level."* *"For me it is very important to have an open and good communication culture within the team. This is not covered by the presented KEPs."* *"Knowing also the goals of the other departments makes it easier to understand their actions and achieve a better alignment."* *"Thinking about the development of ECO-design products together with your supplier can also be an interesting KEP."*
Automotive (C4)	"risk monitoring" "pooling demand" "master data management" "1st tier supplier"	*"The aspect of managing supplier audits including the action monitoring after an audit is very important and should be added in terms of supplier development."* *"Next to having defined interfaces, I think it is also relevant to define a culture of early involvement of PSM as separate KEP."* *"A stronger emphasis on supplier assessment might be important."* *"Next to the knowledge about the proper supplier strategy (e.g. VMI) it is also an aspect of maturity to be able to 'sell' this strategy to the supplier."*
Engineering/ Metallurgy (C5)	"Integrate technology roadmap of the supplier into own PSM strategy". "pooling of demand"	*"For the initial maturity assessment it might be enough to generally ask for the interfaces to the other departments. For a detailed assessment and for deriving an improvement initiative it can be helpful to split this KEP by asking for the 'interface quality' to each relevant department."* *"Risk management and cost management can eventually be an own maturity dimensions. The detailed aspects are covered, although it is not so clear at first sight."*
Chemicals (C6)	"due-diligence phase of an M&A" "pooling of demand"	*"Having a code-of-conduct with relevant suppliers is a relevant sub-criterion for the category 'Sustainability & Ethics'."* *"The documentation and structured filing of the most relevant correspondence with suppliers is a crucial aspect of maturity in PSM from our perspective."* *"Analysing the activities and certificates of the supplier in the area of sustainability and CSR can be a sign of maturity in this dimension."*
Pulp & Paper (C7)	-	*"Having a purchasing portal on your company's website might increase the efficiency of supplier searching."* *"Officially reporting about the activities and results concerning sustainability can be another relevant KEP."*
Automotive/ Metals (C8)	-	*"Clarity about the release status of an article is very important for us in PSM. This maybe should be added as one further KEP."* *"A stronger emphasis on supplier assessment and development is important."*
Energy (C9)	"ingredient branding" "trend scouting"	*"Another relevant KEP should cover the aspect of deputies in PSM. It is an important aspect especially in case long-term employees leave."* *"Having an internal price database available enables you to quickly make initial calculations for new projects."*
Automotive (C10)	"due-diligence phase of an M&A"	*"Having neutral specifications in order to work on a broader choice of suppliers is an innovative approach PSM should work on together with R&D."* *"For us the efficient and exact execution of operational tasks (ordering, order confirmation) is as important as strategic issues. A KEP expressing the relevance of both dimensions would be desirable."* *"Having concept competitions with suppliers in place is a mature approach for getting innovative ideas for a product."*

Table 67: Analysis of clarity of key evaluation points and ideas for further KEPs

Basically, all eight proposed maturity dimensions were considered appropriate by the ten case firms. Company (C5) made the remark that without knowing the detailed KEPs of the eight maturity dimensions, it might be possible that a participant may think that

risk management and *cost management* are not covered by the maturity assessment. However, and due to the interdisciplinary character of these two elements it was decided to keep them covered by the respective main categories and not to create a new and separate maturity dimension.[91]

Based upon the inputs from the firms, the following 22 KEPs were added to the best-practice database of determining factors of a mature PSM function:

No.	Category	Added KEP
1	Strategy & Plans	*Key issues of the competitors' sourcing strategies are known.*
2	Strategy & Plans	*PSM knows the main goals of the other departments to create a better process and strategy alignment.*
3	Organisation & Internal Interfaces	*There is a high transparency about the release status of an article.*
4	Organisation & Internal Interfaces	*Deputies are installed for the critical positions and trained in a proper way.*
5	Organisation & Internal Interfaces	*Based upon functional requirements and specifications formulated in a neutral way from the user, it is easy for PSM to find a high number of potential suppliers.*
6	Supplier Management & External Interfaces	*For a rolling supplier assessment a clear procedure (e.g. frequency, process owner) and templates are in place.*
7	Supplier Management & External Interfaces	*For the most important suppliers regular audits are held and the defined and agreed measures for improvement are monitored in a structured way.*
8	Supplier Management & External Interfaces	*The results of the supplier assessment will be internally discussed, analysed and forwarded to the supplier as basis for improvement projects.*
9	Supplier Management & External Interfaces	*Supplier development projects are defined, documented in written form and contain measurable goals and KPIs.*
10	Supplier Management & External Interfaces	*PSM is able to sell the preferred strategy to the supplier and convince the supplier to cooperate in common improvement projects.*
11	Talents & Skills	*There is an excellent communication culture and style between the CPO/purchasing manager and the PSM team.*
12	Process Excellence & ICT	*A clear process for ramp-up projects is established.*
13	Process Excellence & ICT	*A clear process for ramp-down projects (incl. reducing level of stock of BOM items) as well as product change management is established.*
14	Process Excellence & ICT	*The critical communication (e.g. orders, confirmations, side-letter, contracts) with the supplier is archived and accessible in a suitable form (e.g. ERP, DMS).*
15	Process Excellence & ICT	*A specific PSM area on the company's website enables the supplier to actively enter in contact with the company (supplier portal) and also provides relevant business documents (e.g. GTP, policies) for supplier management.*
16	Process Excellence & ICT	*The operational excellence in PSM has the same status as strategic work.*
17	Innovation & Methods	*Concept competitions are used to obtain innovative ideas from the suppliers.*
18	Innovation & Methods	*PSM is using a price database for the relevant components to provide fast price calculations for new products.*
19	Sustainability & Ethics	*The knowledge of the suppliers is used to jointly work on ECO-design products.*
20	Sustainability & Ethics	*A code of conduct is part of the supplier contract.*
21	Sustainability & Ethics	*Activities and projects dealing with sustainability and ethics are part of the regular PSM reporting.*
22	Sustainability & Ethics	*PSM analyses the activities of the suppliers in the field of sustainability and ethics (ECO-Audit, ISO14001) during the evaluation and in the assessment process.*

Table 68: Additional key evaluation points based upon multiple case studies

Furthermore, six existing KEPs were finally reformulated due to comments of the participants concerning potential room for misinterpretation or misunderstanding.

[91] For example, *working on a dual sourcing strategy* is also part of risk management and is covered in the dimension *"Supplier Management & External Interfaces",* conducting *risk and market monitoring* is covered as KEP in *"Strategy & Plans". Cost management* is exemplary covered in *"Innovation & Methods"* but can also be interlinked with *being professional in negotiations ("Talents & Skills").*

No.	**Original KEP** (see Table 22ff)	**Reformulated or adapted KEPs**
11	*PSM is involved in the due diligence phase of M&A to ascertain e.g. savings potential through pooling.*	*If the company is planning to buy and merge with another company, the opinion of PSM is actively requested (e.g. savings potential through joint purchasing activities, access to new supply markets).*
13	*There are clear interfaces and communication structures in the company (e.g. R&D for new product ideas, standardisation issues/ production planning for forecasting issues/ logistics for delivery planning/ sales/business units for budgeting issues). It is clearly defined when PSM has to be involved (in a cross-functional team).*	*13a. There is a will and culture of early involvement of PSM.* *13b. There are clear interfaces and communication structures to the relevant teams/departments in the company (>> individual definition of departments/teams and individual weighting and assessment.)*
29	*The strategy and technology roadmap of the supplier is considered when working on the own PSM strategy and product development.*	*The strategy as well as technological innovations and plans from the supplier are known and transferred into own PSM strategy and product development.*
36	*Frame Orders and call-offs with main suppliers are properly used to increase efficiency in the purchasing process and use the price advantages of pooling.*	*Frame Orders and call-offs with main suppliers are properly used to increase efficiency in the purchasing process and use the price advantages of joint purchasing.*
40	*Next to the 1st tier supplier also the relevant sub-tiers for strategic products are known.*	*Next to the direct supplier also the upstream suppliers are known for strategic products.*
55	*The hard skill portfolio […] of the PSM team is managed in an appropriate way.*	*The skill level in the relevant domains meets the requirements (>> individual selection of recommended skills/capabilities and adding specific skill sets if necessary).*
56	*The soft skill portfolio […] of the PSM team is managed in an appropriate way.*	
72	*PSM takes a driving role in creating new business opportunities and bringing innovations into the firm due to the expertise about global supplier markets (e.g. ingredient branding, trend scouting).*	*PSM takes a driving role in creating new business opportunities and bringing innovations into the firm due to the expertise about global supplier markets (e.g. using the well-known brand of the supplier for upgrading the own product).*

Table 69: Reformulated key evaluation points based upon multiple case studies

RESEARCH RESULT

The applied *"bootstrapping approach" (Prockl, 2005, p.401)* combining theoretical findings (top-down) and practical experience from the field (bottom-up) finally leads to the completion of the best-practice database of determining key evaluation points of maturity in Purchasing and Supply Management as one content-related core element of the PSM²F. Taking the theoretically-derived KEPs presented in chapter 2 as a basis, 22 KEPs were added by analysing the data from the case study. Another 5 KEPs were reformulated, one KEP was split into two separate aspects and two KEPs were combined into one new KEP. Finally, the best-practice database of elements of high PSM maturity contains 127 KEPs in eight dimensions (see appendices).

Maturity Dimension	**Final number of KEP**
Strategy & Plans	20
Organisation & Internal Interfaces	19
Supplier Management & External Interfaces	28
Controlling & Performance Management	10
Talents & Skills	13
Process Excellence & ICT	16
Innovation & Methods	12
Sustainability & Ethics	9
Total number of KEPs	**127**

Table 70: Final number of key evaluation points

Given the feedback of the firms and taking into consideration that the aspect of "PSM skills" is not covered in a homogeneous and structured way by the current PMM, it was decided to include the results and taxonomy of available studies concerning purchasing and supply management skills and competences as additional input for refining the assessment module of PSM^{2}F. The following studies were considered:

- *Giunipero/Pearcy (2000): World-class purchasing skills: an empirical investigation, Journal of Supply Chain Management, Vol.36, No.3, pp.4-13.*
- *Carr/Smeltzer (2000): An empirical study of the relationships among purchasing skills and strategic purchasing, financial performance, and supplier responsiveness, Journal of Supply Chain Management, Vol.36, No.2, pp.40-54.*
- *Giunipero et al. (2005): Purchasing/supply chain management flexibility: moving to an entrepreneurial skill set, Industrial Marketing Management, Vol.34, No.6, pp.602-613.*
- *Giunipero et al. (2006)*: *Supply management's evolution: key skill sets for the supply manager of the future, International Journal of Operations & Production Management, Vol.26, No.7, pp.822-844.*
- *Tassabehji/Moorhouse (2008)*: *The changing role of procurement: Developing professional effectiveness, Journal of Purchasing and Supply Management, Vol.14, No.1, pp.55-68.*

The summarised competence fields can subsequently be used as an extension and deepening of the generally formulated KEP concerning *"appropriate hard and soft skill portfolio" (KEP 55, 56, chapter 2.2.3.5)*. Based upon this reference table (Table 71) or out of the following condensed list (Table 72), the company can finally choose these specific skill sets, which might be relevant due to their current or industry-specific requirements.

Furthermore, the assessment module is designed to add further company-specific required competencies that are not yet covered.[92] Given that some mentioned (especially *technical* and *advanced (hard) procurement*) skills are already covered in a KEP of another dimension apart from "Talents & Skills" (e.g. risk management in "Strategy & Plans", cost/spend as well as project management in "Innovation & Methods", eProcurement in "Process Excellence & ICT"), it is recommended to go through the other KEPs first, finally checking whether any competence field ultimately needs to be added.

[92] This dynamic extension option of the assessment module was deliberately chosen in order to keep the framework flexible in terms of adding new determining aspects of maturity over time.

Giunipero/Pearcy (2000)	Carr/Smeltzer (2000)	Giunipero et al. (2005)	Giunipero et al. (2006)	Tassabehji/Moorhouse (2008)
Ideal skill set for a world-class PSM professional based upon literature research and 136 interviewed PSM executives	*Survey to determine whether PSM skills are related to strategic purchasing, a firm's financial performance and supplier responsiveness*	*Relevant skills to attain PSM flexibility based upon an exploratory study*	*Key skills and knowledge for PSM professionals based upon a qualitative study with 54 executives of large US companies*	*Professional purchasing skills based upon literature from 1993-2006 and interviews with eighteen senior procurement professionals*
▪ Interpersonal communication ▪ Ability to make decisions ▪ Ability to work in teams ▪ Analytical thinking ▪ Negotiation ▪ Managing change ▪ Being customer focused ▪ Influencing and persuasion ▪ Strategic thinking ▪ Understanding business conditions	*Technical skills* ▪ Computing ▪ Mathematics ▪ Blueprint reading ▪ Understanding manufacturing, forecasting & logistics *Skills techniques* ▪ Communication ▪ Presentation ▪ Coordination ▪ Negotiating ▪ Cost analysis ▪ Problem-solving ▪ QM ▪ Time management *People/behaviour skills* ▪ Customer orientation ▪ Being pro-active ▪ Ability to follow up ▪ Flexibility ▪ Stress management ▪ Team working ▪ Patience ▪ Multi-tasking	▪ Planning ▪ Influencing and persuasion ▪ Internal motivation ▪ Creativity ▪ Risk management ▪ Decision-making ▪ Interpersonal communication	▪ Team-building ▪ Strategic planning skills ▪ Communication skills (speaking, listening and writing) ▪ Technical skills ▪ Broader financial skills	*Technical Skills* ▪ Computing ▪ Mathematics ▪ Blueprint reading ▪ TQM ▪ Legislation ▪ Cost analysis ▪ Product knowledge ▪ Negotiation ▪ Manufacturing, forecast and processes *Advanced procurement skills* ▪ Category management ▪ Global sourcing ▪ Cost driver analysis ▪ Strategic sourcing ▪ Project management ▪ eProcurement *Interpersonal skills* ▪ Oral communication & listening ▪ Persuading and influencing ▪ Creative thinking ▪ Recognise own strengths ▪ Stress management ▪ Leadership & conflict management *Internal enterprise skills* ▪ Change management ▪ Cultural awareness ▪ Communication & motivation *External enterprise skills* ▪ Supplier & stakeholder relationship management ▪ Cross-functional teamwork *Strategic business skills* ▪ Manage strategic alliances ▪ Risk management

Table 71: Reference models for PSM skills

Out of the five analyzed studies the following competence fields can be summarised. If a maturity dimension is added in brackets, the PSM²F already provides a correlating KEP (also indicated in italics):

Soft Skills	Hard Skills
Interpersonal communication (speaking, listening, writing)	*Quality management techniques (Talents & Skills)*
Decision-making	*Risk management techniques (Strategy & Plans)*
Cross-functional team-building & working	*Technical product & process knowledge (Process Excellence & ICT; Talents & Skills)*
Analytical thinking & problem-solving	*Category management & Strategic Sourcing (Strategy & Plans)*
Negotiation	*Cost management (Innovation & Methods)*
Influencing and persuasion	*ICT skills (Process Excellence & ICT)*
Time, task & stress management	*Legislation & Contracting (Supplier Management & External Interfaces)*
Strategic (entrepreneurial) thinking & planning	
Creative thinking (Innovation & Methods)	
Cultural awareness (Sustainability & Ethics)	
Customer and stakeholder orientation (Organisation & Internal Interfaces)	
Change management & leadership (Talents & Skills)	

Table 72: Summarised core skills of PSM professionals

5.1.2 Validation of the design characteristics of the maturity assessment

Next to the analysis of possibly necessary content-related adaptations (5.1.1), the remarks from the participants as well as the analysis of the received data were used as well for validating the design and architectural characteristics of the assessment module of the PSM²F and to detect possible challenges in implementing or adopting the PSM²F in a firm. As central input, the assessment module was presented and introduced to the firms before the participants were asked to comment on the following questions and invited to carry out the actual assessment:

a) *Is the overall assessment logic clear and applicable or do you have ideas for methodological improvements? Would a one-step maturity assessment (without weighthing/defining the SDTMS) be sufficient, practicable and useful?*
b) *Would you suggest narrowing down the assessment criteria?*
c) *How would you personally estimate the relevance of a maturity assessment for developing the PSM function in your firm?*

Essentially, the *assessment scheme* – with its two-step approach starting with the definition of the SDTMS before the actual maturity assessment on a 4-digit Likert scale using pre-defined anchor-phrases – was regarded as useful and clear from all ten firms. In the following table, comments from the firms concerning methodology, structure as well as relevance of an initial maturity assessment for an intended transformation initiative are illustrated:

Company	Exemplary comments and feedback on the method and structure of the assessment module of the PSM²F	Usefulness of 1-step assessment without weighting	Relevance of initial maturity assessment
Aerospace (C1)	*"Not all KEPs are relevant or easily realisable or applicable for SME (e.g. supplier integration programs, eAuctions) due to limited resources and unbalanced power. So the possibility to weight the KEPs based on context-specific issues makes a lot of sense."*	Not useful	Very high (++) "The assessment directly shows you some improvement paths."
Electrical Engineering (C2)	*"It would be very interesting and useful to integrate the view of the responsible line manager of the CPO into the maturity assessment (e.g. COO, CEO) or at least into the definition of the significance level."* *"For me the amount of assessment criteria is ok if we decide to do the assessment cycle on an annual base. If we would decide to have a shorter cycle, then a reduction of the criteria would make sense."*	Not useful	Very high (++) "Next to that, an internal customer survey is planned to find out what is the concrete picture of PSM from the viewpoint of the other departments."
Mechatronics (C3)	*"It might be a good idea to have the chance to add some company-specific KEPs to the framework to increase the context-specific character."* *"I wouldn't reduce the KEPs in the first cycle so I can see the big picture of my team about what they are assuming what is important or not."* *"Next to the nominated strategic purchaser and the operational buyers I would suggest inviting all PSM members to the assessment."*	Not useful	Very high (++) "Crucial point, but only when including the different positions of the PSM team in order to gain a holistic view."
Automotive (C4)	*"A pre-test of the PSM²F with only one third or half of the KEPs would make sense to reduce the hurdles of participation and get an impression about the method and practicability."*	Not useful	Very high (++)
Engineering/ Metallurgy (C5)	*"At the beginning, I was uncertain if the framework can also be applied to our firm because of our strong project-oriented business and purchasing activities. I was surprised that nearly all of the KEPs were also applicable for us."* *"The possibility to weight the KEPs in terms of self-defining a SDTMS according our specific needs seems to be very helpful."* *"I would not have a good feeling if I have to make a pre-selection of the KEPs for the whole team. Perhaps I would overlook something that is very important from the perspective of my team."*	Not useful	Very high (++) "The assessment of the KEPs shows you a direct link to the transformation roadmap."
Chemicals (C6)	*"The maturity assessment is very extensive. Maybe it would make sense to have the chance to choose for specific dimensions and do not need to make the whole assessment at once."*	Not useful	Very high (++)
Pulp & Paper (C7)	*"It was sometimes hard but useful to only have a four-digit scale. So it was necessary to make oneself clear if we are rather good or bad in this specific field."* *"I would not limit the criteria. Assuming that we conduct the assessment once a year, I think that it is possible to do the overall assessment."*	Not useful	Medium (~) "It is not yet foreseeable what we will do with the assessment result."
Automotive/ Metals (C8)	*"The integration of at least one from the operational and one from the strategic purchasing team is highly relevant. It would be also useful to integrate our CEO's opinion."*	Not useful	Very high (++) "It helps to directly derive ideas and actions for the transformation."
Energy (C9)	*"However some KEPs are not so relevant for a company like ours, the assessment – with the possibility to define weights of significance – is suitable also for our firm."* *"Adding KEPs would be a helpful extension of the framework."*	Not useful	High (+) "A benchmark can always help at the beginning of a transformation."
Automotive (C10)	*"A quick test would be useful as a starting point. It should contain KEPs from each dimension or a sort of top KEPs."*	Not useful	High (+) "Gives the transformation project more structure at the beginning."

Table 73: Methodological feedback from the case companies

Basically, the firms asked for more flexibility in the form of adding or excluding KEPs, some of them (e.g. C4, C6, C10) would prefer choosing for specific dimensions or a sort of "quick test" (company C10) in order not being forced to conduct the entire assessment of all eight maturity dimensions at once. Furthermore, extending the core group with temporary members (other PSM team members, executive managers;

company C2, C8) was indicated as relevant advancement to enhance the content-related quality and representation of the result as well as to create an improved buy-in for the entire PSM team and beyond.

Furthermore, the case firms confirmed the proposal of the advisory board (chapter 4.1) not to execute the assessment on a fixed date *(e.g. workshops setting; Heß, 2015)* as overall group, but to give the people the opportunity to work on the assessment when they have leisure and time. This might ensure a more intense analysis and better quality of the response. By applying the proposed Delphi method, the single assessments can subsequently be summarised, discussed and – if necessary – refined to finally derive an agreed result *(see example in chapter 5.3)*.

Although at least one participant of each company outlined the positive learning effect of reading all the KEPs that might trigger ideas for the transformation and foster organisational learning, it might be possible that due to the *triangulation rule of participation*, there are some (strategic management) aspects the operational buyer does not know and vice versa. Therefore, all ten companies requested an *"I don't know"* option for the assessment of the maturity (Figure 34). However, the firms agreed upon applying one assessment scheme for all participants (main reason: organisational learning) rather than making different versions for different PSM functions. Moreover, the firms mentioned, that it would essentially make no sense and furthermore would not be feasible to define a representative and exclusive set of KEPs for the different – and (in theory and not to mention in practice) not uniform – job profiles in the PSM field.

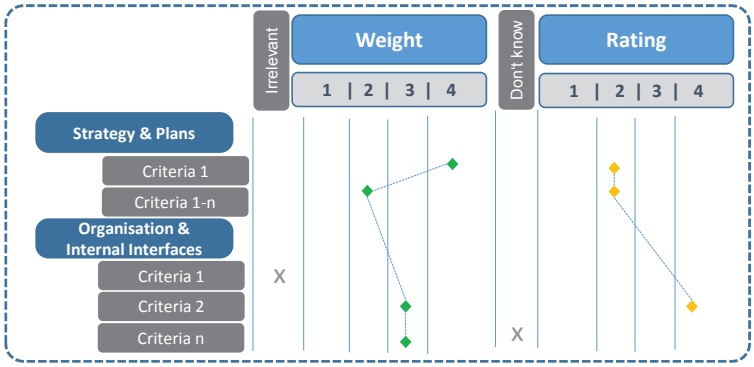

Figure 34: Final maturity assessment scheme

All ten firms opposed to a one-step assessment without having the possibility of contextualisation (e.g. weighting of KEPs, excluding KEPs). In general none of the companies would assign great usefulness to maturity models as strategic management instrument if such models are strictly targeting on a predefined maturity path towards one uniform *world class stage*.[93]

[93] This point of criticism of the main part of the available PMMs was already highlighted and discussed in chapter 2.2.2.

During the actual assessment (procedure is described in chapter 3.2), the participants (1) evaluated each KEP (on a four-digit Likert scale) in terms of significance, keeping the question *"Which maturity level we have to target (SDTMS) for the intended goals and current or upcoming challenges/contingency variables"* in mind, before the (2) actual assessment of the current maturity level.

RESEARCH NOTE

For a better and clearer systematisation of linking the PSM goals with the respective KEPs, the quality function deployment (QFD) approach might be an interesting methodical enhancement and field for further research. This approach was originally developed in the 1970s to translate customer needs into technical design requirements/characteristics in a structured way *(e.g. Akao, 2004; Park/Kim, 1998)*. In the here presented approach the customer needs may be exchanged with the PSM goals that need to be achieved and the product design or engineering characteristics can be exchanged with the KEPs. A matrix (in the original approach it is called *house of quality/HOQ*) might be used as template to support the process:

- *In the rows the PSM goals/contingent factors are listed (I)*
- *In the columns the KEPs are listed (II)*
- *Within the matrix the intensity of the relationship is indicated. In the conventional HOQ a rating scale of 1 (weak), 3 (medium) and 9 (strong) is common to rate the degree of strengths between (I) and (II).*

By analysing the data of the assessment of the case firms (Figure 35 and Table 74), it was possible to illustrate that none of the companies – five are illustrated in the following figure, all ten in the subsequent table – were focusing on the theoretical highest maturity scenario (THMS) but on specific and different SDTMS.

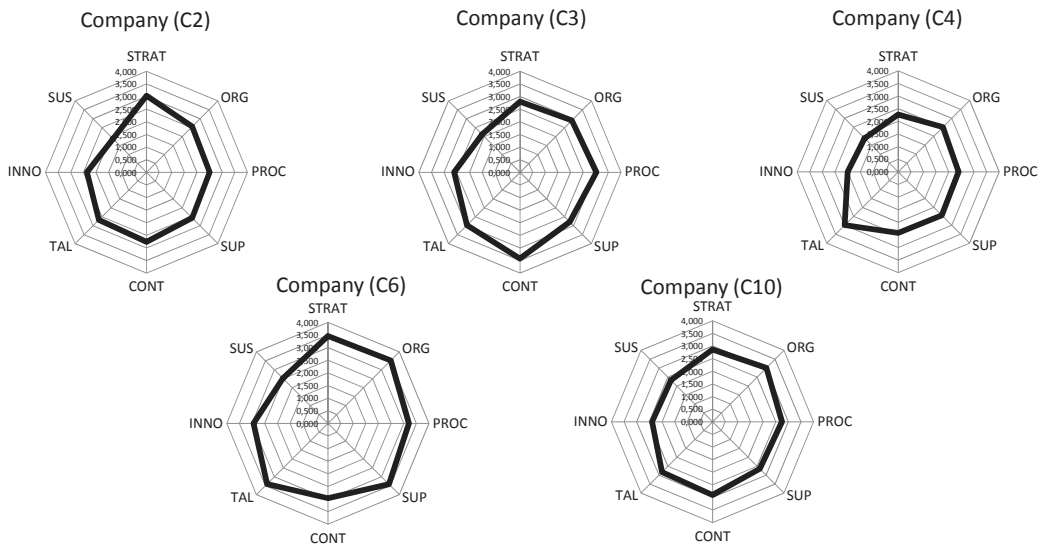

Figure 35: Different target scenarios (SDTMS) of five exemplary case companies (overall PSM team)

Company	STRAT	ORG	PROC	SUP	CONT	TAL	INNO	SUS
Aerospace (C1)	3,0	3,3	2,5	2,7	3,5	3,2	2,5	2,0
Electrical Engineering (C2)	3,0	2,6	2,8	2,6	2,9	2,7	2,4	1,8
Mechatronics (C3)	2,8	2,9	3,1	2,8	3,4	3,0	2,6	2,1
Automotive (C4)	2,3	2,5	2,5	2,4	2,5	2,9	2,1	1,8
Engineering/ Metallurgy (C5)	3,4	3,4	3,3	3,5	3,2	3,6	3,4	2,1
Chemicals (C6)	3,4	3,5	3,4	3,4	2,9	3,4	2,7	2,4
Pulp & Paper (C7)	2,8	2,9	3,0	2,6	2,7	3,0	2,6	2,6
Automotive/ Metals (C8)	2,9	3,1	3,2	3,2	3,4	3,2	2,9	2,3
Energy (C9)	2,5	2,8	3,0	2,4	2,6	3,1	2,5	2,4
Automotive (C10)	2,9	3,0	3,2	2,7	2,9	2,8	2,4	2,3
Average significance	**2,9**	**3,01**	**3**	**2,8**	**3**	**3,1**	**2,6**	**2,2**

Table 74: Cross-case analysis SDTMS

Due to the hypothesis that a firm's intended target maturity profile (SDTMS) is mostly represented by its defined goals, that can change over time, it seemed reasonable to clarify and analyse the different goal sets of the case firms. The following questions were raised (Table 75):

a) *What are the general corporate goals in your company (e.g. growth, ROI, quality, cost efficiency, innovation, sustainability)?*
b) *Which purchasing goals are currently the main focus of improvement (e.g. reducing & optimising costs, reducing risks & secure the supply, increase flexibility, improving quality)? Are these goals stable or unstable?*

Company	Corporate goals	PSM goals (CPO view)	PSM goals (team view)
Aerospace (C1)	growth, profitability	savings, security of supply	quality, security of supply
Electrical Engineering (C2)	growth, profitability, innovation	cost of goods sold/savings, CLIP-rate	outsourcing, contract quote/frame orders, lead-time, savings
Mechatronics (C3)	innovation, quality	pro-active supplier management, more strategic orientation, security of supply/reducing risks, reducing costs/savings	security of supply/reducing risks, savings, more strategic orientation
Automotive (C4)	stable growth, innovation, savings, sustainability	security of supply, savings, sustainability	savings, inventory turnover, security of supply
Engineering/ Metallurgy (C5)	quality, innovation, savings	savings (in comparison to budget), delivery time, quality	savings, quality
Chemicals (C6)	profitability, savings, growth, innovation	savings, quality, security of supply sustainability	savings, security of supply, quality, standardisation, inventory level
Pulp & Paper (C7)	cost leadership, quality leadership, growth, sustainability	security of supply, savings	security of supply, savings, quality
Automotive/Metals (C8)	growth, sustainability, savings	inventory, security of supply, lead-time	savings, security of supply, quality
Energy (C9)	sustainability, quality	legal security savings, sustainability	security of supply, legal security, savings, active supplier management,
Automotive (C10)	profitability, growth	savings, security of supply	savings, reducing inventory costs, security of supply

Table 75: Set of corporate and PSM goals

Especially company (C2), (C3) and (C9) highlighted that over the last three years regular changes in the set of corporate as well as purchasing goals were on the agenda. The CPO from company (C2) said that *"3 years ago the main goal was to work on*

overall savings, one year ago the main focus was to intensively work on compliance issues and security of supply and now the KPIs 'cost-of-goods sold' as well as 'CLIP rate' are on the top of the agenda." Company (C9) as well as company (C4) emphasised the growing attention on sustainability issues in their firm over the past year. The responsible purchasing manager from company (C3) mentioned that *"due to a restructuring of our management team, my direct line manager also changed. This leads to a different set of goals and an order to give PSM a more strategic orientation. Concrete savings weren't any longer the single element on the top of the agenda"*. One lead buyer of company (C9) stated that *"three years ago the restructuring of the purchasing department was the overall goal, last year it was the pro-active supplier management and to intensify strategic purchasing activities and now the focus is on ensuring the legal security within the tendering process."* Based upon a within-case analysis, these verbally expressed statements can also be exemplary illustrated for company (C2), (C3) and (C6).

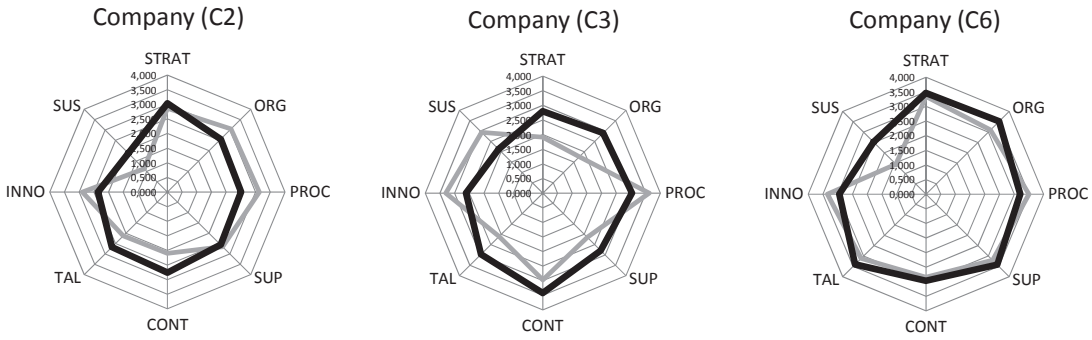

Figure 36: Changing target scenarios over time

Analysing the self-defined target scenarios of these selected companies in a three years period (black: now, grey: three years ago) as an example, two further aspects appear interesting in this regard: First, primarily evident for company (C6), there does not always seem to be a demand or intention for moving to "higher maturity". The current setup seems to fit. For company (C3), a shift of priorities to more strategic and structural aspects (Strategy & Plans, Organisation & Internal Interfaces, Talents & Skills) becomes obvious. This also fits to the statement from the CPO mentioned above that a change in the management team *"leads to a different set of goals and an order to give PSM a more strategic orientation."* A shift of priorities also becomes apparent for company (C2). This new prioritisation also went along with a *pro-active acceptance of a decrease of maturity in other areas (Figure 37, see also chapter 5.3). "While we tried to install processes and instruments to keep the maturity level also in the other*

dimensions high, in case of doubt it was actively decided to shift the resources towards the new higher prioritised topics.", so the CPO from company C(3).[94]

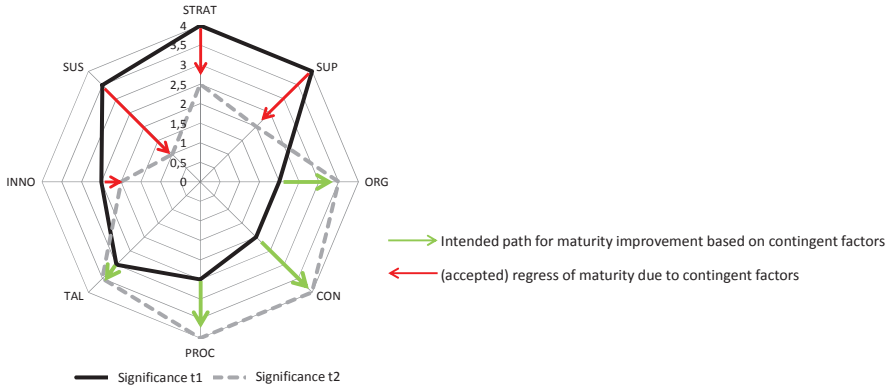

Figure 37: Changing target-values and dynamic maturity pathways based upon contingent factors

RESEARCH RESULT

The presented analysis of the changing goal sets as well as changing target scenarios over time (fit for purpose) underline the relevance of the proposed *self-defined and targeted maturity scenario* (SDTMS, chapter 2.2.2) which places a firm in the position to dynamically update its target maturity profile due to changing contingent factors or insufficient correlation of the current SDTMS with the intended goals.

The ability to realise that *"a particular set of routines can lose their value if they support a competence which no longer matters" (Teece et al., 1997, p.524)*, and to actively reconfigure the internal setup for better responding to current or changing contigent factors, is discussed in strategic management journals since the 1990s *(e.g. Teece/Pisano, 1994; Teece et al., 1997, Eisenhardt/Martin, 2000; Winter, 2003)* and might also contribute to a advancement of the discussion about PSM maturity research.

Taking a look at the above-presented purchasing goals from the perspective of the CPO and the respective teams (Table 75), it becomes apparent that in not a single firm there was a total agreement on the current goals. Referring to common practice of PMM not to include diverse views of a team into the assessment or the definition of a target maturity scenario, this conceals the risk of heading towards strategies (defined by the CPO) the team might not understand or agree, which subsequently hinders the necessary driving forces for the change. This underlines the necessity of an *agreed goal-set (Where do we want/need to go?)* within the team before starting with the definition of the significance values and the maturity assessment, and highlights the relevance of the *triangulation rule of participation.*

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94 This statement is an indication, that it might be necessary to stronger interlink the findings from the *theory of constraints (Goldratt, 1990; Rahman, 1998; Gupta/Boyd, 2008)* with the discussion about PSM maturity.

Different views on the significance level of the PSM maturity dimensions based upon the hierarchy level are displayed in Figure 38 and Figure 39 and Table 76.

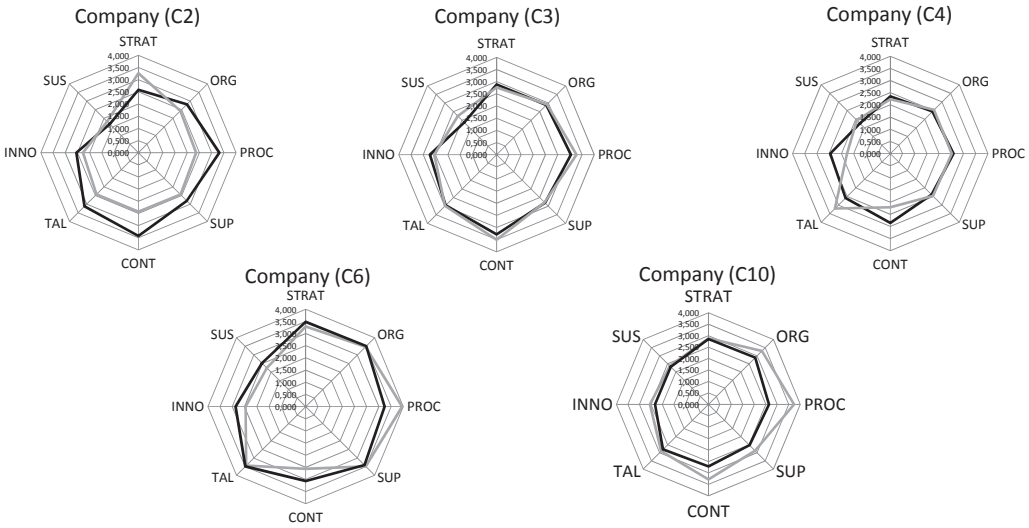

Figure 38: Different target scenarios of five exemplary case companies (CPO VS PSM team excl. CPO)

The assessment of the CPO/purchasing manager is highlighted in black; the evaluation from the PSM team (excl. CPO) is represented as a grey line.

RESEARCH NOTE

Since not all case firms nominated a strategic purchasing expert and a buyer next to the CPO (e.g. some firms nominated Lead Buyers who cover both functions; see Table 65) and that the functional profile of the participants (especially between Lead Buyer, Buyer and Strategic Purchasing) in spite of similar job titles was quite different, in the data analysis a distinction of results was only made between management functions (CPO/Purchasing Manager) and the rest of the team.

Out of the five radar charts representing five different firms, in the following tables three case firms are selected to analyse the results and deviations between the CPO and the PSM team (significance *and* maturity) in further detail.

Company (C2)				
Significance/Weight				
	CPO	Ø TEAM	Deviation	Range
STRAT	2,59	3,27	-0,68	1,5
ORG	2,82	2,43	0,39	1,4
PROC	3,32	2,36	0,96	1,6
SUP	2,81	2,44	0,37	1,2
CONT	3,43	2,43	1,00	1,6
TAL	3,13	2,44	0,69	1,5
INNO	2,54	2,27	0,27	1,4
SUS	1,67	1,81	-0,14	1,5
			Overall Range	1,5

Company (C2)				
Maturity				
	CPO	Ø TEAM	Deviation	Range
STRAT	2,23	2,1	0,13	1,2
ORG	2,32	2,31	0,01	1,1
PROC	3	2,23	0,77	2,1
SUP	2,43	2,2	0,23	1,4
CONT	3,13	2,4	0,73	1,9
TAL	2,7	2,23	0,47	1,7
INNO	2,15	1,89	0,26	1,4
SUS	1,1	1,43	-0,33	1,3
			Overall Range	1,5

Company (C3)

Significance/Weight

	CPO	Ø TEAM	Deviation	Range
STRAT	2,88	2,77	0,11	1,2
ORG	2,89	2,93	-0,04	1,5
PROC	3,05	3,27	-0,22	1,2
SUP	2,81	2,78	0,03	0,7
CONT	3,29	3,50	-0,21	1,1
TAL	2,95	2,99	-0,04	1,0
INNO	2,73	2,55	0,18	1,4
SUS	1,88	2,25	-0,37	1,6
			Overall Range	1,2

Company (C3)

Maturity

	CPO	Ø TEAM	Deviation	Range
STRAT	2,57	2,1	0,47	1,8
ORG	3,1	2,8	0,30	1,5
PROC	2,64	3,2	-0,56	2,1
SUP	2,64	2,2	0,44	1,8
CONT	3	2,4	0,6	1,9
TAL	2,84	2,1	0,74	1,7
INNO	2,2	2,3	-0,1	1,1
SUS	2,2	2,1	0,1	1,2
			Overall Range	1,6

Company (C6)

Significance/Weight

	CPO	Ø TEAM	Deviation	Range
STRAT	3,29	3,49	-0,20	0,8
ORG	3,48	3,52	-0,04	0,6
PROC	3,96	3,24	0,72	1,1
SUP	3,49	3,42	0,07	1,0
CONT	2,57	3,07	-0,50	1,3
TAL	3,44	3,49	-0,05	1,1
INNO	2,46	2,86	-0,42	1,6
SUS	2,25	2,53	-0,28	1,6
			Overall Range	1,1

Company (C6)

Maturity

	CPO	Ø TEAM	Deviation	Range
STRAT	2,92	2,32	0,6	1,3
ORG	3,05	2,54	0,51	1,4
PROC	3,1	2,73	0,37	1,1
SUP	2,89	2,95	-0,06	1,0
CONT	2,9	2,75	0,15	1,9
TAL	2,74	2,85	-0,11	1,3
INNO	1,89	2,42	-0,53	1,8
SUS	1,95	2,23	-0,28	1,5
			Overall Range	1,4

Figure 39: Within-case analysis of significance and maturity per category

The deviation column in Figure 39 indicates the different views of the CPO/purchasing manager and the team (excl. CPO) on the two dimensions *"estimation of significance level"* and *"assessment of current maturity" (Deviation = CPO_{value} -$Team_{value}$)*. The statistical range value of maturity in the last column is an indication for the overall as well as dimension-specific deviation and accordance rate of the participants (see chapter 3.3). The higher the value (on a scale from 1-4), the lower is the level of congruency. Based on this information, it is possible to introduce a *significance/maturity ratio* as another analysis for the maturity reporting (chapter 5.1.3). This metrics indicates the deviation of the *perceived significance of a KEP* (or a set of KEPs) in relation to the *estimated current maturity level*. Following that, it is possible to propose that the higher the ratio between the realised significance of a (set of) KEP and its accepted low maturity level, the higher the motivation to change (see also chapter 5.3).

In Table 76 the overall range value for all companies, and also the detailed number of KEPs (out of the 104 initially introduced key evaluation points) with the highest accordance and the highest deviation is listed.

Company	Overall Range	Number of KEPs with highest accordance (Range: 0)	Number of KEPs with highest deviation (Range: 3)
Aerospace (C1)	1,3	25	6
Electrical Engineering (C2)	1,5	11	26
Mechatronics (C3)	1,2	16	8
Automotive (C4)	1,4	12	8
Engineering/ Metallurgy (C5)	1,4	14	16
Chemicals (C6)	1,1	27	5
Pulp & Paper (C7)	1,0	37	2
Automotive/ Metals (C8)	1,4	19	9
Energy (C9)	1,2	32	7
Automotive (C10)	1,2	30	3

Table 76: Overall range value (significance) in each company

RESEARCH RESULT

The result of the data analysis from the case firms revealed that in all firms there were different views (between the CPO and the team) on the PSM goals as well as about the necessary target scenarios (e.g. intended structures, processes, capabilities, policies) and estimations of the current maturity level. This validates the necessity of the *triangulation rule of participation* (chapter 3.1), and the need for taking sufficient time for discussing the deviations and for explaining his/her own results to finally come up with a high level of congruency as precondition for a common striving during the transformation. This hinders the participants to pursue diverse and conflicting goals. This result of the data analysis also validates the proposed two-step approach of assessment (module 2), starting with an agreement on a self-defined and targeted maturity scenario (SDTMS) before the actual maturity assessment.

Furthermore, the *deviation value* between the CPO/purchasing manager and the other participants as well as the *statistical range value* could have been validated as suitable indicators for the *level of congruency* within a maturity initiative.

To address the above-mentioned request of three of the ten firms (C4, C6, C10) towards providing a sort of *preliminary maturity assessment (quick test),* but also to investigate if it is possible to deduce a sort of *basic maturity foundation* indifferent of branch or respective goals of each firm, the received data from the firms was analysed in within- and cross-case analyses. In detail *(1) the average significance value* for each maturity dimension (on a scale from 1-4) and each firm was analysed (considering also the different views based upon hierarchy) followed by *(2) an investigation of those (single) KEPs, which show a high accordance value* across the ten firms. The statistical range value (see chapter 3.3) was used as central indication for the accordance rate of the respective maturity dimension across the companies (Table 77). The lower the range value, the higher the accordance rate.

Company	STRAT	ORG	PROC	SUP	CONT	TAL	INNO	SUS
Aerospace (C1)	3,0	3,3	2,5	2,7	3,5	3,2	2,5	2,0
Electrical Engineering (C2)	3,0	2,6	2,8	2,6	2,9	2,7	2,4	1,8
Mechatronics (C3)	2,8	2,9	3,1	2,8	3,4	3,0	2,6	2,1
Automotive (C4)	2,3	2,5	2,5	2,4	2,5	2,9	2,1	1,8
Engineering/ Metallurgy (C5)	3,4	3,4	3,3	3,5	3,2	3,6	3,4	2,1
Chemicals (C6)	3,4	3,5	3,4	3,4	2,9	3,4	2,7	2,4
Pulp & Paper (C7)	2,8	2,9	3,0	2,6	2,7	3,0	2,6	2,6
Automotive/ Metals (C8)	2,9	3,1	3,2	3,2	3,4	3,2	2,9	2,3
Energy (C9)	2,5	2,8	3,0	2,4	2,6	3,1	2,5	2,4
Automotive (C10)	2,9	3,0	3,2	2,7	2,9	2,8	2,4	2,3
Average significance	**2,9**	**3,01**	**3**	**2,8**	**3**	**3,1**	**2,6**	**2,2**
Ranking	**5**	**2**	**3**	**6**	**4**	**1**	**7**	**8**
Range Value	**1,13**	**1,02**	**0,90**	**1,09**	**1,00**	**0,9**	**1,30**	**0,8**

Table 77: Cross-case analysis for ranking the most significant maturity dimensions (CPO & Team)

Analysing the received data without making a split between (a) CPO and (b) PSM team (excl. CPO), *"Talents & Skills"* is the most important and stable category with a range value below "1". *"Organisation & Internal Interfaces"* and *"Process Excellence & ICT"* are ranked 2nd and 3rd. *"Innovation & Methods"* (ranked 7th and with the highest range value) and *"Sustainability & Ethics"* are ranked on the last two positions.

Company	STRAT	ORG	PROC	SUP	CONT	TAL	INNO	SUS
Aerospace (C1)	3,3	3,4	2,8	2,9	3,7	3,3	2,5	2,0
Electrical Engineering (C2)	2,6	2,8	3,3	2,8	3,4	3,1	2,5	1,7
Mechatronics (C3)	2,9	2,9	3,0	2,8	3,3	2,9	2,7	1,9
Automotive (C4)	2,4	2,4	2,6	2,4	2,9	2,6	2,5	1,8
Engineering/ Metallurgy (C5)	3,5	3,1	3,0	3,4	3,1	3,7	3,6	2,0
Chemicals (C6)	3,3	3,5	4,0	3,5	2,6	3,4	2,5	2,3
Pulp & Paper (C7)	2,8	2,7	3,1	2,6	2,6	2,7	2,5	2,5
Automotive/ Metals (C8)	3,1	3,0	3,1	3,5	3,4	3,6	2,5	2,6
Energy (C9)	2,6	2,7	3,5	2,4	2,9	3,3	2,5	2,4
Automotive (C10)	2,9	3,3	3,7	2,9	3,3	2,9	2,5	2,4
Average Significance	**2,94**	**2,98**	**3,21**	**2,92**	**3,12**	**3,15**	**2,63**	**2,16**
Ranking	**5**	**4**	**1**	**6**	**3**	**2**	**7**	**8**
Range Value	**1,11**	**1,04**	**1,36**	**1,10**	**1,08**	**1,12**	**1,17**	**0,98**

Table 78: Significance of maturity dimensions (CPO/purchasing manager's view)

The CPOs mainly agreed on the importance of *"Process Excellence & ICT"* (but with a relatively high range value), followed by *"Talents & Skills"* and *"Controlling & Performance Management"*. Also here *"Innovation & Methods"* as well as *"Sustainability & Ethics"* are evaluated with low importance.

Company	STRAT	ORG	PROC	SUP	CONT	TAL	INNO	SUS
Aerospace (C1)	2,8	3,3	2,2	2,4	3,3	3,0	2,7	2,1
Electrical Engineering (C2)	3,3	2,4	2,4	2,4	2,4	2,4	2,3	1,8
Mechatronics (C3)	2,8	2,9	3,3	2,8	3,5	3,0	2,5	2,3
Automotive (C4)	2,2	2,5	2,5	2,5	2,2	3,2	1,8	1,9
Engineering/ Metallurgy (C5)	3,3	3,8	3,6	3,5	3,2	3,5	3,2	2,2
Chemicals (C6)	3,5	3,5	3,2	3,4	3,1	3,5	2,9	2,5
Pulp & Paper (C7)	2,8	3,1	3,0	2,8	2,9	3,1	2,7	2,8
Automotive/Metals (C8)	2,7	3,1	3,2	3,0	3,3	2,8	3,2	1,9
Energy (C9)	2,5	2,8	2,7	2,4	2,3	2,9	2,6	2,4
Automotive (C10)	2,9	2,9	2,6	2,5	2,7	2,8	2,3	2,3
Average Significance	**2,88**	**3,03**	**2,87**	**2,77**	**2,89**	**3,02**	**2,62**	**2,22**
Ranking	**3**	**1**	**4**	**6**	**5**	**2**	**7**	**8**
Range Value	**1,25**	**1,39**	**1,40**	**1,11**	**1,29**	**1,05**	**1,45**	**0,94**

Table 79: Significance of maturity dimensions of the PSM team (excl. CPO) from the case companies

The PSM team (excl. CPO) mainly agreed on the significance of *"Organisation & Internal Interfaces"* (with a relatively high range value), closely followed by "*Talents & Skills"*. Also here *"Innovation & Methods"* as well as *"Sustainability & Ethics"* are evaluated with low importance.

It is rather surprising that those dimensions mainly associated with management tasks like *"Strategy & Plans", "Organisation & Internal Interfaces"* or *"Talents & Skills"* were valued higher from the PSM team (excl. CPO), whereas the dimension *"Process Excellence & ICT"* – which might be primarily associated with a stronger operational focus – was ranked as most important dimension from the PSM executives.

RESEARCH RESULT

The presented rankings of the most relevant maturity dimensions should not be confused as (a statistically valid) generalisable deduction. However, taking a combined look on the ranking of a maturity dimension and the range value against the background on the diverse goal sets (Table 75) and the chosen maximum variation strategy might allow some generalisation. Therefore, the dimension "Talents & Skills" as well as "Organisation & Methods" rank both in the top 4, which makes these two dimensions to a sort of *basic maturity foundation* indifferent of the respective goals and context-specific conditions.

In order to investigate whether single KEPs show a high accordance value across the ten firms, an analysis of the most frequently mentioned KEPs in terms of relevance for assessing the PSM maturity was conducted, sorted by (1) *CPO/purchasing manager* (Table 80) and (2) *PSM team* (excl. CPO/purchasing manager, Table 81).

No.	Key Evaluation Points	Category
1	*Powerful ICT support (e.g. ERP, SRM) for routine tasks.*	*Process Excellence & ICT*
2	*There is an excellent communication culture and style between the CPO/purchasing manager and the PSM team.*	*Talents & Skills*
3	*There is a will and culture of early involvement of PSM.*	*Organisation & Internal Interfaces*
4	*The PSM department and its employees know or (better) are part of creating the corporate goals and consider the strategic goals of the company in their actions.*	*Strategy & Plans*
5	*Roles and responsibilities for specific tasks and approval steps are clearly defined (e.g. mandates, job descriptions, requirement profiles).*	*Organisation & Internal Interfaces*
6	*There are clear interfaces and communication structures with the relevant teams/departments in the company.*	*Organisation & Internal Interfaces*
7	*Strategic supplier (relationship) management is defined as an important asset in the company. A closed supplier management cycle is established from supplier analysis and selection, assessment and development.*	*Supplier Management & External Interfaces*
8	*The hard skill portfolio of the PSM team is managed in an appropriate way (e.g. negotiation, process management, quality management, ICT skills, finance impact of PSM activities, project management, technical knowledge, blueprint/specification reading).*	*Talents & Skills*
9	*The mind set and aspiration of the PSM personnel and the CPO is high (culture of excellence and entrepreneurial thinking).*	*Talents & Skills*
10	*There are fixed resources (time, manpower) for strategic tasks and initiatives next to daily operations.*	*Strategy & Plans*
11	*The CPO and other PSM team members with responsibility for employees have the necessary leadership competencies.*	*Talents & Skills*
12	*Clear and suitable commodity structure based upon an agreed commodity code classification with defined responsibilities is in place.*	*Strategy & Plans*
13	*For selecting new suppliers a multi-dimensional approach covering not only price issues is applied.*	*Supplier Management & External Interfaces*
14	*Contract management is established at a professional level (coverage rate, standards, archive, compliance rules, different templates for different supplier types). If there are no contracts, clear general terms of purchasing are in place.*	*Supplier Management & External Interfaces*
15	*For the critical parts a second source is defined.*	*Supplier Management & External Interfaces*
16	*Key performance indicators for critical processes and goals are defined and are regularly reviewed (e.g. ability to delivery, on-time-delivery, complaints).*	*Controlling & Performance Management*
17	*The soft skill portfolio of the PSM team is managed in an appropriate way (e.g. interpersonal communication, teamwork, analytical skills, customer orientation, problem-solving, self-motivation, managing changes, conflict resolution, cultural awareness, being able to sell ideas).*	*Talents & Skills*
18	*There is a TOP-Management commitment for PSM strategies, goals and actions.*	*Organisation & Internal Interfaces*
19	*PSM has a high professionalism in actions with high visibility to (internal and external) stakeholders (e.g. design of RFQ, offer comparison, negotiation, meeting coordination, controlling).*	*Organisation & Internal Interfaces*
20	*PSM is established as main and first contact to the supplier.*	*Supplier Management & External Interfaces*

Table 80: Ranking of the twenty most important key evaluation points based upon the CPO's opinions

No.	Key Evaluation Points	Category
1	*There is an excellent communication culture and style between the CPO/purchasing manager and the PSM team.*	*Talents & Skills*
2	*Clear and suitable commodity structure based upon an agreed commodity code classification with defined responsibilities is in place.*	*Strategy & Plans*
3	*Powerful ICT support (e.g. ERP, SRM) for routine tasks.*	*Process Excellence & ICT*
4	*Roles and responsibilities for specific tasks and approval steps are clearly defined (e.g. mandates, job descriptions and requirement profiles).*	*Organisation & Internal Interfaces*
5	*Clear targets and standardised feedback process for personnel (e.g. annual meeting, feedback-questionnaire) in place.*	*Talents & Skills*
6	*The CPO and other PSM team members with responsibility for employees have the necessary leadership competencies.*	*Talents & Skills*
7	*The hard skill portfolio of the PSM team is managed in an appropriate way (e.g. negotiation, process management, quality management, ICT skills, finance impact of PSM activities, project management, technical knowledge, blueprint/specification reading).*	*Talents & Skills*
8	*The PSM department and its employees know or (better) are part of creating the corporate goals and consider the strategic goals of the company in their actions.*	*Strategy & Plans*
9	*The mind set and aspiration of the PSM personnel and the CPO is high (culture of excellence and entrepreneurial thinking).*	*Talents & Skills*
10	*For the critical parts a second source is defined.*	*Supplier Management & External Interfaces*
11	*There are fixed resources (time, manpower) for strategic tasks and initiatives next to daily operations.*	*Strategy & Plans*
12	*Contract management is established at a professional level (coverage rate, standards, archive, compliance rules, different templates for different supplier types). If there are no contracts, clear general purchasing terms are in place.*	*Supplier Management & External Interfaces*
13	*Deputies are installed for the critical positions and trained in a proper way.*	*Organisation & Internal Interfaces*
14	*The most important sources (primary and secondary) are known for finding appropriate supplier.*	*Supplier Management & External Interfaces*
15	*The soft skill portfolio of the PSM team is managed in an appropriate way (e.g. interpersonal communication, teamwork, analytical skills, customer orientation, problem-solving, self-motivation, managing changes, conflict resolution, cultural awareness, being able to sell ideas).*	*Talents & Skills*
16	*Frame orders and call-offs with main suppliers are properly used to increase efficiency of the purchasing process and use the price advantages of pooling.*	*Supplier Management & External Interfaces*
17	*Clear documentation of core PSM processes (e.g. purchasing manual) that fulfil the recommendations of professional process management (e.g. process notation, defined process owner) and compliance guidelines.*	*Process Excellence & ICT*
18	*Based upon functional requirements and specifications formulated in a neutral way from the user, it is easy for PSM to find a high number of potential suppliers.*	*Organisation & Internal Interfaces*
19	*An adequate level of remuneration according industry standards is guaranteed.*	*Talents & Skills*
20	*Based upon a corporate strategy, PSM develops short-, mid- and long-term plans and goals (e.g. negotiation targets, process goals, supplier goals) as well as an overall PSM strategy in a structured way (strategy alignment, roadmap approach).*	*Strategy & Plans*

Table 81: Ranking of the twenty most important key evaluation points based upon the PSM team's opinions

Finally, in the following table the twenty most frequently mentioned KEPs from the analysed maturity models (Table 30, chapter 2.2.3) will be compared with the presented consolidated view from the case study firms (PSM team incl. CPO).

Comparison of key evaluation points by source	
Theory (2.2.2.-2.2.4)	**Case Study**
KPIs for critical processes and goals are defined and are regularly reviewed (e.g. ability to delivery, on-time-delivery).	There is an excellent communication culture and style between the CPO/purchasing manager and the PSM team.
A cross-functional training and skill management for PSM employees prepare the PSM team for their tasks (e.g. internal and external training, job rotation, training plans).	Powerful ICT support (e.g. ERP, SRM, workflows) for routine tasks.
Strategic supplier (relationship) management is defined as an important asset in the company. A closed supplier management cycle is established from supplier analysis and selection, assessment and development.	Roles and responsibilities for specific tasks and approval steps are clearly defined (e.g. mandates, job descriptions and requirement profiles).
There are clear interfaces and communication structures in the company (e.g. R&D for new product ideas, standardisation issues/ production planning for forecasting issues). It is clearly defined when PSM has to be involved.	Clear and suitable commodity structure based upon an agreed commodity code classification with defined responsibilities is in place.
The strategy and technology roadmap of the supplier is considered when working on the own PSM strategy and product development.	Clear targets and standardised feedback process for personnel (e.g. annual meeting, feedback-questionnaire) in place.
Based upon a corporate strategy, PSM develops short-, mid- and long-term plans and goals (e.g. negotiation targets, process goals, supplier goals) as well as an overall PSM strategy in a structured way (strategy alignment, roadmap approach).	The CPO and other PSM team members with responsibility for employees have the necessary leadership competencies.
Powerful ICT support (e.g. ERP, SRM) for routine tasks.	The PSM department and its employees know or (better) are part of creating the corporate goals and budgets and consider the strategic goals of the company in their actions.
Concepts of process- and/or IT Integration with (relevant) suppliers for efficient and effective operations are established (e.g. EDI, SRM).	The soft skill portfolio of the PSM team is managed in an appropriate way (e.g. interpersonal communication, teamwork, analytical skills, customer orientation).
Clear documentation of core PSM processes that fulfil the recommendations of professional process management (e.g. process notation, defined process owner) and compliance guidelines.	The mind set and aspiration of the PSM personnel and the CPO is high (culture of excellence and entrepreneurial thinking).
By applying a (multi-dimensional) purchasing controlling it is possible to link the purchasing's influence on firm's performance (e.g. scorecard).	For the critical parts a second source is defined.
The PSM department and its employees know or (better) are part of creating the corporate goals and budgets and consider the strategic goals of the company in their actions.	There are fixed resources (time, manpower) for strategic tasks and initiatives next to daily operations.
Formulated and differentiated sourcing strategies (per category and/or supplier) are established based upon a structured process (e.g. using portfolio-technique; strategic importance of products).	Deputies are installed for the critical positions and trained in a proper way.
Intensive use of strategic spend and cost management methods (LPP, TCO, CBD/Open Book, investment appraisal).	The most important sources (primary and secondary) are known for finding appropriate supplier.
Risk and market monitoring is established as integrated part of the PSM operations (e.g. anticipate trends, SWOT).	Contract management is established at a professional level (coverage rate, standards, archive, compliance rules, different templates for different supplier types). If there are no contracts, clear general purchasing terms are in place.
The PSM department is at a senior hierarchical level in the company (part of the management or directly in the first reporting line to the executive management).	Frame orders and call-offs with main suppliers are properly used to increase efficiency of the purchasing process and use the price advantages of pooling.
There is a clear career path for professional advancement in the PSM department.	The hard skill portfolio of the PSM team is managed in an appropriate way (e.g. negotiation, process management, quality management, ICT skills).
Roles and responsibilities for specific tasks and approval steps are clearly defined (e.g. mandates, job descriptions and requirement profiles).	Process automation (e.g. workflows) for routing tasks (e.g. x-articles) is primarily used to stabilise the processes and having more time for strategic issues than for cutting costs.
Structured policies and documented procedures for the core phases in the supplier management process are in place, as well as clear responsibilities.	There are clear interfaces and communication structures in the company (e.g. R&D for new product ideas, standardisation issues/ production planning for forecasting issues). It is clearly defined when PSM has to be involved (in a cross-functional team).
Clear and suitable commodity structure based upon an agreed commodity code classification with defined responsibilities is in place.	There is a will and culture of early involvement of PSM.
There is a TOP-Management commitment for PSM strategies, goals and actions.	Structured policies and documented procedures for the core phases in the supplier management process are in place, as well as clear responsibilities.

Table 82: Comparison of the twenty most important key evaluation points from theory and practice

RESEARCH NOTE

The analysis showed a relatively high accordance rate between the opinion of the participating CPO/purchasing managers and the PSM teams across the firms: 12 out of 20 KEPs are ranked from both sides in the top 20 list of most frequently mentioned key evaluation points (indifferent of respective goals and contextual factors). By contrast, the accordance rate between theory and practice is rather low, whereby only seven out of the top 20 KEPs based upon theory (chapters 2.2.3-2.2.4) were also covered from the case firms (CPO or PSM team). Only on three KEPs *(powerful ICT support, being part of the corporate goal setting process and clear and suitable commodity structure)* all three rankings (theory, CPO and PSM team) agreed. The reason for this might be that most of the (analysed) academic books and scientific journal papers, available as sources for theoretical deriving the key evaluation points, might have a strong(er) focus on large(r) enterprises, whereas the sample presented here rather represents medium-sized firms, which naturally focus on other aspects first. This reflects strong evidence of the need for more intensive (maturity) research on purchasing and supply management for small- and medium-sized firms, and again underlines the necessity of contextualisation of a maturity model for a useful application in a firm.

Furthermore, this result makes it impossible to derive a sort of uniform quick check for maturity assessment – as requested by three case study firms – with a limited number of key evaluation points that might fit for all companies.

5.1.3 Validation of the proposed maturity reports and templates

During the second on-site visit the condensed data from the assessment of the respective firm was presented and discussed applying the conceptually designed maturity reports (see chapter 3.3). Furthermore, the case firms were asked to give recommendations for further relevant reports. All proposed reports (chapter 3.3) were considered suitable and essentially clear in its application by the ten companies. Company (C2), (C4), C(5), C(8) and C(10) outlined that the results are very meaningful and that they are surprised to see "*the diversity of opinions about strengths and weaknesses as well as relevant issues to work on"* between the team and the CPO in such a condensed format, what again underlines the relevance of the *triangulation rule of participation.* Company (C2), (C3) and (C6) also highlighted the *"power of disagreements"* which fostered organisational learning and triggerd constructive discussions in their specific cases. To motivate the participants to take a contrary position to the CPO, an open and collaborative culture *(Bititci et al., 2015),* as well as a deliberate nomination of critical and constructive employees who have the courage to be at variance with the CPO and dare to openly point out weaknesses and rooms for improvement is recommended.

The following recommendations for further reports and templates to improve the maturity reporting and action module of the PSM^2F were made: Company (C3)

recommended adding a report representing *"the virtual optimist and pessimist within the firm"*. This report in the form of a radar chart with the eight maturity dimensions contains two curves representing the particular highest and lowest value of significance and maturity of the participating parties.[95] Taking the proposed report No. 3 *(Comparison of weighted result of CPO in comparison with different views based upon hierarchy and areas of responsibility)* presented in chapter 3.3 as a basis, the following figure illustrates the extension with the "*virtual optimist"* and *"virtual pessimist"*.

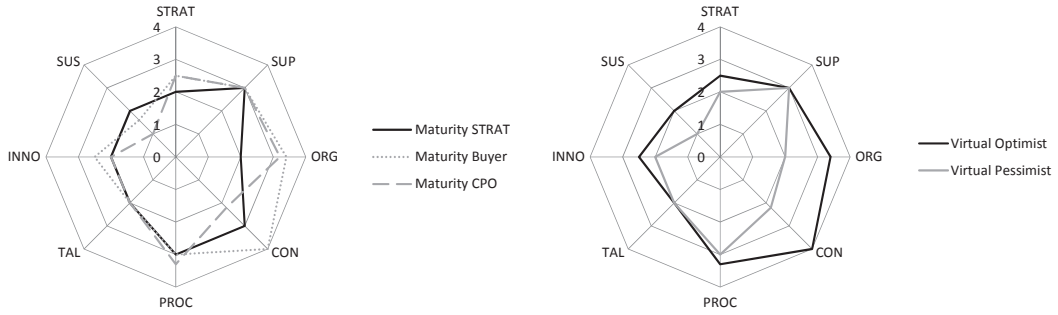

Figure 40: Virtual optimist and pessimist within the PSM team

In contrast to the other radar charts, there is not one curve per participant/participating group, but one curve representing all highest values of the participants. If one participant always assigns the highest score, then the curve of this participant is also the virtual curve. If there are three participants with different opinions about the current maturity level, then the virtual curve is a mixture of the respective highest value of these three evaluations.

Based upon the further requested "Don't know" option in the maturity assessment (chapter 5.1.1), a report representing the overall *"Don't know"quote* per single KEP or maturity dimension (Table 83) can be an indicator for those areas, the members of the PSM department have the lowest (but should have a higher) knowledge about.

Maturity Dimension	Total number of assessed KEPs	Number of "Don't know" mentions	"Don't know" quote
Strategy & Plans	20	4	20%
Organisation & Internal Interfaces	19	5	26%
Supplier Management & External Interfaces	28	4	14%
…	-	-	-

Table 83: "Don't know" quote per maturity dimension (example)

[95] Some management oriented maturity models are offering a quite similar report, but in contrast to here with a multi-firm perspective. Based on their consulting experience and benchmarking data, *Cell Consulting, Arthur D. Little* and *IMP Consulting* define a "virtual star" as a notional value representing the highest value in each dimension.

Company (C4) and (C7) asked for a report (in the form of a list) representing those KEPs that currently have a high maturity value and a rather low corresponding significance *(over-achieved KEPs)*. These areas of over-achieving may block some resources that can be better used in areas of high significance and corresponding low maturity, why making them transparent might be useful. Based upon this, it is also possible to calculate and display the average maturity per category and compare it with the average significance value (SDTMS) in this dimension to indicate *over- and underachieved maturity dimensions.*

Strategy & Plans	**Ø Maturity**	**Agreed SDTMS**
Risk and market monitoring is established as integrated part of the PSM operations (e.g. anticipate trends, SWOT) to secure the supply.	3,5	2
…	-	-
Talents & Skills		
Integration programmes for new personnel (e.g. job rotation, job profiles, checklists, mentoring, feedback, team building) helps to easily integrate new employees.	4	2
…		

Table 84: Over-achieved KEPs (example)

To finally transform the results and findings from the maturity assessment into concrete actions for improvement, company (C1), (C3) and (C5) requested a condensed overview concerning the impact of improving a specific KEP and the necessary resources to do so. Therefore, the *"Impact-Effort-Portfolio"* – also recommended by the European Foundation for Quality Management (EFQM, 2006) – can be proposed as advancement of the third module of the PSM^{2}F. It contrasts the impact of a transformation measure with the effort that might be necessary for the implementation (Figure 41).

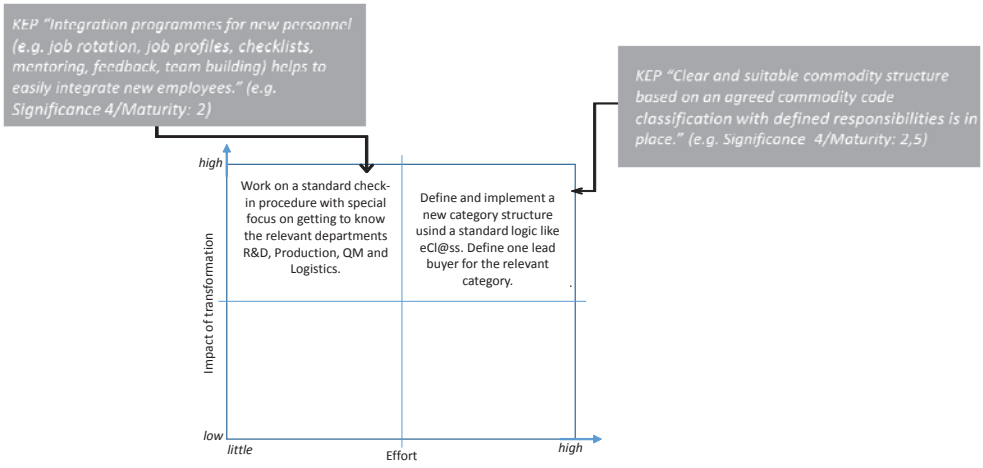

Figure 41: Impact-Effort Portfolio (including an example)

If the effort and necessary resources for bringing a very important KEP (significance value 3-4 with simultaneously low maturity value) to a higher maturity level are not so extensive, time-consuming or costly, these steps should be undertaken first (top-left quadrant). In the top-right quadrant, you can position those topics that also refer to a very important KEP but for which the effort to bring these aspects to a higher maturity

level is very resource-/time- or cost-consuming. In the lower half of the portfolio, the topics that do not have such a high impact on the intended transformation goals can be recorded.

RESEARCH RESULT

Taking the proposed maturity reports and templates from chapter 3.3 as a basis and expanding these recommendations by the findings from the case studies, the following maturity reports and templates for planning and monitoring a PSM transformation *(third content-related core element of PSM²F)* can be finally suggested:[96]

- *Overall maturity level in each dimension in comparison to the agreed target scenario or the theoretical highest maturity scenario*
- *Comparison of the maturity estimation from the CPO in comparison with the estimation from the PSM team*
- *Comparison of the maturity estimation based upon hierarchy and areas of responsibility*
- *Most relevant KEPs sorted by the agreed significance value (SDTMS)*
- *Most relevant KEPs sorted by the average maturity level*
- *Most relevant KEPs sorted by maturity dimension and corresponding (agreed) significance value (SDTMS)*
- *Most relevant KEPs sorted by maturity dimension and corresponding (agreed) maturity value*
- *Change of maturity level (increase/decrease) in comparison to initial assessment and agreed target maturity scenario (SDTMS)*
- *Range value and level of congruency of maturity assessment*
- *Accordance rate per maturity dimension*
- *Virtual optimist and pessimist within the PSM team*
- *"Don't know" quote per maturity dimension*
- *Over-achieved key evaluation points*
- *KEP portfolio (significance-maturity)*
- *Impact-Effort-Portfolio*
- *Action plan template*

5.1.4 *Validation of the factor model of supportive elements for maturity transformation initiatives in PSM*

To finally validate the theoretically derived determining factors of effective and efficient improvement initiatives (chapter 2.2.5), the participants were asked to comment on the factor model, which was first presented and then – in analogy to the maturity assessment and following the advice of the advisory board (chapter 4.1) – forwarded per email to give the participants the chance to work on it when they have time. Along with checking whether a factor is unclear, the participants were asked to evaluate each factor on a scale from 1 (not relevant for a successful change) to 4 (very relevant for a successful change; Figure 42). Following that, the received data was

[96] Especially for the first three reports the integration of the view of the direct line manager of the CPO (e.g. CEO, COO) would be a valuable advancement in order to get a profound impression and feedback from the executive level (see also comment from company (C2), Table 73).

analysed to detect the most and least significant factors from the perspective of the ten case firms.

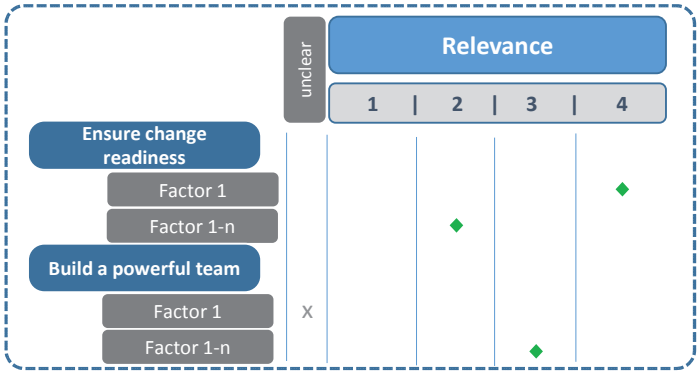

Figure 42: Relevance check of supportive factors for a PSM transformation

No factor was defined as unclear and also no further factors were proposed from the firms. Moreover, the defined seven categories were confirmed as being suitable and meaningful by the firms. In the following table, the ranking of the twenty most important factors (calculated by mentions) is displayed.

	Most important supportive factors for a transformation in PSM	∅ Rele-vance	Main category
1	*Ensure TOP-Management commitment for the intended change and visibility during the change.*	*3,93*	*Work on a shared vision and accepted goals*
2	*Decide for (a) strong leader(s) and leading team.*	*3,93*	*Build a powerful and leading change team*
3	*Celebrate the "real heroes" and not just the team-leader or overall change manager.*	*3,93*	*Deliver quick and intermediate wins and celebrate success*
4	*Ensure clear responsibilities and commitment to the tasks in the change team.*	*3,87*	*Build a powerful and leading change team*
5	*Making priorities, taking decisions and shift tasks and responsibilities if necessary.*	*3,80*	*Ensure resources and set priorities*
6	*Convince TOP-Management with clear KPIs or benchmark studies that a change is necessary.*	*3,73*	*Ensure change readiness in the PSM team*
7	*Work on and create a shared vision for the organisation, the team and the individual. Try to make it visible, easy to understand and clear (see-feel-change).*	*3,67*	*Work on a shared vision and accepted goals*
8	*Ensure a culture of early and open communication (feedback/lessons-learned). Create multiple ways of giving (two-way) feedback.*	*3,53*	*Establish authentic and open communication*
9	*Guarantee the necessary resources (budget, time) and ensure the availability and visibility of a change leader/agent.*	*3,53*	*Ensure resources and set priorities*
10	*Plan a pilot-phase (trial run) to check whether a new approach works.*	*3,53*	*Ensure transparent transformation roadmap & consolidation*
11	*Foster a culture that risk taking/making errors is allowed to boost creativity and innovation.*	*3,53*	*Ensure change readiness in the PSM team*
12	*Don't stick to the plan simply because it's a plan. Allow adaptation based upon arising (new) contingent factors (e.g. changing goals, market indicators) and reasonable criticism or feedback.*	*3,47*	*Ensure transparent transformation roadmap & consolidation*
13	*Establish a lessons-learned cycle to learn from the good and bad practices of each change initiative.*	*3,47*	*Establish authentic and open communication*
14	*Create a culture of trust and being supportive.*	*3,40*	*Ensure change readiness in the PSM team*
15	*Change the conditions (e.g. technology, systems) and infrastructure when necessary for the intended change.*	*3,40*	*Ensure resources and set priorities*
16	*When starting the change, ensure a clear transition roadmap that can be easily explained.*	*3,33*	*Ensure transparent transformation roadmap & consolidation*
17	*Ensure clear KPIs and controlling -loops for status control (e.g. BSC, steering meeting).*	*3,27*	*Ensure transparent transformation roadmap & consolidation*
18	*Actively plan quick and intermediate wins especially for those people who are critical at the beginning but crucial for the success of the transformation.*	*3,13*	*Deliver quick and intermediate wins and celebrate success*
19	*Accept and actively motivate people to take a critical approach towards the change plan. This feedback can shed new light on the original plan, and can make it better.*	*3,13*	*Establish authentic and open communication*
20	*Analyse and integrate all relevant internal and external stakeholders with the purpose of creating a feeling of ownership (buy-in) before the change starts (work on critical mass, early involvement). Try to catch their emotions.*	*3,13*	*Work on a shared vision and accepted goals*

Table 85: 20 most important supportive factors for a PSM transformation based upon field-research (CPO & Team)

In Table 86 the ten least important factors based upon the mentions of the case study firms are listed.

	Least important supportive factors for a transformation in PSM	∅ Rele-vance	Main category
1	*Be open for diversity.*	*2,2*	*Build a powerful and leading change team*
2	*Understand that an organisational change needs a change of the team and a change of a team needs a change of individuals.*	*2,27*	*Build a powerful and leading change team*
3	*Institutionalise the changed procedures and habits by e.g. new process descriptions, updated job descriptions and business cards or by conducting road-shows for promotional purpose.*	*2,33*	*Ensure transparent transformation roadmap & consolidation*
4	*Work on a clear elevator pitch about the intended change that is transparent and easy to understand and remember.*	*2,33*	*Establish authentic and open communication*
5	*Start with the communication long before the start of the change and avoid a cold start.*	*2,40*	*Build a powerful and leading change team*
6	*Actively plan team-building measures in advance to have a powerful team when the change starts (e.g. outdoor training, regular relaxed meetings across hierarchies).*	*2,40*	*Establish authentic and open communication*
7	*Don't promote the closure of the change too early.*	*2,47*	*Ensure transparent transformation roadmap & consolidation*
8	*Accept and actively plan phases of "inefficiency" in the overall plan (e.g. typical change curve, learning dip) and plan interventions.*	*2,47*	*Ensure transparent transformation roadmap & consolidation*
9	*Ensure a target group-oriented communication plan (who receives which information when and in which form: e.g. roadshow, conference, wiki, social media, mailing, personal).*	*2,53*	*Establish authentic and open communication*
10	*Give the involved people space for self-organisation (empowerment).*	*2,53*	*Build a powerful and leading change team*

Table 86: 10 least important supportive factors for a PSM transformation based upon field-research (CPO & Team)

RESEARCH RESULT

The seven main categories with its 45 determining factors for fostering an effective and efficient change in PSM could have been confirmed by the case studies. Since no further factor was added from the firms and no factor had an average value below 2.2 (on a scale from 1-4; Table 86), this model can be seen as a robust summary of determining factors which might increase change management capabilities in PSM.

Main categories of supportive change factors in PSM	Final number
Ensure change readiness in the PSM team	5
Build a powerful change team	9
Work on a shared vision and accepted goals	5
Establish an authentic and open communication	7
Ensure a transparent transformation roadmap	9
Ensure resources and set priorities	6
Deliver quick and intermediate wins	4
Total number of factors	**45**

Table 87: Final number of supportive change factors

Comparing the top 20 list (Table 85) with the theoretically-derived factors of supporting a transformation in PSM (Table 55, chapter 2.2.5), there is an accordance rate of twelve out of twenty factors. In detail the factors 1, 2, 5, 6, 7, 8, 10, 15, 16, 17, 18, 19 and 20 are in both top 20 lists. To prove the robustness of these factors, the range value (1-4) was analysed across the ten cases. The result is displayed in Table 88:

Company	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Ensure TOP-Management commitment for the intended change and visibility during the change.	4	4	4	4	4	4	4	2	4	4
Decide for (a) strong leader(s) and leading team.	3	3	4	4	4	4	4	3	4	4
Making priorities, taking decisions and shift tasks and responsibilities if necessary.	4	4	3	2	4	4	3	4	2	3
Convince TOP-Management with clear KPIs or Benchmark studies that a change is necessary.	4	4	3	3	3	3	3	4	3	3
Work on and create a shared vision for the organisation, the team and the individual. Try to make it visible, easy to understand and clear (see-feel-change).	3	4	4	3	3	3	3	3	3	4
Ensure a culture of early and open communication (feedback/lessons-learned). Create multiple ways of giving (two-way) feedback.	3	3	3	3	4	3	3	3	3	3
Plan a pilot-phase (trial run) to check whether a new approach works.	3	3	3	4	3	3	3	3	3	3
Change the conditions (e.g. technology, systems) and infrastructure when necessary for the intended change.	3	3	3	2	3	4	3	4	3	3
When starting the change, ensure a clear transition roadmap that can be easily explained.	3	2	3	3	3	3	2	3	3	3
Ensure clear KPIs and controlling -loops for status control (e.g. BSC, steering meeting).	2	3	3	3	3	2	3	4	3	3
Actively plan quick and intermediate wins especially for those people who are critical at the beginning but crucial for the success of the transformation.	3	3	2	3	3	3	3	1	3	2
Accept and actively motivate people to take a critical approach towards the change plan. This feedback can shed new light on the original plan, and can make it better.	2	2	3	3	3	2	3	2	3	3
Analyse and integrate all relevant internal and external stakeholders with the purpose of creating a feeling of ownership (buy-in-) before the change starts (work on critical mass, early involvement). Try to catch their emotions.	3	3	3	2	3	2	2	3	2	3

Table 88: Cross-case analysis for the top twelve factors for a successful PSM transformation

RESEARCH RESULT

With an average range value of 1.4 over all twelve factors, these selection (out of the overall 45 factors) can be validated as rather robust and suitable for supporting an effective and efficient transformation in PSM, which makes them a sort of *basic foundation for a successful transformation in PSM*.

5.2 Validation of the applicability of the PSM²F in a longitudinal case: an action research approach

In the previous chapters the main focus was on the presentation of the central findings for validating and refining the proposed structural elements of the PSM²F *(best-practice database with KEPs and assessment scheme, maturity reporting, factor model of supportive elements for maturity transformation initiatives in PSM)*. Moreover, findings concerning the design characteristics were discussed. Building on this, in this section a brief summary of one cycle of the PSM²F will be presented based upon one longitudinal case. Overall target is to (1) *make the application logic and interaction of the three modules and its structural elements of the framework clearer* and (2) to give an example of *applying the factor model of supportive elements on one concrete business case.* Hence, this paragraph contributes to a better understanding about how

the *PSM dimension* and the *change management dimension* might complement each other for an effective and efficient transformation process. Furthermore *(3) the most significant challenges in the implementation and application of the PSM²F* will be finally summarised.

Company (C3) was selected for the longitudinal case due to an intended strategic reorientation and overall reengineering of the PSM function.

Case Study Company	Company (C3), Mechatronics
Employees	180 in total, 8 in PSM department
Role of participants	Core team: CPO, Strategic Purchasing, Lead Buyer // During the longitudinal case 5 other PSM employees took part in the maturity assessment.
PSM goals	Increase the strategic orientation, intensify pro-active supplier management, reducing risks & security of supply, reducing & optimising costs
External view (other departments) on PSM importance	High

Table 89: Profile of longitudinal case firm

As already mentioned in chapter 4.1, in this longitudinal study, strategies from action research were applied. In detail, the field researcher took an active role of facilitating the process of maturity assessment and transformation in cooperation with the participants of company (C3). This direct collaboration was mainly reflected by supporting the CPO in introducing the PSM²F to the firm and support the PSM team in establishing a concrete company-specific transformation strategy and action plan. Next to generally agreeing in participating in the longitudinal case, the participants of the company also had to confirm that they are aware of playing a more active role in the (action) research process[97] *(Müller, 2005; Coughlan/Coghlan, 2002; Reason, 1999).* Main objective was to perform one cycle of the PSM²F together with the field researcher, to validate the main constructs and elements of the framework. One part of the *researcher-client agreement (see chapter 4.1)* was also to publish the final (research) results in order that other firms can benefit from the findings too.[98] By receiving support in conducting the maturity assessment as well as in setting-up a transformation roadmap and action plan, company (C3) also received significant value in return. For a clear understanding, the subsequent explanations will follow the three main modules of the PSM²F (chapters 3.1-3.3). When describing the procedure and key findings, particular attention will be given on presenting the outcomes and findings in a way whereby the solutions and results should not only be relevant for the immediate

97 In comparison with the other case firms, in the longitudinal case the expenditure of time each participant had to spend was much higher (five more on-site visits) and also the contact between the on-site visits was more intensive.

98 Furthermore, it was clarified by the field-researcher that the research part of the longitudinal case will end by August 2015.

situation in the respective firm, but can also lead to general applicable learnings for other companies *(Coughlan/Coghlan, 2002; Coghlan/Brannick, 2001).*

5.2.1 Preparation module

Due to the fact that company (C3) also took part in the overall case study (starting four months before the longitudinal case), the research goals as well as the basic concept of the PSM²F was already known and clear. Moreover, the three participants (CPO, Strategic Purchasing, Lead Buyer) were already defined as the *core team*. In this role, the *context-specific setup of the PSM²F* and jointly working on the initialisation of the first interventions for *triggering the driving forces* and preparing a smooth transformation were the first tasks. As a sort of guiding principles for setting the target maturity scenario (SDTMS) of the transformation of the PSM function, the following goals were (pre-)defined (see Table 89):

- *Increase the strategic orientation*
- *Intensify pro-active supplier management*
- *Reducing risks & security of supply*
- *Reducing & optimising costs*

Before announcing the PSM maturity improvement initiative to the entire PSM department and the rest of the firm, in an all-day workshop the model of determining change factors (see chapter 2.2.5) was jointly analysed with the participants to develop strategies and interventions that might facilitate the intended structural transformation. The following measures and actions were defined, taking the 45 theoretically-derived supportive factors of maturity improvement (Table 48-Table 54) as a reference.

Ensure change readiness in the PSM team (2.2.5.1)	**Derived strategies and measures for the transformation roadmap**
Create a sense of urgency and awareness for the need of change (long) before the actual transformation projects start. Convince the affected people that there is a risk of not changing the old habits and structures.	▪ Decision to invite all PSM employees next to the core team in participating in the maturity assessment and action planning in order to achieve the buy-in. ▪ The researcher supported the CPO in creating a presentation including benchmark- and trend-studies in PSM (see chapter 2.2.4.2) that might enhance the driving forces. This presentation was then used for an initial kick-off presentation with the PSM team to announce the transformation initiative. ▪ Two (innovative) companies from the network of the researcher were invited to actively present some of their past activities to improve the PSM maturity during the recent years and to provide some external views to the PSM team which might also foster the driving forces.
Ensure the necessary competencies and abilities (hard skills and soft skills) before the actual change project starts to build up confidence and reduce fear of change.	▪ One team member was currently finishing a master degree programme in Purchasing Management. Given that this person was also very experienced, this person assumed the role as a second change agent next to the CPO. ▪ For the other team members suitable external training primary in project management (for working on the sub-projects after the assessment) and strategic purchasing were selected and offered.
Ensure a culture of lifelong learning and an inner desire to become continuously better.	▪ It was decided to conduct one field trip to a comparable company (same size and branch) and one to a large and industry leading company from the automotive sector for benchmarking reasons and to foster out-of-box experiences. ▪ The CEO – who triggered the transformation to a more strategic orientation – was asked to participate in the kick-off workshop with the PSM team but also to start with informal messages concerning the importance of lifelong learning and continuously improvement in advance.
Create a culture of trust and being supportive.	▪ In this company, a good culture was already established (e.g. informal communication style, many socialising activities). Nevertheless, it was decided to actively communicate to each PSM team member in a personal conversation after the kick-off that his/her expertise is crucial for the successful transformation.
Foster a culture that risk taking/making errors is allowed to boost creativity and innovation.	▪ The CEO was also asked to address this message in his direct conversations as well as during his kick-off speech.

Table 90: Derived strategies to "Ensure change readiness"

Build a powerful change team (chapter 2.2.5.2)	**Derived strategies and measures for the transformation roadmap**
Decide for (a) strong leader(s) and leading team with change experience.	▪ The CPO and the aforementioned supportive change agent were nominated as the main leading team due to their experience. ▪ However, it was intended to create a feeling of an overall *change team culture* with flat hierarchies and high level of autonomy. Correspondingly, all other PSM team members were defined as "change facilitators".
Work on suitable roles within the team for the change period and for the time after the transformation according their (probable) commitment.	
Having transparency about the different "players" in the change initiative concerning their commitment (e.g. first mover, early followers, late followers, blockers, change agents).	▪ Given that the experience level within the PSM team was different, the specific roles in the change were planned accordingly. New employees got the role of "external experts", bringing their experience into the discussion. The more experienced ones were positioned as "process experts" who perfectly know the effects of change on the daily routines. Both roles were defined as equally important. ▪ Furthermore, for each employee a DISC profile representing different behavioural types/patterns (Dominance, Inducement, Submission and Compliance) was available and used for deeper investigation.
Be open for diversity in order to learn and benefit from different personalities and their strengths.	▪ Although diversity was more-or-less already given (male, female; educational level; experience), it was decided to conduct at least two field trips a year or invite external PSM experts from other firms to speak about their experiences and ideas.
Ensure clear responsibilities and commitment to the tasks in the change team.	▪ It was agreed that the CPO will have the overall lead for the overall transformation. ▪ For the different sub-initiatives, it was defined to nominate a "change owner" out of the team, who will subsequently have the lead to define (if necessary) an own team and plan the necessary budget for the concrete projects.
Actively plan team-building measures in advance to have a powerful team when the change starts.	▪ Due to the fact that in this company half-yearly team workshops (outside the firm) are compulsory and were already budgeted, it was decided to use the first team workshop in 2015 (February) to focus especially on team-building and team-experiencing.
Give the involved people space for self-organisation (empowerment).	▪ The lead for the single transformation projects was spread to the entire team.
Understand that an organisational change needs a change of the team and a change of a team needs a change of individuals.	▪ This aspect was discussed in a meeting together with the CPO, the CEO as well as the other two nominated members of the core group. Outcome was to plan the communication strategy as well the overall time schedule in a way that the affected people will have the chance to reflect, to hand in their remarks, doubts and concerns and clarify that a change of the intended plan is possible due to legitimate reasons.
Ensure flat hierarchies and eliminate status and rank in the creative process of ideas generation.	▪ This point was mainly given, and the company was used to work on creative or strategic tasks together with the management.

Table 91: Derived strategies to "Build a powerful change team"

Work on a shared vision and accepted goals (chapter 2.2.5.3)	**Derived strategies and measures for the transformation roadmap**
Analyse and integrate all relevant stakeholders with the purpose of creating a feeling of ownership (buy-in-) before the change starts.	▪ For the kick-off workshop with the entire PSM team it was planned to jointly work on a visual vision of the intended common future. "What is our self-image in five years from now? and "How we want to be perceived from other departments and external stakeholders?" were the two main leading questions that needs to be illustrated in an easy way. ▪ Learning journeys and training activities should also increase the driving forces and the establishment of a "culture of excellence" and a common vision to become a world-class PSM team.
Work on and create a shared vision for the organisation, the team and the individual. Try to make it visible, easy to understand and clear.	
Ensure TOP-Management commitment for the intended change and visibility of the management during the change.	▪ This aspect was mainly given, but the CEO was asked to visit the PSM department more often especially at the beginning and then occasionally during the transformation and ask for the status of the change and the needs of the team to boost the transformation.
Transfer the overall vision of the change from a corporate view to clear individual goals for each employee.	▪ The CPO took on the task, to connect the goals for the overall PSM transformation with the individual goals of each employee. Moreover, it was defined that these goals will be discussed during the annual review meeting at the end of Q1/2015 of the new fiscal year.
Giving affected people sufficient time to reflect and think about the intended change. Allow feedback and discussion and accept that there are multiple constructs of reality, values (right/wrong) and problems. Legitimate the expression of feelings.	▪ The overall time schedule and communication plan should be planned in a way that the affected people will have sufficient time to reflect and hand in their remarks and concerns. ▪ To encourage feedback, everyone will be asked to name at minimum one idea for improvement or one aspect of concern.

Table 92: Derived strategies to "Work on a shared vision"

Establish an authentic and open communication (chapter 2.2.5.4)	**Derived strategies and measures for the transformation roadmap**
Ensure clarity, honesty and authenticity in the change communication. *Ensure a culture of early and open communication (feedback/lessons-learned). Create multiple ways of giving (two-way) feedback.* *Start with the communication long before the start of the change and avoid a cold start.* *Ensure a target group-oriented communication plan (who receives which information when and in which form: e.g. roadshow, conference, wiki, social media, mailing, personal).*	▪ It was decided to follow the two-phase approach of communication (chapter 3.1), and ask the CEO to use official meetings to inform the company about the need for operational excellence due to the expansion course and future goals of the company (not focusing on PSM in particular). ▪ It was agreed that the CPO will subsequently take this opportunity to address the possibility and the role of PSM to actively participate in this overall excellence programme to improve certain areas of the purchasing function and contribute towards reaching the corporate goals. ▪ It was also defined, to actively communicate that the current state was suitable for the current challenges, but that the future challenges would need a different setup, in order not to create a feeling of "everything we did in the past was wrong". ▪ The core team as well as the CEO were sensitised to prove the content and planned media of the communication. If it might have a negative effect for one of the team members, this communication should be conducted personally. Non-critical communication can also be undertaken in an electronic way.
Accept and actively motivate people to take a critical approach towards the change plan. This feedback can shed new light on the original plan, and can make it better.	▪ One external communication expert, who already had experience with the company, was invited to hold a workshop with the PSM team in 12/2014 to discuss with the team the topic of "feedback" and "constructive criticism".
Establish or use a lessons-learned cycle to benefit from good and bad practices and experiences from previous change initiatives.	▪ It was decided to start every (new) sub-initiative of the transformation with a "lessons-learned" session from (associated) past projects.
Work on a clear elevator pitch about the intended change that is transparent and easy to understand and remember.	▪ The elevator pitch was created containing three parts: First, to address the chance to work now on open issues due to the company-wide excellence programme. Second, by referring to the above-mentioned drawing of the jointly agreed future state of purchasing in the firm (Purchasing 2020). And third, to underline the possibility of new tasks, roles and responsibilities that might be possible due to a more strategic orientation of the PSM function in the future.

Table 93: Derived strategies to "Establish an authentic and open communication"

Ensure a transparent transformation roadmap (chapter 2.2.5.5)	**Derived strategies and measures for the transformation roadmap**
Ensure professionalism in project management for each of the concrete change initiatives, and keep an eye on other change projects in the firm that might affect the intended change (multi-project-management). *Ensure clear KPIs and controlling-loops for status control (e.g. BSC, steering meeting).*	▪ The company is already offering basic project management trainings for its employees. ▪ It was agreed that each owner of a sub-project of a transformation will be in charge of planning and controlling the project from a time- (i.p. start-date, milestones, due date) and cost-perspective (necessary investment or external costs), as well as in the definition of the project team. ▪ Furthermore, it was planned to define sub-projects that will not last longer than three months, to keep the team motivated (next to the daily business). ▪ For each sub-project the "change owner" will have to present a so-called "one-pager" about the status (i.p. budget, time-plan, risks, next steps) on a regular base. ▪ The CPO will be responsible for the multi-project-controlling and also for taking priorities of the single initiatives to guarantee that single team members are not overloaded or too many initiatives are running parallel. ▪ It was also agreed to use one of the standardised weekly (every Friday) information meetings per month to report about the status of one of the improvement projects.
When starting the change, ensure a clear transition roadmap that can be easily explained.	▪ The transition roadmap will be based upon the result of the definition of the SDTMS and the maturity assessment (module 2). Subsequently, the critical aspects will be analysed, discussed and sub-initiatives will be planned. For each sub-initiative a brief description with intended short- and long-term outcome and planned due date have to be created (action plan).
Accept and actively plan phases of "inefficiency" in the overall plan (typical change curve, learning dip) and plan interventions.	▪ It was decided to actively address this aspect in the kick-off workshop with all PSM team members, to prove that the management is aware of that, and prepare the organisation for not being frustrated due to this "normal" course within a transformation.
Institutionalise the changed procedures and habits by e.g. new process or job descriptions, clear responsibilities, updated business cards or by conducting road-shows for promotional purpose.	▪ It was decided to celebrate every last cycle of the old process. ▪ The project leader was defined as responsible person to check and update the process and job descriptions if necessary.
When working on the plan, discover the future in diverse perspectives and scenarios. Integrate the management view and the view from the employees from the middle-management and from the shop floor.	▪ It was decided (and approved from the CEO) to apply the (more cost-intensive) triangulation rule of participation whenever it is possible and whenever it makes sense to guarantee diverse views on the topic. ▪ For the creative process and dissolve old habits it was decided always to ask: "When there is no restriction of budget, how would the process/the new structure looks like?". ▪ For creating new procedures that are highly customer-oriented, it was decided that all "change owners" should raise and discuss the following question with the project: "When you have to work with the output of the process, what should this output look like?"
Don't stick to the plan simply because it's a plan. Allow adaptations based upon arising (new) contingent factors and reasonable criticism or feedback.	▪ The affected team members will receive the information during the kick-off that they will have an active and facilitating role in designing the future of the PSM function of the firm. It will also be addressed that it might be possible to change and re-prioritise some projects when contingent factors change or due to legitimate objection.

Ensure a transparent transformation roadmap (chapter 2.2.5.5)	**Derived strategies and measures for the transformation roadmap**
Plan a pilot-phase (trial run) to check if a new approach works.	▪ It was agreed that, if possible, trial runs of new approaches (e.g. new supplier assessment form, new workflow for supplier qualification) are preferred over working too long on the "perfect" concept. ▪ It was defined in advance that changes of these pilots/prototypes are very likely and that the "successful change" will only be announced after the first feedback and refinement loop.
Don't promote the closure of the change too early.	

Table 94: Derived strategies to "Ensure a transparent transformation roadmap"

Ensure resources and set priorities (chapter 2.2.5.6)	**Derived strategies and measures for the transformation roadmap**
Guarantee the necessary resources (budget, time) and ensure the availability and visibility of a change leader/agent.	▪ Starting the longitudinal case, the aspect of offering the necessary budget was discussed between the field researcher and the CEO as well as the CPO. For the CEO it was clear that additional resources will be necessary and that he agrees on approving necessary extra hours or if necessary external support by third parties. ▪ The CEO was asked to actively address this willingness during the kick-off workshop. ▪ As mentioned above, all dedicated leaders of a sub-project had to plan the necessary budget for the intended initiative. Together with the CPO these drafts have to be discussed before final approval.
Making priorities and shifting tasks and responsibilities if necessary.	▪ The CPO took the role as a kind of "change controller" of the parallel initiatives.
Change the conditions (e.g. systems) and infrastructure when promoting the intended change.	▪ Although necessary data was essentially available in the internal ERP system as well as in a data-warehouse, the CEO indicates his willingness also to invest in new systems (e.g. SRM/eProcurement) if necessary for reaching the next level.
Be open for and plan external input from consultants, universities or other external experts when useful.	▪ At the beginning the field researcher could take this role of initiating and facilitating the transformation. ▪ External experts form other companies were also invited to present their ideas of a progressive PSM or applied strategies to improve the PSM performance in their firm.
Convince TOP-management with clear KPIs or benchmark studies that a change is necessary.	▪ Essentially, the CEO wanted the transformation. Nevertheless it was helpful to use studies and the structured maturity assessment framework to convince the CEO that the transformation will be undertaken (1) in a structured way, and (2) by involving the affected people.
Use top-down pressure to overcome some critical phases to make the intended change happen.	▪ For the CPO as well as the CEO it was clear that it also belongs to their management responsibility to occasionally use pressure to overcome critical phases or deal with critical or destructive team members.

Table 95: Derived strategies to "Ensure resources and set priorities"

Deliver quick and intermediate wins (chapter 2.2.5.7)	**Derived strategies and measures for the transformation roadmap**
Ensure incentives and rewards for (interim) success. Make stories out of it and spread it out to the company as motivation.	▪ It was agreed that the CPO will actively inform the team at the beginning of the transformation that new job profiles as well as new positions will be available (e.g. stronger focus on strategic purchasing, more responsibility for the Lead Buyers). ▪ It was also agreed that it is possible to create positions or update job profiles during or after the transformation is accomplished. ▪ The CPO and the CEO decided to plan a separate budgetary item for these incentives for the fiscal year 2015. ▪ One team member who normally is very sceptic about new approaches gained the active and highly important role of the "constructive change pessimist". He was in charge of discussing the meaningfulness and practicability of the intended measure together with the CPO and the dedicated sub-project leader.
Actively plan quick and intermediate-wins especially for these people that are critical in the beginning but crucial for the success of the transformation.	
Use the quick and intermediate wins as "magic moments" for introducing new change steps.	▪ It was decided to wait until the new processes/structures run stable and show a satisfying level, before launching a new initiative.
Celebrate the "real heroes" and not just the team-leader or overall change manager.	▪ It was decided to make the process owners transparent on the internal web-page of the PSM team. Furthermore, it was decided that the owners should use the opportunity of the standardised weekly (every Friday) information meetings to speak about the status and the results of their initiative.

Table 96: Derived strategies to "Deliver quick and intermediate wins"

RESEARCH RESULT

Also during the process of deriving the strategies and measures for fostering the transformation, the *triangulation rule of participation* was valuable, given that the strategic purchaser as well as the lead buyers gave numerours inputs.

Parallel to elaborating the above-presented measures and strategies that might positively influence the further procedures within the transformation process (see also Figure 28) in PSM, the core team also analysed the proposal of the theoretically-derived maturity assessment (see Figure 14) with its 104 key evaluation points in terms of necessary extension. Eight KEPs were finally added (see Table 68) based upon the feedback of the participants.

At the same time, the CEO intensified the (formal and informal) internal communication[99] about the need for further operational excellence in the firm, which is necessary to cope with the future challenges and planned business development. This initiated spirit within the firm was used to conduct the *kick-off workshop* (see Table 90, 92, 94, 95) in December 2014 to officially launch the PSM transformation "Purchasing 2020".[100] For this workshop the entire PSM department was invited. During the introduction of the CEO and CPO, both managers tried to apply the aforementioned strategies to foster change readiness (Table 90), to work on a shared vision (Table 92), and guarantee that the necessary resources will be (made) available to lay the foundation for an effective and efficient transformation (Table 95). Following that, the field researcher was officially introduced. Since the overall case study was already running for half a year and the core team regularly informed their – hitherto non-involved – colleagues about on-going actions, made the presentation of the overall research project and its goals easier. Furthermore, the field researcher's agenda and the defined exit date in August 2015 were announced, as well as that the overall transformation will be coordinated and monitored by the CPO.

The main part of this workshop was spent on discussing the intended goals (see Table 89) and working on a common visual vision for "Purchasing 2020" (Table 92). First, each participant had to define his/her own visual image of the intended future of PSM following the raised questions: *"What is our self-image in five years from now?"* and *"How we want to be perceived from other departments and external stakeholders?"* Due to the fact that the participants were not used to draw pictures to define a message, it was decided that everyone can also use written statements. During the workshop it became obvious that another workshop is necessary to finalise the task. The overall topics addressed from the participants were more-or-less the same. Exemplary statements were: *"We want to have more management attention for our work", "we need to be better integrated in the strategic decisions in our firm", "PSM should be the*

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99 All analysed sources about change management (see chapter 2.2.5) underline that a well-conceived communication strategy at an early stage can minimise the costs of failure due to poor or missing communication later in the transformation project *(see also Höfler et al., 2013; EFQM, 2006).*

100 *Weisbord/Janoff (2002)* provide a good overview about planning and conducting a *"future conference" (p.47ff)* within a firm.

central hub for all supplier management issues", "we want to have a stronger strategic focus and also more resources for working on such issues next to our daily work" or *"we want to be perceived as a pro-active service-oriented partner in the firm"*. To finally come up with a (professional) visual representation that can subsequently be displayed as a visual reminder for the team (and the other stakeholders) about the overall PSM vision for the future, a company specialised in graphic recordings (www.graphic-recording.at) was asked for support. Obtaining the consolidated content-related input from the field researcher, the company finally came up with the version presented below (Figure 43).

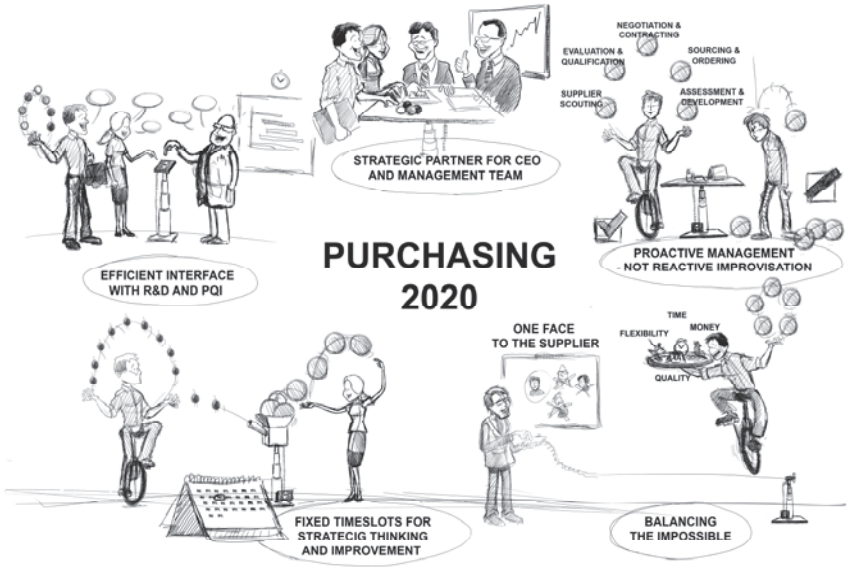
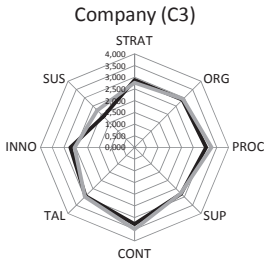


Figure 43: Vision „Purchasing 2020"

At the end of the second workshop, the maturity assessment (module 2 of the PSM^{2}F) was introduced as next step to integrate the opinion and expertise of all eight PSM team members to define the target scenario (SDTMS) for reaching the pre-defined goals (in a narrower sense) as well as the overall vision (in a broader sense) before finally evaluating the current maturity level.

5.2.2 Assessment module, reporting and action plan

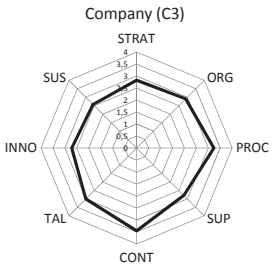
In January 2015 the assessment module of the PSM^{2}F was presented from the field researcher together with the CPO in front of the extended group. The participants were asked to complete the assessment (using a prepared spreadsheet application) following the procedure already described in chapter 3.2, before forwarding it to the field researcher for final consolidation. The consolidated result is displayed in Figure 43 (black line: CPO, grey line: average result of the team excl. CPO).



Company (C3)				
Significance/Weight				
	CPO	Ø TEAM	Deviation	Range
STRAT	2,88	2,77	0,11	1,2
ORG	2,89	2,93	-0,04	1,5
PROC	3,05	3,27	-0,22	1,2
SUP	2,81	2,78	0,03	0,7
CONT	3,29	3,50	-0,21	1,1
TAL	2,95	2,99	-0,04	1,0
INNO	2,73	2,55	0,18	1,4
SUS	1,88	2,25	-0,37	1,6
			Overall Range	1,2

Figure 44: Consolidated result, significance value in company (C3), before applying Delphi method

Illustrated by the quite similar curves in the radar chart but also by the rather low deviations of the significance value for the eight dimensions between the CPO and the team, there was already a high level of congruency among the participants about the question "*What is a proper target scenario of maturity to reach the intended goals in our firm?"*. Going deeper into the data, overall 16 KEPs showed a range value of 0 *(highest accordance; e.g. "The PSM department and its employees know or (better) are part of creating the corporate goals and budgets and consider the strategic goals of the company in their actions.", "Formulated and differentiated sourcing strategies (per category and/or supplier) are established based on a structured process", "There is a clear career path for professional advancement in the PSM department.")* and only 8 KEPs showed a range value of 3 *(highest deviation; e.g. "A process map gives a clear overview and structure into the core and supporting process in PSM.", "A continuous improvement initiative is in place, so ideas can be handed in easily from the PSM team.", "Next to the 1st tier supplier also the relevant sub-tiers for strategic products are known.").* Nevertheless it was decided to test the Delphi method to create an even more robust initial situation and target setting. In Figure 45 the consolidated target scenario after applying the Delphi method is displayed.



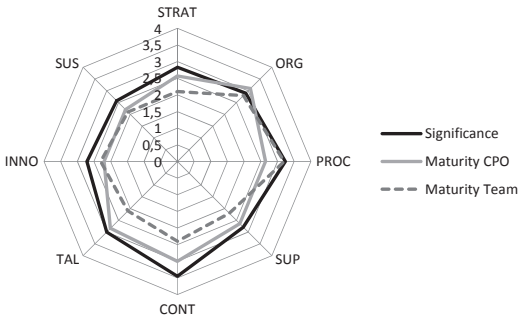
Company (C3)					
Significance/Weight					
	CPO	TEAM excl. CPO	Deviation	Agreed	Range
STRAT	2,84	2,82	0,02	2,83	0,6
ORG	2,9	2,9	0	2,9	0,3
PROC	3,2	3,27	-0,07	3,235	0,4
SUP	2,81	2,78	0,03	2,795	0,7
CONT	3,4	3,5	-0,1	3,45	0,9
TAL	3	3	0	3	0,1
INNO	2,73	2,7	0,03	2,715	0,2
SUS	2,6	2,55	0,05	2,575	0,3
				Overall Range	0,4

Figure 45: Consolidated result, significance value in company (C3), after applying Delphi method

By doing that, it was possible to reduce the average deviation from 0.15 down to 0.04,[101] to reduce the overall range value from 1.2 to 0.4, and finally come up with an *agreed target maturity scenario* (self-defined and intended highest maturity scenario, SDTMS) represented in the radar chart. In a next step this target scenario was

[101] Sum of the single deviation values for each dimension divided by 8.

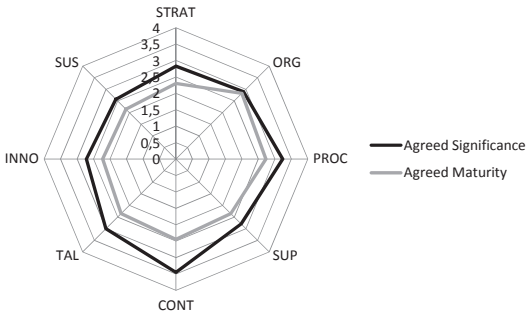
subsequently compared to the result of the actual maturity assessment. The consolidated result is displayed in Figure 46.



Company (C3)				
Maturity				
	CPO	TEAM excl. CPO	Deviation	Range
STRAT	2,57	2,1	0,47	1,9
ORG	3,1	2,8	0,3	1,5
PROC	2,64	3,2	-0,56	2,1
SUP	2,64	2,2	0,44	1,8
CONT	3	2,4	0,6	1,9
TAL	2,84	2,1	0,74	1,7
INNO	2,2	2,3	-0,1	1,1
SUS	2,2	2,1	0,1	1,2
			Overall Range	1,6

Figure 46: Consolidated result, maturity and significance value in company (C3), before applying Delphi method

In comparison to the significance value, the estimation about the current maturity level showed more disagreements. Especially in the dimension "Process Excellence & ICT", "Controlling & Performance Management" and "Talents & Skills" the deviations were significant. This is why an open discussion about the individual results was initiated and the Delphi method was applied. The goal was to derive an agreed and more robust picture about the current maturity as a basis for the planning of the necessary transformation steps.



Company (C3)					
Maturity					
	CPO	TEAM excl. CPO	Deviation	Agreed	Range
STRAT	2,3	2,3	0	2,3	0,8
ORG	2,85	2,8	0,15	2,825	0,6
PROC	2,7	2,75	-0,3	2,725	1,2
SUP	2,38	2,32	0,06	2,35	0,1
CONT	2,5	2,4	0,1	2,45	0,3
TAL	2,6	2,1	0,5	2,35	1,1
INNO	2,25	2,2	0,05	2,225	0,2
SUS	2,2	2,1	0,1	2,15	0,2
				Overall Range	0,6

Figure 47: Consolidated result, maturity and significance value in company (C3), after applying Delphi method

Although the discussion did not lead to an approximation of all differently estimated KEPs, it was possible to reduce the overall range value from 1.6 to 0.6 and the average deviation value from 0.25 to 0.08.

Taking this result as a basis for the action planning, it was decided to select those key evaluation points representing a very high significance value (3 or 4) for the intended goals and a corresponding low maturity value (1 or 2), and work on improvement measures for these issues first. In the following table, six out of these (in total 23) KEPs are exemplary displayed:

Key Evaluation Points	Dimen-sion	Corresponding goal dimension	Ø Signifi-cance	Ø Maturity
The PSM department and its employees know or (better) are part of creating the corporate goals and budgets and consider the strategic goals of the company in their actions.	STRAT	Increase the strategic orientation	4	2
A sourcing committee is installed for the final selection of new suppliers.	ORG	Intensify pro-active supplier management	4	1,5
Risk and market monitoring is established as integrated part of the PSM operations (e.g. anticipate trends, SWOT) to secure the supply.	STRAT	Reducing risks & security of supply	3,5	1,5
For the critical parts a second source is defined.	SUP	Reducing risks & security of supply	3,5	1,5
Formulated and differentiated sourcing strategies (per category and/or supplier) are established based upon a structured process (e.g. using portfolio-technique).	STRAT	Intensify pro-active supplier management	3,5	1,5
Intensive use of strategic spend and cost management methods (LPP, TCO, CBD/Open Book, investment appraisal).	INNO	Reducing & optimising costs	3,5	2

Table 97: Critical KEPs for further action planning (Excerpt)

For the concrete action planning, another facilitated workshop was held in February 2015. An excerpt of the action plan is illustrated in the table presented below.

Key Evaluation Points	Current Maturity	Intended Maturity[102]	Planned measures
The PSM department and its employees know or (better) are part of creating the corporate goals and budgets and consider the strategic goals of the company in their actions.	2	4	***Short-term actions:*** - *Go through the presentation with the annual goals of the company (2014) in one of the next PSM jour-fixe meetings as refresher.* - *Link the current PSM activities of this year with the overall corporate goals to make the performance impact transparent.* ***Mid/Long-term actions:*** - *Promote the CPO to the management team of the company in the new fiscal year to be part of the relevant corporate circles.*
A sourcing committee is installed for the final selection of new suppliers.	1,5	4	***Short-term actions:*** - *Organise a workshop with one representative of QM, Logistics and R&D to present and discuss the supplier evaluation matrix used from PSM, talk about the problems of the past due to unclear responsibilities and present the idea of a sourcing committee.* ***Mid/Long-term actions:*** - *Define the members of the sourcing committee and start a 2-months pilot-phase.*
Risk and market monitoring is established as integrated part of the PSM operations (e.g. anticipate trends, SWOT) to secure the supply.	1,5	3,5	***Short-term actions:*** - *Set up an internal task force to update the already-available safety-stock list of risky parts from autumn 2013.* - *Check the contract database to ascertain for which (critical) suppliers contracts are missing.* - *Create a report based on the ERP system for which suppliers alternatives are available and qualified.* ***Mid/Long-term actions:*** - *Define relevant market indices for the relevant categories of the company (e.g. raw-material-price indicators, currency trends) and work on a consolidated risk-cockpit.* - *Build up alternatives for the suppliers of the most critical parts.*
For the critical parts a second source is defined.		3,5	
Formulated and differentiated sourcing strategies (per category and/or supplier) are established based upon a structured process (e.g. using portfolio-technique).	1,5	3,5	***Short-term actions:*** - *Conduct an internal training about portfolio-technique and strategic sourcing in PSM.* ***Mid/Long-term actions:*** - *Define internal strategic sourcing teams (Lead Buyer + Strategic Purchasing) and give them the responsibility to define concrete sourcing strategies for the most important articles/suppliers based upon purchasing volume or risk issues.*
Intensive use of strategic spend and cost management methods (LPP, TCO, CBD/ Open Book, investment appraisal).	2	3,5	***Short-term actions:*** - *Extend the quarterly supplier assessment form with a criterion concerning open book policy to give this aspect more weight.* - *Conduct an internal training concerning spend and cost management.* - *Work on a template for combining the offered price with the result of the supplier evaluation (linear performance pricing).* ***Mid/Long-term actions:*** - *Work on a TCO analysis template for evaluating new potential supplier (e.g. transportation costs, customs, product price, transaction costs).*

Table 98: Action plan for critical key evaluation points (Excerpt)

[102] The planned maturity is represented by the target scenario (SDTMS) defined in the beginning.

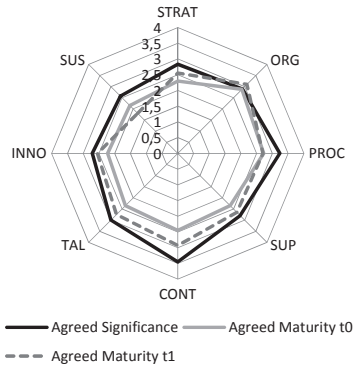
For each measure one PSM team member was defined as a *change owner*, who was in charge for planning the necessary milestones, nominating team members as well as necessary budget (see Table 91 and Table 95). Given that the fiscal year started in 02/2015 the specific ownership of single projects was also transferred into the annual target agreement between the CPO and the employees (Table 92) and also a monetary or a non-monetary incentive was defined for those employees in charge (Table 96).

Next to the critical KEPs listed above, it was also decided that the CPO will try to keep an eye on those KEPs in parallel (but without defining an official project for their realisation) where the effort of transformation is rather low (e.g. no investments, no large or cross-functional project teams necessary) in comparison to the impact *("low hanging fruits")*. Examples for that were: *(1) Adapting the time-booking system so the employees have the chance to officially book certain working hours on strategic projects and tasks (KEP: There are fixed resources for strategic tasks and initiatives next to daily operations), (2) sending out an official mailing to the most important suppliers asking for feedback about the relationship (KEP: Suppliers are regularly asked for feedback), (3) next to forwarding a consolidated view on the most critical operational KPIs (on-time-delivery, order confirmation quote), also the status of on-going strategic projects became an integrated part of the standard PSM reporting (KEP: The purchasing controlling comprises well-balanced quantitative and qualitative KPIs).*

The CPO took the lead for monitoring and facilitating the overall maturity transformation *(change controller)*, including regular status meetings with the respective change owners, informing the other stakeholders within the firm about the on-going PSM transformation *(change marketing)* as well as initiating further interventions (Table 90ff) to boost the driving forces in the organisation.

In the course of the overall case study, the field researcher met the CPO and the two other members of the core team again in May 2015 and used this opportunity to review the status of the action plan in a narrower sense and the overall PSM transformation in a broader sense. Apart from some minor deviations in the project time schedule of some sub-projects, and the finding of the CPO that the monitoring of the sub-projects is more time-consuming than expected, there were no significant issues, problems or unexpected events that made a change of the overall transformation plan necessary. During this meeting it was also announced to combine the exit of the researcher with a re-evaluation of the maturity value as well as to ask the participants for feedback about the most valuable measures for fostering the change as well as about the most significant challenges in the overall application of the PSM^2F.

However not all initiated measures were already finished to the defined end date of the longitudinal case in August 2015, all eight employees of the PSM department were asked to complete the maturity assessment again. The consolidated result is displayed in Figure 48.



Company (C3)					
Re-Assessment of Maturity t1					
	Agreed Significance t0	Agreed Maturity t0	Agreed Maturity t1	Performance	Trend
STRAT	2,83	2,3	2,55	0,25	↗
ORG	2,9	2,875	3,1	0,225	↗
PROC	3,235	2,725	2,7	-0,025	↘
SUP	2,795	2,35	2,65	0,3	↗
CONT	3,45	2,45	2,93	0,48	↗
TAL	3	2,35	2,75	0,4	↗
INNO	2,71	2,225	2,55	0,325	↗
SUS	2,575	2,15	1,8	-0,35	↘

Figure 48: Consolidated result, overall maturity rating in t1, radar chart and table

During the longitudinal case, the planned and executed measures and actions led to an improvement of six out of eight dimensions. The maturity dimension "Process Excellence & ICT" remained more-or-less stable (small decrease), the dimension "Sustainability & Ethics" showed a noticeable decrease. This overall result was positively received by the team, and given that the current focus of the transformation was rather *on improving the maturity in supplier management, strategic purchasing, risk management and cost management* and deliberately not on sustainability and process management issues, this slight decrease was also accepted.

Finally the participants were asked to indicate the most relevant and expedient measures and actions that supported the transformation.

No.	Supportive factors for fostering the transformation	Reference table, chapter 5.3.1
1	Decision to invite all PSM employees to participate in the maturity assessment and action planning to achieve the buy-in.	Table 90
2	Decision to jointly work on a real picture of the intended common future ("What is our self-image in five years from now? How we want to be perceived from other departments and external stakeholder?")	Table 92
3	Obtain insights from the outside: Presentation from companies about their activities for maturity improvement in PSM during recent years // Field trips to other companies.	Table 90
4	Clear and simply explicable "elevator pitch" about the intended change (Why? Overall procedure, What are overall goals?).	Table 93
5	The official and regular announcement of the CEO and the CPO that there will not be any consequences for those who may make mistakes in the creative process of developing new ideas, processes or methods.	Table 90
6	The public confirmation of the CEO in front of the PSM team concerning being willed to offer additional budget if necessary.	Table 95
7	Decision, to spread the lead and ownership for the single transformation projects to the entire team and its members.	Table 91
8	Connection of the goals for the overall PSM transformation with the individual goals of each employee.	Table 92
9	To position the CPO as the central change controller of the parallel initiatives to keep the overview and making priorities if possible.	Table 95
10	Making the process owners transparent on the internal web-page of the PSM team, and give them the opportunity to directly speak about the status and the results of their projects in front of the other colleagues.	Table 96

Table 99: Ten most frequently mentioned measures and actions with high impact on transformation

Next to the the measures mentioned above, especially the high level of accordance between the CPO and the team about the SDTMS (Figure 44) is hypothesised as having a leverage on the rather positive development of the maturity dimensions presented in Figure 48.

RESEARCH RESULT

The feedback from the ten case firms but also the findings from the longitudinal case proved that the presented PSM^{2}F with its three modules building on the three proposed content-related core elements *(key evaluation points/assessment, maturity reporting & action planning, model of determining factors for an effective and efficient change)* is basically applicable in diverse settings (various industries, company sizes). Especially the contextualisation of the basic setup regarding the context-specific factors of the firm, and the definition of a critical core team with representatives of the PSM department (triangulation rule) could be validated in the longitudinal case. Nevertheless a firm must pay attention on some *challenges and risks when implementing and applying the PSM^{2}F:*

- If (all) participants do not show a willingness to question current habits, processes and structures and do not want to try out new things ("think outside the box") they might indicate a deliberately falsified (and too positive) maturity assessment.
  Mitigation: Invite a diverse team of participants with different backgrounds and personalities, intensively work on the driving forces for a change in advance by leadership or carry out the maturity assessment by a (neutral) third-party.
- If the result of the maturity (self-)assessment is used just to promote the professionalism of the own department (to the CEO or external partners), there is the risk of (artificial) exaggeration.
  Mitigation: Use the PSM^{2}F primarily as (internal) strategic management instrument for facilitating the transformation and do not link rewards to an increase of the maturity level when the maturity assessment is done in a self-application setting.
- Insufficient top management commitment.
  Mitigation: Convince the management with explaining the leverage effect of PSM on the firm's financial results or benchmark studies about potentials of a mature PSM function.
- If the participants are not sufficiently experienced in PSM and their specific industry, they might define a SDTMS only based on their individual perception (subjective bias) instead of defining a meaningful scenario for the overall industry and firm.
  Mitigation: Ensure an assessment team which is having at least a 3 years experience in PSM and the respective industry or build up a consortium of relevant and cooperative companies to start a benchmarking project.
- Finding and coordinating the necessary time slots and resources for a common starting workshop and necessary follow-up meetings and working on the concrete tasks might be rather challenging next to daily business.
  Mitigation: Guarantee a clear budget for the transformation project, ensure top-management commitment and transfer the overall vision of the change from a corporate view to clear individual goals for each employee.
- The time resources needed for filling out the assessment (it will take approximately 2-4 hours to define the SDTMS and the assessment) by several participants (triangulation rule) may block a company to start such a transformation process.
  Mitigation: Split the overall assessment (e.g. Strategy & Plans, Talents & Skills) or reserve a sufficient time frame for the participants to hand in their assessment.
- An advanced competence in applying spreadsheet software (e.g. Microsoft Excel) is needed for the data analysis as well as for creating the maturity reports.
  Mitigation: Training activities or external support.
- Lack of competence in moderation and presentation techniques.
  Mitigation: Training activities in advance or ensuring external support.

5.3 Patterns and possible classifications of maturity transformation initiatives

To address the last research goal 1.5 (see chapter 1.2) of identifying concrete patterns and structural elements for a classification of typical maturity improvement initiatives, the following questions were discussed and investigated during the case study process:

a) Who normally triggers maturity initiatives in your company?
b) What role does an external support play in improvement initiatives in your firm?
c) How would you describe a typical transformation project in your firm (e.g. discrete change in form of larger projects, continuous change, combination of both)?

Company	Typical trigger for change	Relevance of external support for the change initiative	Continuous VS discrete change
Aerospace (C1)	CEO, CPO, CTO	Medium (~) "Depending on the topic it can be helpful to get an external input. For the real project and transformation I prefer to do it internally with the team, in order to be sure that the things also work after the external expert is gone."	Continuous change "We try to continuously optimise our current instruments next to the daily operations."
Electrical Engineering (C2)	CPO, COO	Very high (++) "A prophet has no honour in his own country." "It is very important when the change has to be undertaken quickly." "Especially when it has to go fast, external support is necessary due to the tensed resource situation."	Discrete change "Projects are permanently on the agenda to improve some aspects of our processes or structures. Official projects make it also easier to ensure better transparency about the things we are doing, which leads to higher management attention."
Mecha-tronics (C3)	CPO, CEO	Medium (~) "Helpful especially for getting an external view." "For the implementation the team has to be intensively involved or do it without too much of external help, to keep the new status alive."	Combination of both[103] "We usually work on an improvement of our processes permanently in our daily business. Larger changes like the implementation of a new IT system for PSM will certainly be undertaken in a project with external support and by shifting the priorities towards this specific project."
Automotive (C4)	CPO, CEO, PSM team	High (+) "Especially for moderation and project management issues." "When there is a tough time-schedule external support is very welcome."	Combination of both "Both variances are common in our firm. If the topic has an interdisciplinary character, then a project is the usual way."
Engineering/ Metallurgy (C5)	CPO	Medium (~) "Only for special tasks and when the internal knowledge is not sufficient."	Combination of both "Depending on the scope of transformation, we define projects or do it next to our daily business."
Chemicals (C6)	CPO, PSM team	High/medium (+/~) "Depending on the topic, but in general it is helpful." "The more interrelated and multi-dimensional the topic will get, the more probable is an external support."	Combination of both "Projects which are directly and exclusively related to PSM are primary triggered and managed by ourselves and conducted on a continuous base".
Pulp & Paper (C7)	CPO, IT department, PSM team	High (+) "Important because you can benefit from the experience and external view from the external experts."	Discrete change "Projects are mainly internally driven, and we work a lot with students from universities as external support. Each project is also part of regular project controlling meetings with the management, which promotes higher management attention. "
Automotive/ Metals (C8)	CPO	Very high (++) "Highly accepted in our firm and good experience with external support."	Discrete change "We are doing a lot of projects with our local universities to bring new ideas and topics on the plate. I prefer to do it step by step in form of well-managed projects."

[103] This type might be described as a mixture of a continuous change with focused discrete activities in the beginning as well as for complex topics.

Company	Typical trigger for change	Relevance of external support for the change initiative	Continuous VS discrete change
Energy (C9)	CPO, CEO	Very important (++) "When the transformation needs a lot of resources or special knowledge, it is very important to have external support."	Discrete change "In our firm, projects supported by external parties are very common especially for multi-dimensional or urgent issues. The project-character is also related with a stricter controlling and implementation rate of the issues."
Automotive (C10)	CEO, PSM team	High (+) "Especially for getting an external view and temporarily increase the resources to work on the issues."	Discrete change "To work in projects is the typical way of improving things. It gives the topic more significance next to daily business, why we prefer doing it that way."

Table 100: Change characteristics in PSM[104]

Analysing and interpreting the comments and feedback from the ten case companies leads to a proposal of *four common transformation types in PSM* including the aspects of *(1) scope of transition (one-dimensional, multi-dimensional), (2) (required or intended) speed/resources for the transformation, (3) level of management attention* and *(4) intensity of external support (Figure 49)*, which show some interrelations: A "*high priority transition"* is characterised by an optimisation of different dimensions and a high demand of resources. External support and high management attention are hypothesised as being necessary to execute the intended transformation in time. A *"constant transition"* may be described as a continuous improvement of multi-dimensions to prepare for the future. It is primarily internally driven and characterised by being conducted over a longer period. Management attention or external support might certainly also be helpful, although it is not as compelling as for the high priority option.

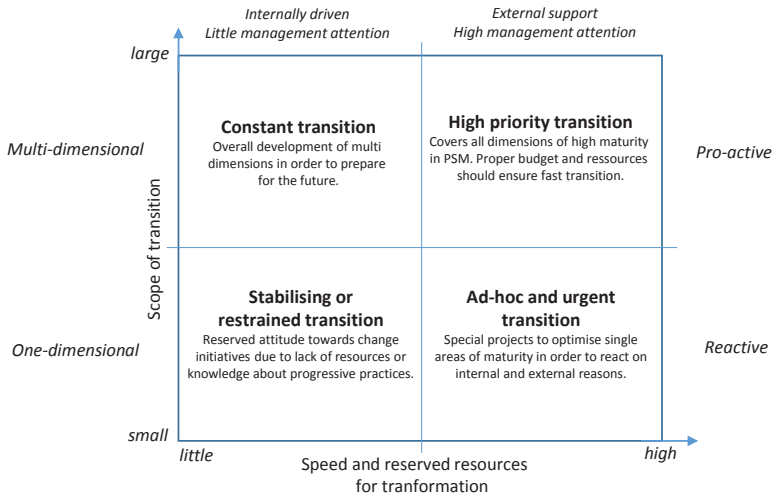


Figure 49: Transformation patterns in PSM

104 The classification of the relevance of an initial maturity assessment as basis for triggering a transformation on a five-digit scale (++, +, ~, -, --) was carried out by the researcher based on the comments of the participants and a comparison between the firms.

The *"ad-hoc and urgent transition"* might be required if unplanned and sudden internal and external circumstances demand for a change. To be successful it is important to give a high priority to the initiative and to reserve enough resources. Management attention and external support are hypothesised as being two necessary elements for a fast transition. The last type – "*stabilising or restrained transition"* – may be characterised by a low management attention, a reserved attitude towards change initiatives and strong restraining forces adhering to familiar habits and procedures. To motivate the team, more leadership, more resources, training activities or higher management attention might be proposed as measures to ensure an increased active attitude and stronger driving forces in the team.

Another transformation pattern in PSM became apparent during the analysis of the changing *self-defined and targeted maturity scenarios* over time (see chapter 5.1.2). In this regard it is important to note, that a decrease in maturity must not necessarily be associated with poor PSM performance. The case studies showed, that due to changing goals and contingent factors, a *"maturity regress"* can be actively triggered in order to focus on the temporary more important and urgent tasks and challenges.

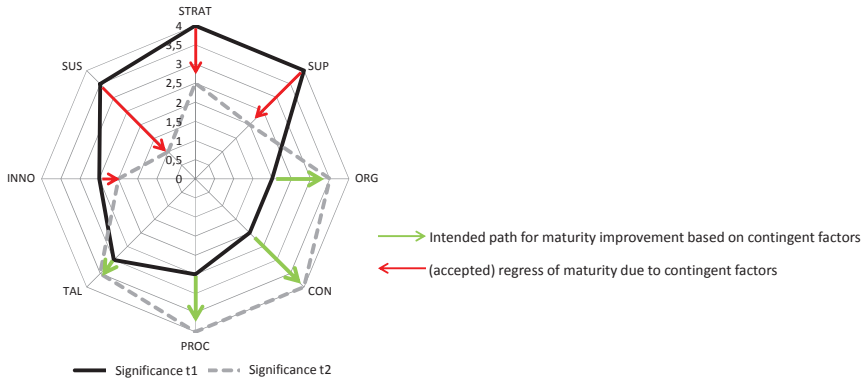


Figure 50: Changing target values and dynamic maturity pathways based upon contingent factors

Such dynamic behaviour appears always plausible when more challenging or new goals are not accompanied with an increase of resources or an active development of the personnel. Hence, a sort of *inherent maximum maturity capacity of a PSM function* can be proposed, which might certainly be increased in the medium to long term (e.g. raising resources, training),[105] but in the short term distinguishes itself by flexibly adapting to new requirements.[106]

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105 External support (e.g. consulting projects) might also lead to short-term improvements, but only an internalisation of the results and deliveries of the (external) project into the PSM team might preserve the higher maturity level.

106 Taking reference to the derived *basic maturity foundation* in PSM (chapter 5.1.2), it can be hypothesised, that a high maturity in these two (structural) dimensions (Organisation & Internal Intercases, Talents & Skills) as well as a high expertise in *change management* might also increase the flexibility and adaptability of a team to quickly readapt to new demands *(dynamic capabilities in PSM)*.

Next to this classification, it is possible to propose another systematisation of PSM transformation, based upon the *significance/maturity ratio* described in chapter 5.1.2. Main hypothesis is that the higher this ratio between the realised significance of a (set of) KEP(s) and its accepted low maturity level, the higher the motivation to change. Using this ratio as a central indicator for the different opinions between the CPO and the PSM team, allows a proposal of *four typical change behaviours*.

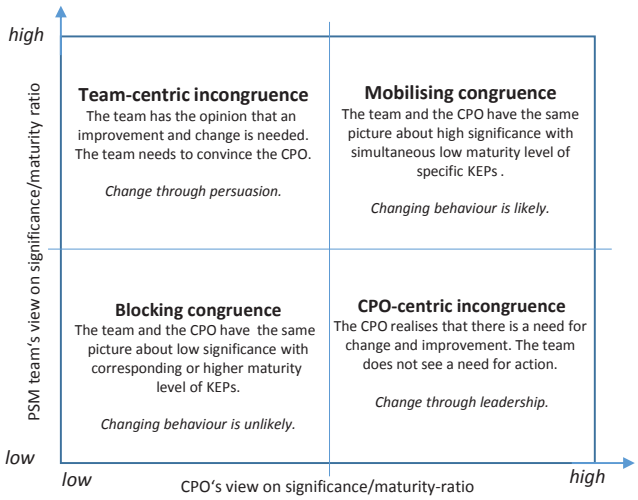

Figure 51: Significance-Maturity Ratio Portfolio (change behaviours)

If both parties have the same view about a high significance with a simultaneously low maturity level *(mobilising congruence)* the transformation might be easier. If only the CPO realises that there is a need for a change, strong leadership and change management interventions (using the recommendations from the model with supportive factors for improvement initiatives) play a greater role *(CPO-centric incongruence)*. If the team perceives the need before the CPO, the CPO needs to be convinced to ensure resources and general support *(team-centric incongruence)*. If both sides see no deviation between the significance and the current maturity level or a high maturity level with simultaneously low significance, changing behaviour is unlikely *(blocking congruence)*. Taking the result of the within-case analysis from company (C2), (C3) and (C6) from Figure 39 as a basis, the following change behaviour might be probable (Figure 52). All maturity dimensions that show a positive value between the significance and the current maturity state for both CPO and the team (e.g. $\text{Significance}^{\text{STRAT\_CPO}}$ (C2: 2.59) – $\text{Maturity}^{\text{STRAT\_CPO}}$ (C2: 2.23) = 0.36 // $\text{Significance}^{\text{STRAT\_Team}}$ (C2: 3.27) – $\text{Maturity}^{\text{STRAT\_Team}}$ (C2: 2.1) = 1.17) are positioned in the top-right corner. Those maturity dimensions which show for both sides a negative ratio are positioned on the bottom left corner.

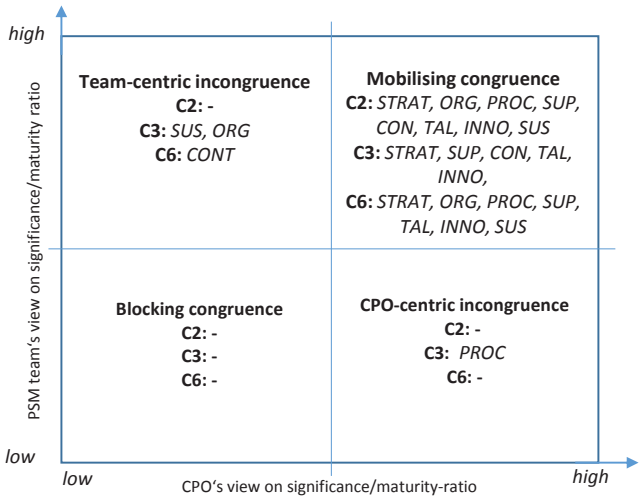

Figure 52: Cross-case analysis of probable change behaviours due to significance-maturity-ratio

When the perceived maturity level is higher than the perceived significance value from the perspective of the CPO and the other way round from the perspective of the PSM team (e.g. dimension "Sustainability & Ethics" and "Organisation & Internal Interfaces" for company (C3) and "Controlling & Performance Management" for company (C6)), the other party has to be persuaded for the necessity of a change. In company (C3), the CPO sees a necessity for improving the dimension "Process Excellence & ICT", while the team perceives a sufficient maturity state.

Considering the frequently mentioned relevance of commitment of the executive management for a successful change *(e.g. Reck/Long, 1988; Champy, 1995; Krüger, 2009 but also case studies)* leads to a proposal of a third dimension also covering an *outside-view*, which might affect and boost the PSM transformation in a firm (Figure 53).

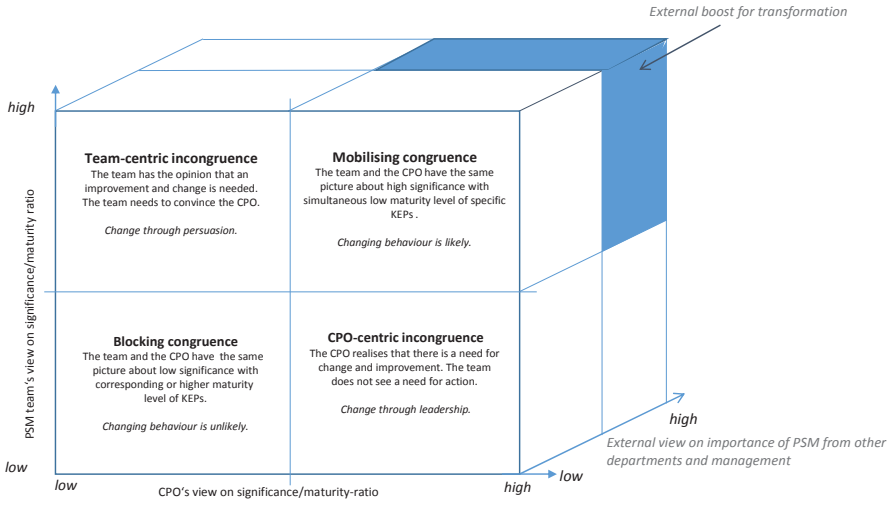

Figure 53: Significance-Maturity Ratio Portfolio incl. an external dimension

Accordingly it can be proposed that also the external view from other departments and especially the executive management concerning the relevance of PSM for the overall firm's success can be a significant boost for the transformation to higher maturity (e.g. easier access to necessary budget for transformation projects, support from other departments in optimising the interfaces and processes between the teams). From the ten case firms, one firm indicates the perceived level of relevance of PSM from the perspective of other departments with "low-medium" (C8), six firms indicate the perceived level of relevance as medium (C1, C2, C4, C5, C9, C10), two firms define it medium-high (C6, C7) and one firm indicates a high perceived relevance level (C3).[107] Accordingly, company (C3), (C6) and (C7) may expect more management attention and support than the others, which is hypothesised to positively influence the transformation. Therefore, it might be recommendable especially for larger transformation initiatives in PSM to work on a supportive attitude and high level of acceptance of PSM in advance, to ensure the "external boost" of the transformation.

[107] The classification was carried out by the researcher based on the comments of the participants and a comparison between the firms. Exemplary, the CPO from company (C3) said: *"Since one year we are now part of every important meeting and it is also planned that I'm announced for the management team in 2015."* In other companies there was a mixed view between management and the other departments: Company (C10) said: *"Our top management gives us the feeling of being an important part in the firm. Other departments may have here yet a different view."* Similar statements came from company (C1), (C2), (C4), (C6) and (C9). In company (C5) it was the other way round: *"The other departments notice and endorse our activities. Currently it is sometimes hard convincing our management to invest more in PSM activities."*

6 Conclusion and outlook

6.1 Synopsis

Numerous scholars *(e.g. Lysons/Farrington, 2012; van Weele, 2010; Monczka et al., 2010; Baier, 2008; Cousins et al., 2008)* as well as practitioners constantly refer to a growing significance of a mature purchasing and supply management function for a company's long-term success. One main reason for this might be the basic realisation of the positive effect, an optimisation of the costs for purchased parts may have on the bottom line in the industry *(e.g. Arnolds et al., 2013; Wallner/Schweiger, 2012; BME, 2011)*. Moreover, the PSM function is directly affected by global trends like high volatility and risks on the raw material and currency market, even more complex supply chain structures as well as upcoming or an intensification of market and legal regulations *(Aberdeen, 2014; Roland Berger, 2014; Spina et al., 2013)*. To cope with that, a high level of professionalism, dynamic adaptability and innovative orientation of PSM is essential. Over the last decades various maturity models in the PSM field were presented by scholars *(e.g. Übeda et al., 2015; van Weele, 2010; Schiele, 2007)* as well as by consulting firms *(e.g. Aberdeen; Arthur D. Little; Horváth & Partners)* to describe the necessary stages a firm needs to go through for being world class. The fact that these models almost exclusively describe a single path of sequenced stages heading towards one (uniform) final stage for all kind of firms without providing proper mechanisms for a context-specific adaptation *(Jording/Sucky, 2015)*, as well as not properly linking the actual assessment to the intended transformation *(de Bruin et al., 2005)*, was the main motivation for an in-depth research on this topic.

Hence, the main research objective of this thesis was to *develop an original Purchasing and Supply Management Maturity Framework (PSM²F)* designed to take situational and context-specific factors into consideration. In the course of the development of the framework, strong emphasis was placed upon the *theoretical foundation*, the *examination of the limitations* of the available maturity models as well as *clear application logic*. The theoretical foundation was mainly built by a systematic literature review and analysis of further sources like white papers, presentations and information on web-sites from relevant consulting firms and PSM-related organisations. Maturity models in PSM were defined as *research nucleus*. Studies about management frameworks and trends in PSM as well as scientific sources about change management and organisational development were defined as complementary sources to avoid selection bias. Two further sub-goals, which form the content-related backbone of the PSM²F, were defined: First, a clustered overview of the *main dimensions and core elements of PSM maturity*, and second, a *factor model of supportive elements for effective maturity improvement initiatives*. Based upon these interim results, a

preliminary version of the PSM²F was conceptually designed (chapter 3), and validated in a multiple case study approach (chapter 4). The main intention of this field research was to gain further inputs for *refining and extending the proposed structural elements of the PSM²F,* to validate the *design characteristics* as well as the *clarity of its applicability* to foster self-application. Furthermore, the inputs from the case studies were used to derive a classification of transformation types in PSM as well as typical behaviour patterns in a change project.

6.2 Contribution

6.2.1 Contribution to theory

This dissertation contributes to the scientific discussion about maturity research in purchasing and supply management in many significant ways. The thesis offers a theoretically well-founded descriptive as well as content-related deepening of the discussion about *purchasing maturity models,* followed by a proposal for a uniform definition of a PMM. Based upon a systematic literature review it was possible to deduce the most comprehensive presentation of 25 scientific as well as 22 management-oriented maturity models thus far, which include both operational and strategic aspects of holistic PSM.[108] In the course of the literature analysis, five main areas of criticism and weaknesses of the available models were summarised and discussed: *(1) rigidity & inflexibility, (2) content-related contradictions, (3) lack of theoretical & empirical foundation and verification, (4) unclear application and missing ready-to-use instruments* and *(5) missing link from assessment to transformation.* Especially the aspect of *inflexibility and lack of contingency* of available models – also criticised by *Jording/Sucky (2015)* – was particularly stressed. In this context, it was proposed to turn away from the strict focus on one specific (final) uniform maturity *point* and rather turn towards relevant maturity *scenarios (dynamic combination of response variables),* on which a company should target due to its context-specific and dynamically changing situation and environment *(contingency variables)* to reach the intended goals *(performance variables).* Accordingly, a *self-defined and targeted maturity scenario (SDTMS)* was introduced that can be dynamically adapted due to changing internal (e.g. goals, resources) and external (e.g. market regulations, legal situation, strategic change of competitor) contingency factors. Hence, this thesis interlinks the discussion about purchasing maturity with perspectives from the contingency theory *(e.g. Sousa/Voss, 2008; Rozemeijer et al., 2003)* and the theory of constraints *(e.g. Goldratt, 1990; Rahman, 1998; Gupta/Boyd, 2008).* This differentiation to only one theoretical highest

[108] In comparison, other scholars like *Schiele (2007)* presented eleven models and *Übeda (2015)* twelve models.

maturity scenario (THMS) would allow a shift from strongly focusing on a uniform one-fits-all-maturity sequence to a more context-specific one. By doing that, the field of application of a PMM might probably rise and become more useful (also) for the large number of SMEs *(Cocca/Alberti, 2010; Singh et al., 2008; Ramsay/Croom, 2008; Garengo et al., 2005).*

This advance follows the request from diverse authors for more contextualisation of maturity models *(e.g. Jording/Sucky, 2015; Röglinger et al., 2012; Mettler/Rohner, 2009)* for a better fit to organisation- and branch-specific needs, and vetoes the unanimous opinion of one final stage for being world class. In this regard, a reference to the *resource-based view of the firm (Barney, 2001; Peteraf, 1993; Wernerfelt, 1984)*, and the perspective of the *dynamic capabilities approach (Eisenhardt/Martin, 2000; Teece et al. 1997; Teece/Pisano, 1994),* as a specific setup which is necessary to create value for firms, becomes apparent. By doing so, this thesis may trigger a more intensive discussion about the necessity of dynamisation of a PMM, due to the fact that *"a particular set of routines can lose their value if they support a competence which no longer matters" (Teece et al., 1997, p.524),* and to focus more on *adaptability* in PSM to stay competitive than just on an overall and non-target-oriented increase of the (structural) maturity. Therefore, it was proposed, that an *optimisation* of PSM maturity can also mean to *actively reduce maturity* in one area *(meaningful maturity regress)* to have free resources for *increasing maturity* in another temporarily more important area *(fit for purpose).* This active reconfiguration of the internal setup for better responding to current or changing contingent factors, is discussed in strategic management journals since the 1990s *(e.g. Teece/Pisano, 1994; Teece et al., 1997; Eisenhardt/Martin, 2000; Winter, 2003)* and might also contribute to an advancement of the discussion and research about maturity in PSM.

One further contribution of the thesis was to provide a transparent and comprehensive systematisation of determining factors and principles of maturity in PSM. For those factors, the term *key evaluation points (KEPs)* was introduced. Overall, 104 KEPs in eight main maturity categories *(e.g. Strategy & Plans, Talents & Skills, Supplier Management & Internal Interfaces)* were initially formulated, taking 47 maturity models, 20 PSM frameworks as well as 11 studies about trends in PSM as a well-founded basis. In the course of the case studies, these theoretically deduced 104 KEPs were enlarged with 22 further KEPs and recommendations for reformulating or regrouping some of the introduced KEPs from the field *(bootstrapping approach; Prockl, 2005)*. Overall, 127 KEPs were derived and can be understood as a set of best-practice recommendations or principles of "good" PSM derived from theory and empirical investigation, a company and in a narrower sense a PSM department can choose from and might focus on to reach the intended objectives or better cope with current or anticipated contingency factors. Given that such a synopsis does not exist to

date for purchasing and supply management, this result can be understood as an initial point for the creation of a *dynamic best-practice database for PSM* that can continuously be extended due to new research findings over time.

Despite being intensively discussed from scholars within the change management or organisational development discipline that a successful transformation (in PSM) can only be achieved by taking the (1) structural, the (2) cultural and the (3) individual change aspects into account *(e.g. Lauer, 2014; Lysons/Farrington, 2012)*, it was shown that the current PMMs are mainly focusing on elements of structural change (e.g. processes, structures, strategies). It was further noted that the literature about managing change or transformation initiatives in PSM is remarkably silent *(e.g. Andreasen, 2012; Stolle, 2008)*. Given that a coherent and well-structured summary of determining factors that foster change management initiatives is not yet available, in a systematic mapping study of scientific journals, academic and management textbooks and studies in the change management field, 45 supportive factors in seven categories (e.g. ensure change readiness, build a powerful team, work on a shared vision) were identified, which might positively influence an effective and efficient change initiative in PSM. Out of these 45 factors, the data analysis of the case firms showed a high accordance on twelve factors that can be proposed as *basic foundation for a successful transformation* (e.g. ensure top management commitment for the intended change and visibility during the change; decide for (a) strong leader(s) and leading team; making priorities, taking decisions and shift tasks and responsibilities if necessary).

Together with the derived determining factors of high (structural) maturity in PSM, represented in the form of KEPs, these two content-related core elements of the PSM^{2}F are proposed as *"dynamic capabilities of PSM"*. Accordingly, it is hypothesised that knowledge and expertise in these two domains are central abilities of a PSM team to (easily) reconfigure and adapt its structures, processes and behaviours to address changing internal and external circumstances in a professional way. The present thesis thus also makes a contribution to the discussion about world-class purchasing skills *(e.g. Giunipero/Pearcy, 2000; Carr/Smeltzer, 2000; Giunipero et al., 2005; Giunipero et al., 2006; Tassabehji/Moorhouse, 2008)*.

The theoretical findings were brought together and used for the conceptual design of the PSM^{2}F. The framework comprises three core modules and embeds the actual assessment in an upstream *(preparation phase)* and a downstream module *(maturity reporting & action planning)*. Hence, in this approach the actual assessment does not stand alone, but is rather one central part (out of three interlinked elements) of a strategic management instrument for purchasing executives or team members who are dedicated for a maturity improvement initiative in the PSM field. Next to these two central content-related elements (key evaluation points/maturity assessment, factor

model for effective transformation) mentioned above, a proposal for concrete maturity reports and summarising analysis that enable a transparent representation of the gathered data and for a continuous monitoring of the progress within the transformation process was introduced as *third content-related core element.* By doing that, the approach presented here follows the request from *Burt et al. (2003)* to develop metrics, which enable a clear measurement of the assessment and progress, and is to the knowledge of the researcher the most comprehensive summary of PSM maturity reports ever presented in a scientific work. Next to these textual building blocks, *design characteristics* were proposed for clear application logic: The assessment module of the framework was designed as *two-step procedure* following a uniform maturity assessment scheme, starting with the context-specific definition of the SDTMS, before the actual maturity assessment. For the definition of the target scenario as well as the assessment itself, one further distinctive feature of the PSM^{2}F is to involve members from all hierarchical levels of the PSM function (i.p. CPO, strategic purchasing, buyer). Therefore, the term *triangulation rule of participation* was introduced, which should enable integrating the diverse perspectives of the PSM team *(swarm intelligence)* in the definition of a context-specific and suitable SDTMS, which should be targeted to reach the pre-defined goals. Moreover, an early and active integration of the people concerned might encourage autonomy and entrepreneurial thinking and support the necessary "buy-in", which is hypothesised as being directly linked with positive group dynamics and driving forces for a change. To foster a structured discussion of the (probable) different views from the participants, the *Delphi method* was proposed and validated as suitable approach.

Following the terminology of *Röglinger et al. (2012, p.330)* and *de Bruin et al. (2005)* that a maturity model should serve a *descriptive, a prescriptive* as well as *a comparative purpose*, in the design of the PSM^{2}F particular attention was paid to serve all three of them: (1) *descriptive purpose:* The PSM^{2}F can be applied for an as-is maturity assessment of the PSM function and provides a deeper understanding of the as-is situation *(diagnostic tool)*, (2) *prescriptive purpose:* The PSM^{2}F indicates how to identify intended future maturity levels (two-step assessment, defining the SDTMS) and offers a well-founded summary of supportive factors for the transformation, (3) *comparative purpose:* Due to the rolling character, the PSM^{2}F allows continuous internal benchmarking and also provides recommendations concerning how to integrate the external benchmarking dimension.

In order to validate and test the conceptually designed PSM^{2}F for relevance and rigor, detect rooms for content-related as well as methodological improvements, to ensure the self-explanatory character of the PSM^{2}F as well as analysing whether there are concrete patterns that enable a classification of maturity improvement initiatives in PSM, a multiple case study approach (including one longitudinal case applying action research

strategies) was conducted with ten industrial firms (firm size: 70-500 employees; on average: <300 employees). In this research step, great emphasis was placed on a comprehensive presentation of the procedure (incl. case study protocol), so other scholars might take reference to it for their own research. Basically, the presented PSM^2F with its three modules as well as the three proposed content-related core elements *(key evaluation points/assessment, maturity reporting & action planning, model of determining factors for an effective and efficient transformation)* proved to be applicable in diverse settings (various industries, company sizes).

The analysis of the perceived data from the field showed that all firms defined different SDTMS and had also different internal views about which maturity profile should be targeted in order to reach the pre-defined goals.[109] Hence, this proves the necessity of the triangulation rule and clear maturity reports, to make these different opinions transparent. As quantitative indicator, the *deviation value between the CPO/purchasing manager and the other participants* as well as the *statistical range value* could have been validated as suitable indicators for the level of congruency within a maturity initiative. Moreover, numerous participants of the case firms highlighted, that these diverse views within the group fostered organizational learning *(power of disagreement)* and, if properly and seriously discussed, can be transferred to strengthen the (common) driving forces for a successful transformation. Therefore, the proposed maturity reports in combination with the Delphi approach were confirmed as being relevant.

Furthermore, it became obvious that a new prioritisation of goal sets can also go along with a *pro-active acceptance of a decrease of maturity in other maturity areas*. Such dynamic behaviour appears always plausible, when more challenging or new goals are not accompanied with an increase of resources or an active development of the personnel. Hence, a sort of *inherent maximum maturity capacity of a group* was proposed, which might certainly can be increased in the long term (e.g. raising resources, training), but in the short term distinguishes itself by flexibly adapting to new requirements *(dynamic capabilities of a PSM team)*.

Nevertheless, and despite the different SDTMS, the maturity dimensions "Organisation & Internal Interfaces", as well as "Talents & Skills" showed a very high and stable significance value in all ten firms, which renders them a sort of *basic maturity foundation in PSM* indifferent of respective goals and context specific conditions. Based on that, it can be hypothesised, that a high maturity level especially in these two (structural) dimensions and the above presented twelve factors of the *basic foundation*

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[109] The data analysis showed, that not a single firm was targeting on the *theoretical highest maturity scenario (THMS)* or defined this "overall maturity" stage as being worth heading to it *("maturity is not an end in itself")*, due to its *firm-specific contingency variables* or a negative *resource-value ratio.*

for a successful transformation might also increase the flexibility and adaptability of a team to quickly readapt to new demands. However, taking a look at the most frequently mentioned KEPs from literature and compares these issues with the most frequently mentioned KEPs from the ten firms; a rather low accordance rate becomes apparent. Only seven out of the top 20 KEPs based upon theory were also covered from the case firms (CPO or PSM team). Only on three KEPs (powerful ICT support, being part of the corporate goal setting process and clear and suitable commodity structure) did all three rankings (theory, CPO and PSM team) show accordance. The reason for this might be that most of the (analysed) books and journal papers available as sources for theoretical deriving the key evaluation points, might have a strong(er) focus on large(r) enterprises, whereas the sample presented here rather represents medium-sized firms, which are obviously focusing on other aspects first. This reflects strong evidence of the need for more intensive (maturity) research on purchasing and supply management for small- and medium sized firms, again underlining the necessity of contextualisation of a maturity model for a useful application in a firm.

Finally, two further classifications and patterns of maturity improvement initiatives and change behaviours were derived and illustrated using the portfolio technique as basis for further and deeper investigation. The first portfolio illustrates *four common transformation patterns* in PSM including the aspects of (1) scope of transition (one-dimensional, multi-dimensional), (2) (required or intended) speed/resources for the transformation, (3) level of management attention and (4) intensity of external support. The other portfolio describes *four typical change behaviours* based upon the perceived gap between the current (low) maturity value and the corresponding high significance value (from the view of the PSM team or the CPO) and addresses the necessity of a high level of (mobilising) congruency between the roles in the PSM team as well as the role of a positive external perception of the value and impact of a mature PSM on the firm's success by the executive management as boost for a transformation.

Summarising, this thesis attempted to make a relevant contribution to all four domains in maturity research: *meta-analysis of available models, maturity model development, application* and *validation (Wendler, 2012, p.1324).*

6.2.2 Contribution to practice

Due to the defined premise to make a reasonable contribution not only for the scientific discussion about maturity research in PSM, this thesis also intended to generate valuable and applicable knowledge for companies, which can support them towards higher sophistication in PSM.

Due to the steadily growing number of available publications about PSM or change management, and the lack of time managers normally have next to their daily business

for studying the newest theories and findings, a consistent and interlinked summary of a sort of best-practice recommendations or principles of progressive PSM *(key evaluation points)* and *recommendations for mastering a change project,* which were also validated empirically in a multiple case study, might be a rather helpful contribution for personal professionalisation and can have a positive impact on an effective and efficient transformation of the PSM function in a firm. Furthermore, the summarised data and presented rankings of the top KEPs or most determining factors for a change might invite a company for a sort of benchmarking.

The entire *Purchasing and Supply Management Maturity Framework (PSM²F)* is designed as a strategic management instrument for purchasing executives who are dedicated for a maturity improvement initiative in the PSM field. Consequently, next to a theoretical well-founded basis, great emphasis was placed on *clarity and simplicity (e.g. Garengo et al., 2005)* as well as to transfer the theoretical findings into *ready-to-use instruments (e.g. Röglinger et al., 2012; Cocca/Alberti, 2010)* for the firms. Thus, companies shall be put in the position to directly apply the findings presented here with the purpose of further developing their PSM function without the need of a third party to keep (external) costs at a minimum.

Due to the critique that most of the maturity models can be criticised for their insufficient documentation quality *(e.g Jording/Sucky, 2015),* and owing to the excessively unilateral view on the *maturity assessment* without taking the *data analysis* as well as *transformation planning* into account, the approach presented here embeds the actual assessment in an upstream *(preparation phase)* and a downstream module *(maturity reporting & action planning)* for a more managerial perspective. Furthermore, the possibility to weight the KEPs by defining a respective significance value before the actual assessment makes the PSM²F more suitable for considering contextual aspects for a better fit to the organisational needs, than by strictly following a pre-defined maturity ladder.

Given that the ten case firms underlined the relevance of such a maturity assessment for defining priorities for further developing the PSM function (nine out of ten firms defined the relevance as *"very high"* or *"high"),* this might allow a sort of generalisation that the assessment approach presented here might also be appropriate for other (industrial) firms with a relevant purchasing volume or criticality and an organisational structure that covers both operational and strategic purchasing tasks (see chapter 4.1). Furthermore, the detailed description of possible maturity reports and templates is unique in this form, providing concrete suggestions concerning how to prepare and present the data in a convenient format.

The presented longitudinal case might also enhance the clarity about the application logic and the interaction of the three core modules of the PSM²F, and provides a sort of

"blueprint" for applying the factor model of supportive elements and the overall framework on one concrete business case.

Finally, the proposed patterns for classifying typical maturity improvement initiatives and change situations in PSM might provide firms with a better understanding of typical change behaviours.

6.3 Limitations and future research

From the above-presented contributions, it becomes obvious that this dissertation has provided valuable findings for both management science and management practice. However, the result of this thesis needs to be viewed in the light of some limitations. Despite a comprehensive literature analysis considering sources about maturity models, management frameworks as well as studies about future trends in PSM, it might be possible that not all relevant sub-domains of PSM were covered for the analysis of the KEPs. The same applies to the analysis of supportive factors for change initiatives in PSM.

Furthermore, a stronger theoretical grounding of the discussion about PSM maturity in the relevant theoretical fields of operations and strategic management (e.g. contingency theory, resource based view, theory of constraints) might be a potential for further advancement of this research field.

Although the feedback from the ten case firms but also the findings from the longitudinal case proved that the presented PSM^2F with its three modules building on the three proposed content-related core elements *(key evaluation points/assessment, maturity reporting & action planning, model of determining factors for an effective and efficient change)* is basically applicable, there are some challenges and risks in the implementation and application of the framework: Examples include the possibility of an (tactical) indication of a falsified (too positive) maturity assessment of the participants in order to keep the familiar structures and processes, a risk of artificial exaggeration in terms of internal marketing (towards the executive management), the challenge of finding enough time for filling out the assessment and coordinating the necessary meetings and workshops or not having the necessary advanced competences in applying spreadsheet software or lacking moderation and presentation techniques which are necessary for facilitating the transformation. To cope with these challenges and risks strategies for mitigation were proposed in the thesis.

Despite a variety of strategies being applied to overcome the concerns regarding validity and reliability (e.g. large and heterogeneous sample) of the case study method and the qualitative data analyses, the final results cannot be seen as basis for statistical generalisations to a broader population. All selected companies have their headquarters

in Austria, so possible cross-cultural differences could not have been analysed adequately (only three participants out of 34 were not born in Austria). For future research it might be interesting in this regard to elaborate on two cultural dimensions and their connection to the applicability of a maturity self-assessment in PSM in more detail: First, the cultural differences between countries (e.g. high- and low-context cultures by *Hall, 1989*; six cultural dimensions by *Hofstede, 1993*) and second the influence of an *organisation's culture (process-orientation vs. results-orientation; easy-going vs. strict working discipline; employee-orientation vs. work-orientation; high vs. low identification with organisation; Hofstede et al., 1990)* on the participation within such a maturity assessment and transformation project. Austria, for example, is defined as a low context culture with a direct communication style and an open approach to mistakes and criticism *(Engelen/Tholen, 2014; Emrich, 2013).*[110] Those countries are also associated with a low power distance according *Hofstede's model about cultural dimensions*. According to that, Austria has the lowest *Power Distance Indicator* (PDI, score of 11) among all ranked countries (China: 80, Italy: 50, USA: 40; Germany: 35). This low PDI means a very decentralised and democratic power structure, and that it is common practice that managers include the experience and expertise of their team members who also expect to be consulted on significant issues. Communication is direct and participative and informal relations with managers are quite common.[111] These characteristics might have influenced the easy applicability of the PSM^{2}F in the ten case firms. Consequently, it can be recommended to intensify the research on cultural dimensions and their effects on the effectiveness and efficiency of a transformation in general and on the applicability of the PSM^{2}F in specific, and to *replicate the study in another geographical* (not only in Austria) or *cultural context*. Moreover, the study might be repeated with a set of *(1) small, (2) medium* and *(3) large size* companies as well as companies of a *(4) specific industry* or with *(5) firms that face the same market dynamics* to investigate whether there are some specific patterns in their maturity targets *(size-specific maturity profiles; industry-specific maturity profiles; dynamic-related maturity profile)* on a larger scale. In this regard it might be interesting to bring this data into a database-driven application. This would subsequently enable deepening analysis about typical transformation paths or core PSM strategies in specific industries, markets, cultures or firm-sizes. Following the basic idea of the PIMS study in the 1960s *(e.g. Buzzell/Gale, 1987),* this could subsequently make it possible to initiate a long-term study about the *performance impact of procurement strategies (PIPS).*

Furthermore, it has to be noted that the empirical evidence of ten case firms including (only) one longitudinal case is not sufficient to validate the PSM^{2}F reliably. In this

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110 Other examples for low context cultures are Scandinavia, Germany, USA, Switzerland or Australia (Rothwell, 2010).

111 The hofstede center (2016); http://geert-hofstede.com/countries.html.

context, it is proposed to conduct more longitudinal cases to prove the validity in a broader scope and to apply and test the PSM^{2}F within firms that are independent of the model development *(de Bruin et al., 2005)*. These firms should assume full responsibility to implement and apply the PSM^{2}F approach only by using the explanations provided in this thesis or forthcoming publications to prove the self-application character on a broader base.

It migh be criticised that the selected case companies were mainly from the industrial and manufacturing sector. The reason for this deliberate decision was that in manufacturing firms the PSM function usually has a particular importance due to the enormous effect on the (financial) bottom line of the company (i.p. high PVO in percentage of TO) and its specific and sensitive role in managing global supplier relations to ensure the supply chain for the final product. However, it is not a question of industry and branch that decide if the application of the PSM^{2}F makes sense. It is rather a question of criticality of the PSM function, the amount of the purchasing volume or the number of supplier relations that need to be managed. Nevertheless it might be an interesting research project to analyse the usability of the PSM^{2}F for trading and service companies and point out necessary rooms for adaptation.

Finally, the proposed patterns and structural elements for a classification of typical maturity improvement initiatives need to obtain more formalisation and empirical tests to be validated.

As highlighted throughout the thesis, this dissertation was conducted in close cooperation with practitioners from the PSM field. In this thesis, a special emphasis was placed on small- and medium sized firms, which are rarely discussed in management research. In this regard it was also interesting to indicate the low level of accordance between the most frequently mentioned factors of high PSM maturity in theory and from the case firms. Accordingly – as well as given that those companies are the backbone of many countries in the EU (e.g. Austria, Italy) – a closer cooperation between scholars and this type of firms might be recommended to strengthen their position to be prepared for future global challenges.

EPILOGUE

"What distinguishes a professional and mature PSM department", was the initially raised question in the preface of this thesis. In this scientific treatise several approaches published over the last decades, which tried to answer this question by mainly searching for the *"best" PSM strategies, structures* or *"world class" skills and capabilities* associated with *being mature*, were discussed and deeply investigated. The automotive industry is subsequently often presented as a "benchmark" that all other companies should strive for.

The research presented here has shown that a uniform answer for all types of firms can hardly be given. While it is certainly possible to detect factors of high maturity, most of the companies will essentially agree on, it is not this theoretical highest (world class) maturity point that the selected case companies were ultimately searching for under real-business conditions; rather, there seems to be an *appropriate maturity profile* for coping with the current challenges and goals towards which the companies are heading. Therefore, if the question concerning the most professional and progressive maturity level cannot ultimately and satisfactorily be answered, perhaps the research efforts should be transferred more to investigate about *minimum effective maturity profiles* for a firm that are sufficient and adequate to cope with the current challenges and goals. This might be an interesting issue especially for SMEs, which usually lack resources, as well as other firms in western countries that need to permanently search for rooms of effectiveness and efficiency to remain competitive.

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APPENDICES

Key evaluation points (KEPs) and maturity assessment scheme of the PSM²F

	Strategy & Plans	irrelevant	Don't know	Significance				Maturity			
				1	2	3	4	1	2	3	4
1	Based upon a corporate strategy, PSM develops an overall PSM strategy as well as short-, mid- and long-term plans and goals (e.g. negotiation targets, process goals, supplier goals) in a structured way (strategy alignment, roadmap approach).										
2	The PSM department and its employees know or (better) are part of creating the corporate goals and budgets and consider the strategic goals of the company in their actions.										
3	Formulated and differentiated sourcing strategies (per category and/or supplier) are established based upon a structured process (e.g. using portfolio-technique; strategic importance of products, risk factors, availability).										
4	Risk and market monitoring is established as integrated part of the PSM operations (e.g. anticipate trends, SWOT) to secure the supply.										
5	Clear and suitable commodity structure based upon an agreed commodity code classification with defined responsibilities is in place.										
6	Global sourcing strategies are evaluated and if relevant put into practice in a structured way.										
7	There are fixed resources (time, manpower) for strategic tasks and initiatives next to daily operations.										
8	The derived strategies are continuously reviewed and if necessary adapted (on a global and/or category level).										
9	Differentiation of supplier management strategies according PSM power/situation on supply market.										
10	Contingency plans for disruptions in the supply chain are available.										
11	If the company is planning to buy and merge with another company, the opinion of PSM is actively requested (e.g. savings potential through joint purchasing activities, access to new supply markets).										
12	The PSM strategy and goals are known by the relevant internal stakeholders and the management team.										
13	Key issues of the competitors' sourcing strategies are known.										
14	PSM knows the main goals of the other departments to create a better process and strategy alignment.										
15	The specific norm-strategies for sourcing and supplier management (based upon e.g. portfolio-technique) are known and applied based upon contextual aspects.										
16	Regular cross-check and adaptation of pre-defined strategies based upon market changes.										
17	In the PSM team there is a strong commitment to strategies and goals.										
18	Before starting with the strategy implementation a gap-fit-analysis ensures if the own maturity level and the maturity level of the supplier (e.g. processes, ICT-level) is suitable and sufficient.										
19	The definition of PSM goals follows the main rules of the SMART-logic.										
20	By guaranteeing a high level of autonomy the PSM team is motivated and creative in working out the detailed plans for reaching the goals.										
	Organisation & Internal Interfaces										
21	There is a will and culture of early involvement of PSM.										
22	There are clear interfaces and communication structures to the relevant teams/departments in the company (>> individual definition of departments/teams and individual weighting and assessment.)										
23	The PSM department is at a senior hierarchical level in the company (part of the management or directly in the first reporting line to the executive management).										
24	Roles and responsibilities for specific tasks and approval steps are clearly defined (e.g. mandates, job descriptions and requirement profiles).										
25	There is a TOP-Management commitment for PSM strategies, goals and actions.										
26	The needs of the internal and external customers are known and PSM regularly asks for feedback.										
27	PSM has the mandates for the complete purchasing volume. If there is Maverick Buying, PSM knows the concrete amount and responsibilities of these orders.										
28	Different options of organising the PSM department are analysed (e.g. central, decentralised, hybrid, Shared Service, outsourcing, offshoring, lead buyer), implemented in a structured way and if necessary further developed based upon business strategy and benchmarks.										
29	A sourcing committee is installed for defining the requirements profile for a supplier and the final selection of new suppliers (including the relevant departments like QM, Logistics, Production, R&D).										
30	There are noticeable activities to implement a working climate and culture for continuous improvement and know-how-sharing.										
31	Valid purchasing guidelines (e.g. acceptance of gifts) are in place.										
32	Regular check if number of employees is adequate according the relevant industry benchmark.										
33	PSM management has autonomy for making decisions that are necessary to reach the defined goals.										
34	PSM has a high professionalism in actions with high visibility to (internal and external) stakeholders (e.g. design of RFQ, offer comparison, negotiation, meeting coordination, controlling).										
35	Internal marketing for "good procurement stories" or "transformation plans" (e.g. road-shows) is carried out.										
36	Professional meeting structure within the PSM department and for all the meetings PSM has the responsibility.										
37	There is a high transparency about the release status of an article.										
38	Deputies are installed for the critical positions and trained in a proper way.										
39	Based upon functional requirements and specifications formulated in a neutral way from the user, it is easy for PSM to find a high number of potential suppliers.										

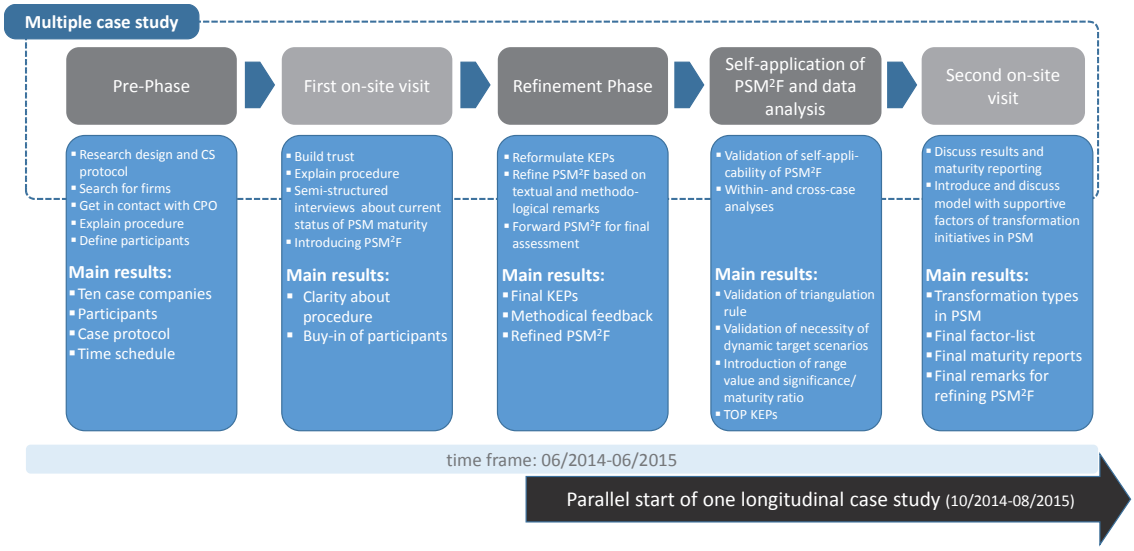
	Supplier Management & External Interfaces	irrelevant	Don't know	Significance				Maturity			
				1	2	3	4	1	2	3	4
40	Strategic supplier (relationship) management is defined as an important asset in the company. A closed supplier management cycle is established from supplier analysis and selection, assessment and development.										
41	The strategy as well as technological innovations and plans from the supplier are known and transferred into own PSM strategy and product development.										
42	Concepts of process- and/or IT Integration with (relevant) suppliers for efficient and effective operations are established (e.g. EDI, SRM).										
43	Structured policies and documented procedures for the core phases in the supplier management process are in place, as well as clear responsibilities.										
44	Contract management is established at a professional level (coverage rate, standards, archive, compliance rules, different templates for different supplier types). If there are no contracts, clear general purchasing terms are in place.										
45	There are defined resources to work on supplier development initiatives (e.g. defined key supplier managers and task force for special topics apart from daily business like value engineering or standardisation).										
46	Professional QM methods and processes with suppliers (e.g. QFD, target values, audits, statistical process control, certification, DoE, zero defect programmes, 8D report) are in place.										
47	Early supplier involvement for product development and innovative issues (e.g. shorten time-to-market, life-cycle-costing).										
48	Frame Orders and call-offs with main suppliers are properly used to increase efficiency in the purchasing process and use the price advantages of joint purchasing.										
49	PSM is established as main and first contact to the supplier.										
50	For selecting new suppliers a multi-dimensional approach covering not only price issues is applied.										
51	The supplier portfolio is regularly analysed for rationalisation possibilities (e.g. exit strategies).										
52	Next to the direct supplier also the upstream suppliers are known for strategic products.										
53	Suppliers receive forecast data to plan their processes and supply chain in an efficient way.										
54	For the critical parts a second source is defined.										
55	Suppliers are regularly asked for feedback (about the relationship).										
56	Price and payment terms are managed in a professional and structured way to optimise the liquidity level and the profit margin (e.g. open book policy).										
57	The most important sources (primary and secondary) are known for searching for appropriate suppliers.										
58	Pre-defined and clear supplier profiles (based upon the necessary requirements for delivering a specific category) are available as basis for the supplier evaluation and final selection.										
59	In the regularly held (e.g. annual) supplier meetings/workshops/supplier councils, ideas for improving the partnership are discussed and defined in written form.										
60	Defined supplier motivation and recognition programmes are in place (e.g. provide incentives for suppliers in the form of new projects, higher quotes, Supplier Award).										
61	For a rolling supplier assessment a clear procedure (e.g. frequency) and templates are in place.										
62	For the most important suppliers regular audits are held and the defined and agreed measures for improvement are monitored in a structured way.										
63	The results of the supplier assessment will be internally discussed, analysed and forwarded to the supplier as basis for improvement projects.										
64	Supplier development projects are defined, documented in written form and contain measurable goals and KPIs.										
65	PSM is able to sell the preferred strategy to the supplier and convince the supplier to cooperate in development projects.										
66	A buying consortium is established to pool demand.										
67	Alliances with universities or research organisations are established for benchmarking purposes.										
	Controlling & Performance Management										
68	KPIs for critical processes and goals are defined and are regularly reviewed (e.g. ability to delivery, on-time-delivery, complaints).										
69	By applying a (multi-dimensional) purchasing controlling it is possible to link the purchasing's influence on firm's performance (e.g. scorecard).										
70	Standard and ad-hoc reporting is available and used as basis for improvement and for informing internal and external stakeholders.										
71	Based upon the measured KPIs, initiatives for improvement are implemented if there are differences between the planned and actual figures.										
72	PSM reporting is also directed to the CEO/board.										
73	Purchasing controlling comprises well-balanced quantitative (e.g. on-time-delivery, order confirmation) and qualitative (e.g. project status, learning) KPIs.										
74	Purchasing performance management is strongly linked with the monitoring of the strategy implementation and the status of target achievement.										
75	There are defined KPIs for each goal to monitor the efficiency/effectiveness of planned actions.										
76	The defined KPIs in PSM encourage cross-functional team work.										
77	Clear defined rules for measuring KPIs prevent manipulation and ensure comparability.										
	Talents & Skills										
78	A cross-functional training and skill management for PSM employees prepare the PSM team for their tasks (e.g. internal and external education/training, job rotation, training plans).										
79	There is a clear career path for professional advancement in the PSM department.										
80	Clear targets and a standardised feedback process for personnel (e.g. annual meeting, feedback-questionnaire) are in place.										
81	The CPO and other PSM team members with responsibility for employees have the necessary leadership competencies.										
82	Integration programmes for new personnel (e.g. job rotation, job profiles, checklists, mentoring, feedback, team-building) helps to easily integrate new employees.										
83	An adequate level of remuneration according industry standards is guaranteed.										

	Talents & Skills	irrelevant	Don't know	Significance				Maturity			
				1	2	3	4	1	2	3	4
84	The mind-set and aspiration of the PSM personnel and the CPO is high (culture of excellence and entrepreneurial thinking).										
85	The PSM team participates in external trainings and/or conferences to bring external knowledge to the company and the PSM department.										
86	There is an excellent communication culture and style between the CPO/purchasing manager and the PSM team.										
87	The skill level in the relevant domains meets the requirements (>> selecting recommended skills/capabilities and adding specific skill sets; see Table 72)										
88	A culture of collaboration and constructive feedback is established to foster organisational learning.										
89	Future challenges and competence-requirements are anticipated for developing HR.										
90	The PSM team knows the products, customers and industry-specific market requirements and business models.										
Process Excellence & ICT											
91	Powerful ICT support (e.g. ERP, SRM) for routine tasks.										
92	Clear documentation of core PSM processes (e.g. purchasing manual) which fulfils the recommendations of professional process management (e.g. process notation, defined process owner) and compliance guidelines.										
93	PSM is actively involved in the demand planning process (product life-cycle management/ forecasting).										
94	The role of PSM in the inventory management process (e.g. safety stock management, optimising inventory level) is clear.										
95	Next to direct purchasing, there is also a clear and defined process for purchasing services, non-inventory items or CAPEX (indirect spend).										
96	A process map provides a clear structure and overview of the core and supporting process in PSM.										
97	Professional e-Auction and tendering/RFQ usage for suitable articles.										
98	Clear responsibilities and templates ensure professionalism in master data management.										
99	A clear process for ramp-up projects is established.										
100	A clear process for ramp-down projects (incl. reducing level of stock of BOM items) as well as product change management is established.										
101	The critical communication (e.g. orders, confirmations, side-letter, contracts) with the supplier is archived and accessible in a suitable form (e.g. ERP, DMS).										
102	A specific PSM area on the company's website enables the supplier to actively enter in contact with the company (supplier portal) and also provides relevant business documents (e.g. GTP, policies) for supplier management.										
103	The operational excellence in PSM has the same status as strategic work.										
104	The processes and internal rules/policies (e.g. approval steps) are aligned with the criticality and corporate impact of the individual business case.										
105	Concepts of materials-, demand- and inventory management are applied (e.g. MRP, JIT, Lean Management) for fostering process excellence.										
106	Process automation (e.g. workflows) for routing tasks (e.g. x-articles) is primarily used for stabilising the processes and securing more time for strategic issues than for cutting costs.										
Innovation & Methods											
107	Intensive use of strategic spend and cost management methods (LPP, TCO, CBD/Open Book, investment appraisal).										
108	Carry out benchmark studies, learning journeys or internal benchmarking (internal audit) to continuously improve the PSM function (e.g. best- practice sharing).										
109	Make-or-Buy decisions are triggered or only carried out by integrating PSM.										
110	PSM takes a driving role in creating new business opportunities and bringing innovations into the firm due to the expertise about global supplier markets (e.g. using the well-known brand of the supplier for upgrading the own product).										
111	A knowledge-pool (e.g. lessons-learned database, PSM-wiki) about past projects or success factors of negotiations is available and increases the efficiency and effectiveness of future activities.										
112	A continuous improvement initiative is in place, so ideas can be handed in from the PSM team and will be handled in a structured way.										
113	Projects for reducing complexity within processes, the procurement portfolio or the PSM structure are carried out (e.g. value engineering)										
114	For the internal communication diverse media channels (e.g. PSM webpage, newsletter, wiki, social media) are available.										
115	The company draws on the services of external consultants or universities for innovative and methodological advice if necessary.										
116	Concept competitions are used to obtain innovative ideas from the suppliers.										
117	PSM is using a price database for the relevant components to provide fast price calculations for new products.										
118	For the continuous improvement and development of the PSM function, the team is trained in creativity techniques.										
Sustainability & Ethics											
119	Corporate social responsibility issues (e.g. green procurement, considering social activities when selecting a new supplier) are part of the PSM strategy.										
120	A dedicated person or group in PSM take care of promoting sustainability programmes.										
121	Diversity management (mix of cultures and gender) is considered a relevant topic in the company.										
122	PSM is playing an active role in continuously optimising the waste management.										
123	PSM is playing an active role in continuously optimising the global footprint.										
124	The knowledge of the suppliers is used to jointly work on ECO-design products.										
125	A code of conduct is part of the supplier contract.										
126	Activities and projects dealing with sustainability and ethics are part of the regular PSM reporting.										
127	PSM analyses the activities of the suppliers in the field of sustainability and ethics (ECO-Audit, ISO14001) during the evaluation and then in the assessment process.										

Final summary of supportive factors for an effective and efficient transformation

Ensure change readiness in the PSM team	
1	Create a sense of urgency and awareness for the need of change (long) before the actual transformation projects start. Convince the affected people that there is a risk of not changing the old habits and structures.
2	Ensure the necessary competencies and abilities (hard skills and soft skills) before the actual change project starts to build up confidence and reduce fear of change.
3	Ensure a culture of lifelong learning and an inner desire to become continuously better.
4	Create a culture of trust and being supportive.
5	Foster a culture that risk taking/making errors is allowed to boost creativity and innovation.
Build a powerful and leading change team	
6	Decide for (a) strong leader(s) and leading team with change experience.
7	Work on suitable roles within the team for the change period and for the time after the transformation according their (probable) commitment.
8	Having transparency about the different "players" in the change initiative concerning their commitment (e.g. first mover, early followers, late followers, blockers, change agents).
9	Be open for diversity to learn and benefit from different personalities and their strengths.
10	Ensure clear responsibilities and commitment to the tasks in the change team.
11	Actively plan team-building measures in advance to have a powerful team when the change starts (e.g. outdoor training, regular relaxed meetings across hierarchies).
12	Give the involved people space for self-organisation (empowerment).
13	Understand that an organisational change needs a change of the team and a change of a team needs a change of individuals.
14	Ensure flat hierarchies and eliminate status and rank in the creative process of ideas generation.
Work on a shared vision and accepted goals	
15	Analyse and integrate all relevant internal and external stakeholders with the purpose of creating a feeling of ownership (buy-in-) before the change starts (work on critical mass, early involvement).
16	Ensure top management commitment for the intended change and visibility of the management during the change.
17	Work on and create a shared vision for the organisation, the team and the individual. Try to make it visible, easy to understand and clear (see-feel-change).
18	Transfer the overall vision of the change from a corporate view to clear individual goals for each employee.
19	Giving affected people sufficient time to reflect and think about the intended change. Allow feedback and discussion and accept that there are multiple constructs of reality, values (right/wrong) and problems. Legitimate the expression of feelings.
Establish authentic and open communication	
20	Ensure clarity, honesty and authenticity in the change communication.
21	Ensure a culture of early and open communication (feedback/lessons-learned). Create multiple ways of providing (two-way) feedback.
22	Accept and actively motivate people to take a critical approach towards the change plan. This feedback can shed new light on the original plan, and can make it better.
23	Ensure a target group oriented communication plan (who receives which information when and in which form: e.g. roadshow, conference, wiki, social media, mailing, personal)
24	Establish or use a lessons-learned cycle to benefit from good and bad practices and experiences from previous change initiatives.
25	Work on a clear elevator pitch about the intended change which is transparent and easy to understand and remember.
26	Start with the communication long before the start of the change and avoid a cold start.
Ensure a transparent transformation roadmap and consolidation	
27	Ensure clear KPIs and controlling-loops for status control (e.g. BSC, steering meeting).
28	When starting the change, ensure a clear transition roadmap that can be explained easily.
29	Accept and actively consinder phases of "inefficiency" in the overall plan (typical change curve, learning dip) and plan interventions.
30	Ensure professionalism in project management (e.g. planning, controlling, closure) for each of the concrete change initiatives, and keep an eye on other change projects in the firm that might affect the intended change (multi-project-management).
31	Institutionalise the changed procedures and habits by e.g. new process or job descriptions, clear responsibilities, updated business cards or by carrying out road-shows for promotional purpose.
32	When working on the plan, discover the future in diverse perspectives and scenarios (e.g. best case, worst case). Integrate the management view and the view from the employees from the middle-management and from the shop floor.
33	Do not stick to the plan just because it is a plan. Allow adaptations based upon arising (new) contingent factors (e.g. changing goals, market indicators) and reasonable criticism or feedback.
34	Plan a pilot-phase (trial run) to check if a new approach works.
35	Don't promote the closure of the change too early.
Ensure resources and set priorities	
36	Guarantee the necessary resources (budget, time) and ensure the availability and visibility of a change leader/agent.
37	Making priorities, taking decisions and shifting tasks and responsibilities if necessary.
38	Change the conditions (e.g. technology, systems) and infrastructure when promoting the intended change.
39	Be open for and consider external input from consultants, universities or other external experts when useful.
40	Convince top management with clear KPIs or benchmark studies that a change is necessary.
41	Use top-down pressure to overcome some critical phases to make the intended change happen.
Deliver quick- and intermediate wins and celebrate success	
42	Ensure incentives and rewards for (interim) success. Make stories out of it and spread it out to the company as motivation.
43	Actively plan quick- and intermediate wins especially for these people that are critical in the beginning but crucial for the success of the transformation.
44	Use the quick and intermediate wins as "magic moments" for introducing new change steps.
45	Celebrate the “real heroes" and not just the team leader or overall change manager.

Summary of case study procedure & case study protocol



Pre(-liminary) phase:

- Develop research design and case study protocol
- Search for firms and get in contact with CPO
- Explain procedure
- Define participants

First on-site visit and follow-up phase:

- Build trust & explain overall procedure of research in front of participants.
- Semi-structured interviews applying the *funnel model (Voss et al., 2002).* This approach begins with broad and open-ended questions, before the topics become more specific:
  - *Personal impression about status and external view on PSM in your company.*
  - *Personal impression about current level of maturity of PSM (e.g. department in general, processes) in the company. Please also try to indicate the maturity level one and three years ago.*
  - *What are the general corporate goals in your company (e.g. growth, ROI, quality, cost efficiency, innovation, sustainability)?*
  - *Which purchasing goals are currently the main focus of improvement (e.g. reducing & optimising costs, reducing risks & secure the supply, increase flexibility, improving quality)? Are these goals stable or unstable?*
  - *Do you know any PSM Maturiy Models? If yes, please name them.*
- Handing over and explaining basic structure of PSM^{2}F. Subsequently, the participants were asked to answer the following questions.
  - *Are the areas of maturity suitable and exhaustive for identifying the (overall) purchasing and supply management maturity of a specific company?*
  - *Is there any specific KEP or maturity dimension missing for an overall evaluation of the PSM maturity?*
  - *Is any single criterion (KEP) unclear for you?*

Refinement phase:

- Applying the content-related feedback from the participants to refine the PSM^{2}F and its content related core elements.
- Forward refined PSM^{2}F to companies for conducting the maturity self-assessment.

Self-application and data analysis:

- In the course of the maturity assessment the participants were asked to answer the following questions:
  - *Is the overall assessment logic clear and applicable or do you have ideas for methodological improvements?*
  - *Would a one-step maturity assessment (without weighthing/defining the SDTMS) be practicable and useful?*

- *Would you suggest narrowing down the assessment criteria?*
- *How would you personally estimate the relevance of a maturity assessment for developing the PSM function in your firm?*

Second on-site visit:

- Discuss the feedback with the participants.
- Present the results of the maturity assessment using the maturity reports.
- Discuss ideas for refining the reports and templates.
- Presenting the factor model of supportive elements for effective maturity improvement initiatives and asking for feedback and comments for refinement and extension.
- Discussion about typical maturity improvement initiatives in the case firms:
  - *Who normally triggers maturity initiatives in your company?*
  - *What role does an external support play in improvement initiatives in your firm?*
  - *How would you describe a typical transformation project in your firm (e.g. discrete change, continuous change, combination)?*