Process Oriented Synergy Management in Production Environments

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Preface

This dissertation originated from the aspiration to make synergies systematically manageable in production environments. The resulting elaboration combines theoretical facts with the experience I gained when dealing with the object of study within the BMW Group.

I would like to give my sincere thanks to Univ.-Prof. Dipl.-Ing. Dr.sc.techn. Reinhard Haberfellner for supporting me during the entire elaboration with valuable feedback. His interdisciplinary mindset and management experience made this practice-relevant thesis with the chosen focus possible. Furthermore, I would like to thank my second assessor, Prof. Dr. Fabian Sting, for both supporting this thesis and his collaboration in the MINI UK case study during his active phase at the INSEAD.

I would like to thank Joachim Grüger in his role as BMW director of the Munich Painted Body for giving me the opportunity to deal with the topic of synergy management in his area of responsibility in detail. He enabled the creation of central tools and systematics developed for this thesis by allowing me to design and fine tune these in practice. Moreover, I appreciate the support of the entire Munich TM-3 team.

Particular thanks are due to Dr. Jürgen Hedrich from the BMW Group. His conviction that synergies need to be managed systematically for resulting in full benefits within corporations is the initiator of this thesis. In addition, I appreciate his time for critical discussions about the subject of interest as well as making the UK case study possible in his function as managing director. The insights from this case study influenced and enriched this thesis with additional evidence and top management insights from all MINI directors. Special thanks are also due to Paul Parkin and Dr. Mathias Hofmann for their exceptional support during the MINI project; plus the entire MINI management team participating in the project.

Many thanks also go to my partner, Tina Kiupel, for her patience, understanding and support during my finalization phase, her sister, my family and friends.

Dipl. Ing. Michael Koziol

Munich, May 2013

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List of Abbreviations

BIW	Body in White
BPI	Business Process Improvement
BPO	Business Process Orientation
BPR	Business Process Reengineering
COC	Center of Competence
D	Director
DtCC	Delivery to Customer Care
FIZ	Forschungs- und Innovationszentrum
GL	Group Leader
GM	General Manager
ItO	Idea to Offer
LR	Line Responsible (Manager)
M	Purchasing and Supplier Network Division
M&A	Merger and Acquisition
MD	Managing Director
MK	Purchasing and Supplier Network Body and Exterior
MP	Maintenance Project
OpIp	Optimizing Indirect Processes
OtD	Order to Delivery
OtO	Offer to Order
PEMM	Process and Enterprise Maturity Model
PEP	Product Development Process
PB	Painted Body (Organizational unit at BMW)
PO	Process Orientation
PREP	Product Feature Profile
PRIME	Process Improvement to Excellence (BMW internal initiative)
PrOSyM	Process Oriented Synergy Model
QMT	Quality Management/Manager Parts
RBV	Resource Based View
ROI	Return on Investment
SIPOC	Supplier Input Process Output Customer
SMM	Synergy Maturity Model
SOP	Start of Production
TM	BMW Plant Munich Organization
TO	MINI Plant Oxford Organization
TQM	Total Quality Management

1 Introduction

Ever since evolution has shown that progress is not only the result of single individuals, groups or cultures, but also a result of the combination of their efforts. Discoveries such as the radioactivity by Marie and Pierre Curie would not have been possible without these two individuals working together and combining their ideas. The Hanseatic League as a commercial and defensive confederation had a major influence on the European trade and politics for more than two hundred years because merchant guilds from a number of northern European cities decided to cooperate. The settlers migrating into the newly developed land of North America since the 17th century gained independency from the European "father" only by allying and forming a fighting force – a tactical move which paved the way for becoming the world power, the United States of America.

It is not only the evidence from the political historical perspective, but also the evidence from the economy which proof that cooperation can be advantageous. The economic environment of the last few decades is also full of examples for the combination of efforts which led to great success stories.

Apple, one of the most successful companies of the present business world was founded by Steve Jobs and Steve Wozniak and made the personal computer as a mainstream product available for the average consumer. The former a great visionary business man, who knows how to sell products, the latter a visionary technology expert, who knows how to make technology work. Independently, both certainly would have been successful in their lives. However, their success to sell innovations to the mainstream based only on the combination of their individual talents.

The Volkswagen Group, one of the largest and most successful car makers in the automotive industry, made its way by mergers and acquisitions combined with a focused cooperation management between the single brands. Common standards and the utilization of shared modules enabled the group to generate combined profits which outstand potential independent solutions. Regarded isolated, some of the Volkswagen brands might even not be able to stay competitive on the automotive market.

However, amongst others, the automotive history has shown that combined efforts were not always leading to a successful outcome. The merger of Daimler with Chrysler only lasted for nine years and caused costs of approximately 10 billion Euros.[1] The BMW and Rover merger lasted for six years and left BMW with a deficit of roughly 5 billion Euros.[2]

For being able to create the next success stories of combined efforts, which are also referred to as synergies, and to prevent failures, organizations have to understand which factors cause them. As one of the most distinguished business scientists of our present times, Michael Porter stated that

"the failure of synergy stemmed from the inability of companies to understand and implement it [Synergy], not because of some basic flaw in the concept.[…] Even in instances where companies possessed a genuine opportunity to harness synergy, they often failed because the tools for analyzing it were lacking or they could not overcome the substantial organization problems of implementation."[3]

The understanding and implementation of synergies is challenging for corporations because synergies can be used in all organizational units of the company. Synergies result from the cooperation of different organizational units as well as interrelations within the organizational units or even external partners; thus leading to a high complexity due to the multitude of different options included.

For being able to tap synergies one needs to manage this complexity. Corporations which are able to do so have a competitive advantage; they are able to save financial resources, improve quality and generate innovations by means of an efficient cooperation.

This dissertation develops the basis for an efficient cooperation and describes a systematic approach how organizations are able to manage synergies.

[1] http://www.faz.net/aktuell/wirtschaft/unternehmen/daimler-chrysler-die-kosten-einer-scheidung-1409707.html

[2] http://www.manager-magazin.de/finanzen/artikel/0,2828,75867,00.html

[3] Porter M. 2004 page 318

1.1 Objective of the Thesis

This dissertation defines a holistic[4] and systematic approach for synergy identification and characterization, questions the role of the organizational structure on the utilization of synergies, defines key success factors on synergy utilization in production environments and examines the idea to use process orientation as a supportive perspective for synergies.

For the purpose of synergy identification and characterization, different perspectives need to be discussed and a suitable model for the explicit characterization of synergies in production environments is to be developed. The objective is an approach which fulfills the requirements of a generally valid and holistically applicable procedure which can be operationalized on a broad basis.[5] For the discussion of key influencing parameters on synergy utilization, including the role of organizational structure, an understanding of cause-effect relations of synergies is of central importance. These prerequisites are elaborated by regarding general economic synergies in a broader scientific content, deriving key parameters for the specific case of synergies in production, supplementing the findings with experience of the researcher gained during his case studies at BMW and confirming or accordingly disproving the results by means of findings of the case studies.

The supportive character of process orientation is examined by deriving commonalities and links between process orientation and synergy management and by regarding the effects of process orientation on synergy-related issues in field case studies.

The thesis is based on literature research and the practical experience of the researcher as a Masters student at the BMW plant Rosslyn (South Africa), PhD student at the BMW plant Munich - this also included his project at MINI Production UK – as well as quality specialist at the BMW headquarters in Munich.

The key scientific problems to be discussed within the scope of this dissertation are presented in the following chapter.

[4] Which is applicable for all hierarchical areas and for a broad user base.

[5] Thus, certain simplicity of the procedure is needed to fulfill these requirements.

1.2 Scientific Problem

The subsequent research questions discuss important details which all together lead to the final result of this thesis; it describes how a systematic synergy management should be organized in production environments in order to enable a successful utilization of synergies. The first research questions allow for a deeper understanding about synergies, whereas the last questions refer to the broader topic of synergy management. The research questions are:

1. How can synergies be characterized and identified systematically in production environments?

Answering this question is of importance for setting the basis for synergy management by detecting synergies. With synergies being characterized systematically, a holistic definition of synergies is made possible; this stands in contrast to the random approach which is usually present when seeking synergies. The target is to find a systematic way how to address all existent and potential synergies.

The answer to this research question is based on a broad literature research which examines different existent approaches on how synergies are characterized. The researcher validated if the literature approaches are applicable to the case study environment. Due to a negative outcome, the answer to this research question is the synergy systematics developed by the researcher which includes the specific needs in the production environment.

2. Which influential factors affect the successful utilization of synergies?

This second question is of interest for having an overall picture of the object of study which includes understanding how and by what the use of synergies is influenced. These questions need to be answered in order to be able to implement the previously defined synergies and to successfully use and manage them.

The answer to this research question includes the input from literature research on the influences affecting a successful utilization of synergies, the evidence of the case studies and the expert interviews conducted by the researcher.

3. Which effect does the organizational structure have on the utilization of synergies in production environments?

This research question addresses to the effect of one specific influential factor which is regarded as centrally important for the utilization of synergies. The answer to this research question includes questioning if the organizational structure has an effect on the utilization of synergies in general, and in which cases it influences the usage of synergies in detail.

The answer to this research question primarily results from the evidence of the case studies, but it is also supported by findings from literature research as well as this explicit question in the expert interviews.

4. Is process orientation suitable for enhancing synergy utilization?

This research question deals with the potential for deploying the principles of process orientation for the purpose of enhancing the utilization of synergies. The answer includes the effect process orientation has on the utilization of synergies; also it identifies which interrelations exist between the concepts of process orientation and synergies. Plus, it validates the opportunity to use process orientation as a starting point for managing synergies.

The answer to this research question is based on the scientific framework of process orientation derived from literature, and examines the connection of process orientation with synergy management in the case studies. The case studies examine both the effect process orientation has on the utilization on synergies and the possibility to make use of process orientation as a starting point of synergy management.

5. How can synergies be managed systematically in production environments?

This research question sums up the results of the previous research questions and additionally discusses what is necessary for a successful synergy management, from the identification phase of a synergy potential up to its utilization. The answer to this research question is primarily based on the experience from the case studies, and also on literature research.

1.3 Scientific Research Method

The elaboration of the scientific problems of this thesis requires input from earlier scientific work, input from the field to answer the scientific questions partly, the design of a new systematics as well as the feedback from the field to prove the validity of the findings. For this reason the researcher decided for case study research as research method.[6] Sources of evidence are i) direct observation, ii) documentation, iii) interviews and iv) participant observation.[7] The case studies are used for establishing the researcher's theoretical knowledge, validating this knowledge as well as theoretical

[6] Based on „Case Study Research: Design and Methods“ fourth edition by Robert K. Yin 2009

[7] Yin, R. 2009 page 102

knowledge from literature research and designing and advancing the synergy identification procedure of this thesis.

Since the researcher was actively involved in some of the case studies, the research approach can be assigned to the action research approach.[8] Action research describes a research approach where the theory construction is combined with observations from the field, plus an active role of the researcher is given in the problem-solving process. As in case study research the findings are proved towards their generalizability, the approach is iterative with a focus on the analysis of causes and problems. A higher acceptance of the findings is aimed by involving practitioners into the problem definition and solving processes. The design is aimed to satisfy the theoretical interests of the research as well as producing practical results which are of interest for the application in the field.

For enabling a higher validity of the findings the researcher decided for a multiple case study design consisting of three case studies. Wherever possible, the findings of the prior case were further developed for modifying the design of the next case study[9]. With this procedure the researcher derived more powerful analytic conclusions which were developed from the cases independently and had the possibility to validate new findings concerning their general applicability.[10]

[8] Probst G., Raub S. 1995 and Gummesson E. 2001

[9] Modification of case studies according to Yin R. 2009 page 62 ff.

[10] Yin, R. 2009 page 60 ff.

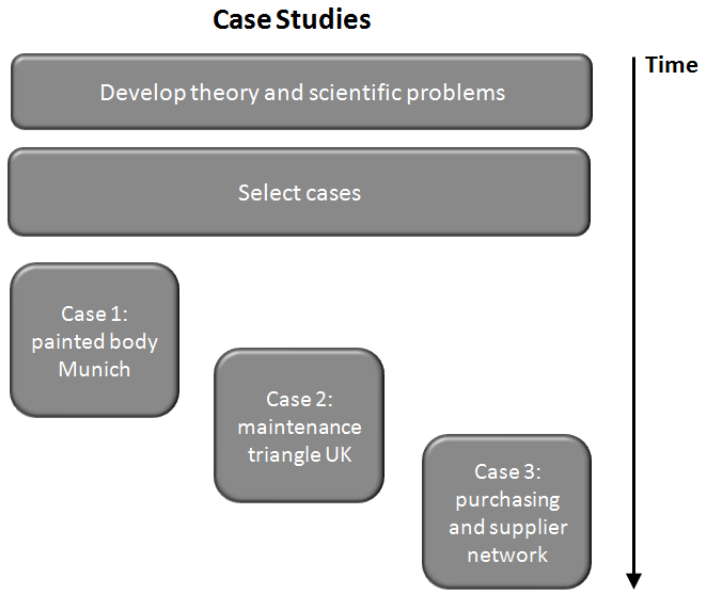

Figure 1: Case studies

The evidence of the case studies is primarily qualitative and additionally includes a questionnaire which was discussed in interviews with relevant representatives[11] for the topic of interest. The approach which includes supplementing the case studies with additional research methods is chosen in accordance with the mixed methods design according to Yin.[12]

Based on the method selected the researcher included the following levels of questions in his research method:[13]

Level 1: Questions asked of specific interviewees.

Level 2: Questions asked of the individual case.

Level 3: Questions asked of the pattern of findings across multiple cases.

Level 4: Questions asked for an entire study. For example, calling on information beyond the case study evidence and including other literature of published data that may have been reviewed.

[11] Ranging from worker to managing director level

[12] Yin R. 2009 page 62 ff.

[13] Yin R. 2009 page 87

Regarding the research questions the evidence from the case studies and from the expert interviews had a different influence on the answer to the research questions. Some of the questions were hypotheses-driven, and the evidence from the field proved or disproved the hypothesis. Some of the research questions were primarily answered by the evidence from the field and supported by findings from scientific research. One scientific question made use of the evidence from the field to continuously improve the result of the answer case by case and within the cases. The principle how the cases influenced the answers to the research questions is shown in the following figure.

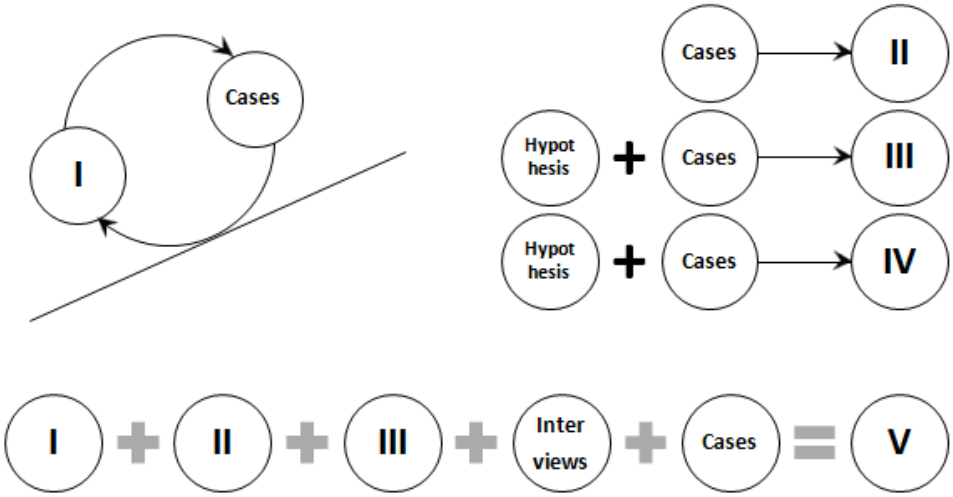

Figure 2: Case studies and research problems

The first scientific problem – *How can synergies be characterized and defined systematically in production environments?* - was further developed during the entire time of the dissertation; the researcher examined different approaches how to address this problem. The first draft of the answer to problem one was developed at the beginning of the first case study, tested during this case and enhanced until the end of case study three. The result presented in this dissertation is the final draft after multiple iterations and improvements made during all field cases.

In the second scientific problem - *Which influential factors affect the successful utilization of synergies?* - the information from all case studies, including the expert interviews, was gathered. With this approach the researcher had the possibility to include different ideas, expert opinions and observations for answering the research question. The evidence from all cases allowed for questioning if the findings from one case were case specific or generally valid for the topic of interest.

In contrast to the first two case studies the research questions three - *Which effect does the organizational structure have on the utilization of synergies in production environments?* – and four – *Is process orientation suitable for enhancing synergy utilization?* - are hypothesis-driven. The cases delivered the evidence to prove or disprove these hypotheses as well as the details about the question of interest.

The hypothesis for research question three is:

The organizational structure of a company has major influence on the utilization of synergies.

The sub-hypothesis is:

The utilization of synergies can generally be influenced positively by implementing a proper organizational structure which favors the use of synergies.

The hypothesis which is the basis for scientific problem four is:

The principles of process orientation support the use of synergies; processes are regarded from end-to-end without referring to organizational boundaries which can negatively influence the use of synergies.

Synergy management can partially be based on process orientation for enabling a systematic use of synergies.

Research question five - *How can synergies be managed systematically in production environments?* - sums up the results of research questions one to four and additionally matches them with insights from literature, with the experience from the case studies, as well as the insights from the interviews.

The questions asked in the expert interviews were the following:

- Which synergies do you think can be used in manufacturing companies?
- How can the synergies you mentioned be identified and described? Which perspectives or approaches are suitable for those synergies?
- Which are the main influential factors on the utilization of the synergies you mentioned? What increases the likelihood of synergies to occur and what blocks it?
- How do you see the influence of the organizational structure on the utilization of synergies? With which kinds of synergies does it play a key role, with which not?
- How do you see the influence of standardization on the utilization of synergies? In which cases are they a decisive influential factor, in which cases are they unnecessary?
- Which role does the leader play when it comes to the utilization of synergies? Which is the role of the staff members?
- How can you motivate both managers and staff members to identify and facilitate synergies cross-departmental?
- Which role, do think, do key performance indicators play while using synergies?
- Which key performance indicators (KPI) you are familiar with hinder or support the concept of synergies? Which KPI support the concept of synergies?

- Which actions do you think can companies take to accelerate the usage of synergies?
- How can a systematic synergy management, which understands/includes synergies and expands potentials, be organized within manufacturing companies?

The questions discussed with the BMW process orientation expert[14] were the following:

- What is a synergy?
- Which synergies are used in your department?
- Which synergies are used by the BMW Group?
- What are the main influential factors on the utilization of synergies?
- How can you systematically describe synergies in the production (environments)?
- How should a systematic and non-randomly synergy management be implemented in the production?
- Which role do synergies play in process orientation?
- How are synergies defined within process orientation?
- Did people focus on using/finding synergies within the framework of PRIME and the definition of processes at BMW?
- Does BMW systematically search for synergies or has it in the past?
- Do you think that synergies are the result of process orientation or do they have to be searched for actively?
- Is process orientation a potential approach for systematically defining and extending synergies?
- Which are the possibilities to systematically integrate synergy management in the process orientation?

Even though the researcher had to follow an iterative procedure for the elaboration of the results of this thesis, the results are presented in a clustered configuration.

1.4 Structure of the Thesis

On the basis of the underlying logic introduced in the previous subchapters the thesis is structured into eight major chapters. The first four chapters are the foundation components for the fifth chapter in which the researcher's synergy management concept

[14] Head of the central department for process management, project leader of the BMW process orientation initiative PRIME and head of the BMW process management network

is introduced. Chapter six introduces the case studies which delivered important insights for the results of this thesis. Chapter seven concludes the results of the thesis and gives an outlook on additional fields of interest on synergy research. After an introduction is given in this first chapter the content of the subsequent chapters is as follows:

Chapter 2: Chapter two covers the major subject of economic synergies. It defines what synergies are, gives an overview about synergy categorizations including the most important synergy concepts, the sources for synergy effects and synergy motives. Apart from that, the key influential factors on using synergies are introduced, including the concept of business relatedness as well as organizational support factors for utilizing synergies. Furthermore, approaches how synergies can be quantified, among others the costs of creating synergies, are presented. The final topics covered in this chapter are challenges which come along with synergies in general and synergy management in particular including central change management advices when dealing with synergies.

Chapter 3: Chapter three deals with the second main theoretical foundation of this thesis, the topic of organization and process orientation. The chapter starts with a general overview about the organization of companies and leads over to the specific topic of process orientation. The latter, as an additional organizational perspective, is introduced including the definition of process orientation and the distinction of process orientation, business process reengineering and business process management. Finally, the most important principles of process orientation are defined.

Chapter 4: This chapter combines the concept of process orientation and synergies. In the course of this, it is questioned how the main principles of process orientation affect synergies as well as the key influential factors of synergy utilization. Likewise general commonalities between the concept of process orientation and synergies are introduced.

Chapter 5: In chapter five the researcher's synergy management approach is introduced. The chapter includes general considerations about the requirements of a systematic procedure and leads over to the introduction of the main findings of the synergy identification and implementation procedure.

Chapter 6: Chapter six introduces the three case studies which centrally supported the findings of this dissertation. Case study number one took place in the painted body organization of the BMW plant Munich. Case study two was a project within the maintenance triangle organization of the MINI production plants in Oxford, Hams Hall and Swindon in the United Kingdom. Case study three is the Purchasing and Supplier Network.

Chapter 7: Chapter eight derives a conclusion of the entire dissertation, shows the limitations of the research method applied in this dissertation and gives a perspective on further research fields regarding the topic of interest.

2 Economic Synergies

2.1 Introduction and General Consideration

This chapter introduces the first basis for this dissertation, which is a general understanding about synergies. This basis is needed because synergies can only be exploited successfully and systematically if they are understood. In order to establish this basis subchapter 2.2 defines the term of synergy, subchapter 2.3 gives an overview about the central synergy categorizations, subchapter 2.4 introduces the key influential factors on using synergies, subchapter 2.5 presents ways to quantify synergies and subchapter 2.6 introduces the challenges of dealing with synergies as well as the according change management approaches to manage these challenges. Thus, this chapter is the first scientific foundation for the design of a process oriented synergy management.

Before the term of synergy is defined, it needs to be understood that synergy is an interdisciplinary concept describing various manifestations of cooperation. It is applied in chemistry, biology, medicine, information technology, social sciences, political sciences, business administration, economics, and theology.[15] An overview of i) the utilization of the term synergy, ii) the phenomenological consideration, iii) the experimental evidence and iv) the conceptual basis of different scientific disciplines is shown in the figure below.[16]

[15] Baltes G. 2000 pages 11 ff.

[16] Baltes G. 2000 page 21

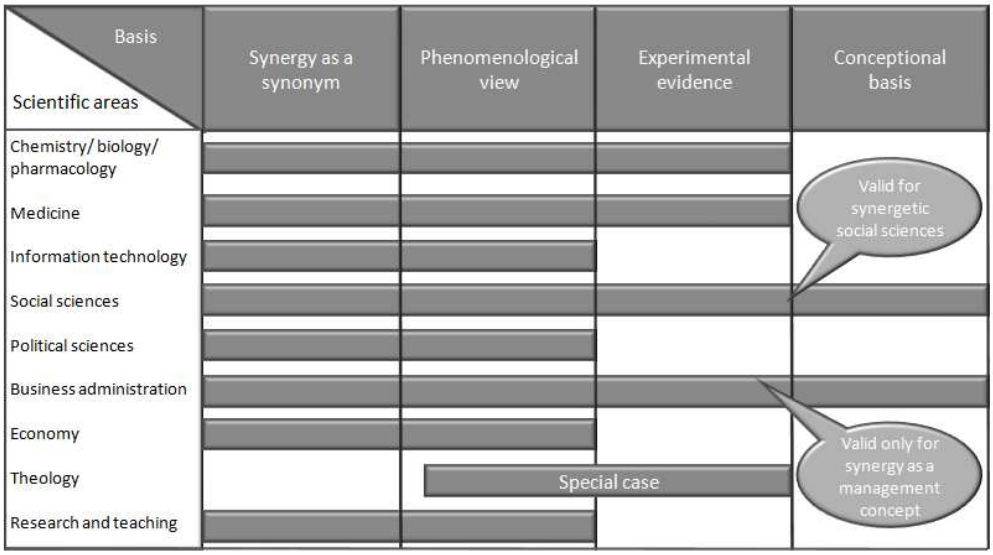

Figure 3: Interdisciplinary utilization of the synergy concept

In the business scientific context, which is of interest in this thesis, the application of the synergy concept is categorized into i) a concept in connection with mergers and acquisitions, ii) a concept for the quantification of synergy effects and iii) a management concept for the business leaders.[17] The latter two are of relevance for this thesis.

After the structure of this chapter is introduced and an overview about synergies in general is given the term of synergy in a broader context and the specific business environment is defined in the following subchapter.

2.2 Definition of Synergy

Etymologically the "word" *synergy* originated from Greek *sunergos* 'working together', from *sun-* 'together' + *ergon* 'work'. The Oxford Dictionaries defines synergy as "the interaction or cooperation of two or more organizations, substances, or other agents to produce a combined effect greater than the sum of their separate effects."[18] The Oxford Advanced Learner's Dictionary defines synergy as "the extra energy, power, success, etc. that is achieved by two or more people or companies working together, instead of

[17] Baltes G. 2000 page 44

[18] Oxford Dictionaries: http://oxforddictionaries.com/definition/english/synergy?q=synergy

on their own."[19] The Term is literally translated as cooperation, in a figurative sense it means to collaborate. Hence, the word can be translated as „working together"[20].

Scientifically, the term was primarily used in natural science for describing the concurrence of two substances or organs with a resulting above-additive effect.[21] Furthermore, Haken[22] refers to his interdisciplinary field of research, which deals with the emergence of new structures and functionalities of systems, as "synergetics".[23] Today the term synergy is not only in common use in science, but it also became established as a term for specific forms of collaborations in social sciences, natural sciences and also in everyday language. It is used, for example, in the field of theology, physics, chemistry, psychology, synergetics and sociology.[24]

In chemistry the term is used for effects resulting from the combination of various substances concerning a chemical or biochemical reaction.[25] In medicine synergy is described as the effect resulting from the combination of various medications, methods of treatment or hormones.[26] The field of information technology uses the term synergy for the interaction of various factors concerning a desired positive effect, such as more efficient processing or reduction of development time.[27] In social sciences the synergies describe phenomena occurring within social groups which can be found in practice.[28] In economics the term is used for the interaction of economic participants.[29] In contrast to all other disciplines theology regards synergy as the interaction between god and human.[30] Business administration has two understandings of synergy; i) as synonym for interaction and ii) as a theoretical management concept.

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[19] Oxford Advanced Learner's Dictionary: http://oald8.oxfordlearnersdictionaries.com/dictionary/synergy

[20] Hofmann E. 2004 page 236

[21] Paprottka S. 1996, page 41. Jawetz, E. The use of Combinations of Antimicrobial Drugs, in ARP, VOL.8, 1968, pages 151-170

[22] Haken, H. Erfolgsgeheimnisse der Natur-Synergetik: Die Lehre vom Zusammenwirken, 2nd Edition, Stuttgart 1981, pages 9-21

[23] Paprottka S. 1996, page 41

[24] Biberacher J. 2003, page 7

[25] Baltes G. 2000 page 13

[26] Baltes G. 2000 page 14

[27] Baltes G. 2000 page 14 ff.

[28] Baltes G. 2000 page 15

[29] Baltes G. 2000 page 18

[30] Baltes G. 2000 page 19

Economic sciences views synergies (also: economies of scope, composite effects)[31] as acquisition-based changes of an overall market value of the acquisition partner resulting after the acquisition in contrast to the sum of their existing single market values prior to the acquisition.[32] These changes would have never occurred if the partners remained working independently.[33] In the same context Ficery et. al. define: "Synergies are the present value of net, additional cash flow that is generated by a combination of two companies that could not have been generated by either company on its own"[34]

The first synergy concept in business science was introduced by Penrose[35] who divided benefits of diversification strategies in two categories.[36] The first one is classified as 'economies of operation' and stands for economic benefits which diversified companies can generate by merging specific operational business functions and (additionally) taking advantage of shared management capabilities and knowledge. The second one is classified as 'economies of expansion' and describes benefits which established companies have after entering new markets due to their existent resources in contrast to start-ups. Even though Penrose's concept did not fall under the category 'synergy' it already implies the basic idea of (business) synergies where a benefit is achieved through the cooperation of two units which otherwise would not have been possible.

The development of the synergy concept in the business context is fundamentally assigned to Ansoff.[37] In 'Corporate Strategy'[38] Ansoff describes the combination of existent resources and capabilities with new market and product areas as synergy effects, assumed that the overall output exceeds the single outputs of the single business units. Ansoff defines synergy as "sharing of capabilities among units of the firm which produces performance which is greater than the performance which can be obtained if the units operate independently of one another. In Anglophone literature synergy and

[31] Franke F. 2009 page 6

[32] Rockholtz C. 1999 page 132

[33] Damodaran A. 2005 page 3

[34] Ficery K. et. al. (2007) page 4

[35] Penrose, E. The Theory of Growth of the Firm, London 1959

[36] Paprottka S. page 41 Unternehmenszusammenschlüsse: Synergiepotenziale und ihre Umsetzungsmöglichkeiten durch Integration, Gabler Wiesbaden 1996

[37] Biberacher J. 2003 page 8 or Karenfort S. 2011 page 14

[38] Ansoff I.H. 1965: page 75

synergy effects are generally used as synonyms."[39] The effect is also often referred to as "2+2=5" effect.[40]

Two decades after the introduction of Ansoff's work Michael Porter reviewed the concept in his book 'Competitive Advantage' published in 1985.[41] Due to their importance both synergy concepts are introduced one of the following subchapters.

Since the development of the first business synergy concept by Ansoff different definitions of the same concept have emerged. These have been developed in different contexts and therefore have different priorities. Generally, all definitions listed below have one thing in common: the central basis of the cooperation or collaboration, respectively, as a source for the synergy. Some of the definitions from scientific contexts are displayed in the following table. Most of them are based on research of synergies in mergers and acquisitions which is the field of science most frequently used for the object of study, the synergy.

Author	German	English
Reißner (1992)	„Synergien sind akquisitionsbedingte Veränderungen gemeinsamer strategischer Erfolgspotenziale der Aquisitionsbeteiligten gegenüber ihren Einzelerfolgspotenzialen"[42]	Synergies are acquisition-related changes of mutual strategic success potentials of the acquisition members in comparison to their individual success potentials.
Paprorottka (1996)	„Synergie steht als Oberbegriff für das Phänomen des Zusammenwirkens sowie dessen mögliche Konsequenzen […]"[43]	Synergy is the generic term for the phenomenon of cooperation plus its possible consequences.
Ebert (1998)	„Unter einer Synergie werden alle erfolgswirksamen Werteänderungen subsumiert, die kostenbezogen und/oder wirkungs- bzw. leistungsbezogen durch einen Unternehmenszusammenschluss generiert werden oder werden sollen"[44]	Under a synergy one subsumes all value changes affecting net income which are or are to be generated through a merger with relation to costs and/or effects or performance.
Rodermann (1999)	„mit dem Begriff Synergie [bezeichnet man] das Zusammenwirken von mindestens zwei ansonsten getrennt voneinander operierenden Geschäftseinheiten mit dem Ziel, operative Effizienzvorteile zu realisieren. Als Folge dieses Zusammenwirkens ergibt sich ein Wert des Ganzen nicht mehr aus der Addition seiner Teile"[45]	The term synergy refers to the interaction of a minimum of two business units which otherwise would have operated separately, aiming to realize operative efficiency benefits. The outcome of this interaction will be the value of the whole instead of only the addition of its single parts.

[39] Paprottka S. 1996 page 41 or Karenfort S. 2011 page 20

[40] Ansoff I.H. 1965 page 75. Amongst others Karenfort S. 2011 page 20.. In German literature the same effect is also referred to as 'Verbundeffekt' or 'Verbundwirkung'.

[41] Porter M. 1985

[42] Reißner S. 1992 page 107

[43] Paprottka S. 1996 page 43

[44] Ebert M. 1998 page 22

[45] Rodermann M. 1999 page 37

Bachmann (2001)	„Überadditive, durch den Merger verursachte Wertseigerung entlang dessen Wertschöpfungskette der zusammengeschlossenen Unternehmen durch neue Ressourcenkombination, primär aufgrund a) gemeinsam durchgeführter Aktivitäten/ gemeinsamer Leistungserbringung und/oder b) erweiterter/ innovativer Aktivitäten/ Leistungserbringung“[46]	Supra-additive accretion of the joint venture along its value chain which is caused by the merger through new combinations of resources primarily due to a) mutually executed activities/ performances and/or b) expanded/ innovative activities/ performances.
Sirower (2001)	„Synergie ist die Verbesserung der Performance der fusionierten Unternehmen gegenüber der Performance, die von den beteiligten Unternehmen getrennt bereits erwartet und gefordert wird“[47]	“Synergy is the increase in performance of the combined firm over what the two firms are already expected or required to accomplish as independent firms”
Metz (2002)	„Synergie [ist] als Sammelbegriff für sämtliche Ursachen [zu bezeichnen], die im Rahmen einer Akquisition den Gesamtwert der beteiligten Unternehmen verändern“[48]	Synergy is the collective term for all causes which change the value of the whole of the companies involved within the scope of an acquisition.
Wirtz (2003)	„Unter Synergien wird im M&A-Kontext verstanden, dass sich mit der wirtschaftlichen Verbindung zweier Unternehmen ein Wertzuwachs einstellt. Dabei sind Synergien […] dann gegeben, wenn der Nutzen des Zusammenwirkens einzelner Faktoren ungleich bzw. größer als die Summe der Nutzen der einzelnen Faktoren für sich genommen ist“[49]	Within the context of M&A, synergies are defined as an accretion which emerges with the economic link of two companies. Synergies occur when the value of the interaction of single factors is unlike or higher as the sum of the individual values of the single factors.
Chatterjee (1986)	Mehrwert, der sich aus der Möglichkeit ergibt, eine fachliche Ressource zu nutzen, die einzig aus dem Unternehmenszusammenschluss resultiert.	„…increased value [which] results from an opportunity to utilize a specialized resource which arises solely as a result of a merger“[50]
Biberacher (2003)	Unter Synergie versteht man das synchrone Zusammenwirken bisher getrennter Unternehmen, Geschäftsbereiche oder Funktionsbereiche, das zu einer Steigerung des Gesamtwertes der Zusammenwirkenden Einheiten führt. Unter Dissynergie versteht man das synchrone Zusammenwirken bisher getrennter Unternehmen, Geschäftsbereiche oder Funktionsbereiche, das zu einer Senkung des Gesamtwertes der zusammenwirkenden Einheiten führt.[51]	Synergy is the synchronous interaction of companies, business units or functional areas which used to work individually which leads to an increase in the value of the whole of the interacting units. Dissynergy is the synchronous interaction of companies, business units or functional areas which used to work individually which leads to a decrease of the value of the whole of the interacting units.
Kogeler (1992)	dem aufeinander abgestimmten Zusammenwirken zweier oder mehrerer Unternehmungen zur Freisetzung von Rentabilitäts- aber auch Risikoeffekten, die bei einer einfachen Addition nicht entstehen würden[52]	It is the coordinated interaction of two or more activities for releasing rentability as well as risk effects, which could not arise in case of a simple addition.

Table 1: Definitions of synergy

The definitions listed above show the first blurring in the scientific context which results from the fact that all authors employ the same basis for their definition but do not have the same overall understanding of the term synergy. For scientific purposes the initial situation is additionally aggravated by i) synonyms for the synergy term and ii)

[46] Bachmann C.W.R.2001 page 158

[47] Sirower M.L. 2001 page 48, Sirower M.L. 1997 page 20

[48] Metz M. 2002 page 59

[49] Wirtz B.W. 2003 page 58

[50] Chatterjee S. 1986 page 119

[51] Biberacher J. 2003 page 53

[52] Kogeler R. 1992 page 5

existence of highly related concepts. In this context, Biberacher[53] lists the synonyms network effect, vertical integration, scope effect, economies of scope, composite effect, spillover effect, effect of integration, interdependencies, combination effect, cooperation effect and interrelation which are used in science to explain synergy-related topics. The reference to related concepts is, for instance, given by economies of operation, economies of expansion, economies of overhead and skills, economies of synergy and economies of scope.

The definition which forms the scientific framework of this thesis is:

Synergy is the interaction or cooperation of resources to produce a combined effect greater than the sum of their individual effects.

In this definition resources include i) tangible, ii) intangible, iii) human and iv) financial resources. In this thesis the terms synergy and synergy effect will not be used as synonyms; the synergy effect is the result of the synergy, the synergy is the means how to achieve the effect. Additionally, the explicit differentiation between synergy and a synergy potential is used in this thesis; a synergy is implemented and realized whereas a synergy potential describes potential not yet realized which might generate a beneficial overall effect under specific conditions. Furthermore, this thesis differentiates *horizontal* and *vertical synergies*. Horizontal synergies are connected with one specific function or process; they usually result from centralizing functions. Vertical synergies, by contrast, arise from the combination of different functions; they usually result from decentralizing functions in organizational units.

2.2.1 Synergy Motives

After the definition of the term synergy and the understanding of it, an overview about synergy motives is given. Major research fields of study where synergies are of importance are mergers and acquisitions (M&A). According to Karenfort[54], who presents the results of a survey conducted with 635 American CFOs, the realization of synergies is a dominant motive for M&A. Additionally, Karenfort introduces three major categories of theories to explain the phenomenon of M&A including the respective theories shown in the figure below. All theories bear upon the synergy concept introduced in this thesis.

[53] Biberacher J. 2003 page 9: Verbundeffekt, Verbundvorteil, Verbundwirkung, Ausstrahlungseffekt, Integrationseffekt, Interdependenzen, Kombinationseffekt, Kooperationseffekt and Verflechtung

[54] Karenfort S. 2011 page11

Economic motives	Managerial motives	Financial Motives
▪ Efficiency theory ▪ Monopoly theory	▪ Inefficient Management theory (Market for corporate control theory) ▪ Management discretion theory ▪ Hubris theory	▪ Valuation theory ▪ Risk diversification theory ▪ Tax and balance sheet theory

Table 2: M&A motives and theories[55]

Economic motives include bidirectional beneficial values for the shareholders of the acquiring and the target company.[56] The first economic motive is based on the efficiency theory which postulates that M&A are carried out to achieve "net gains from synergies".[57] These net gains result from operating synergies which are achieved through the transfer of knowledge, from economies of scale and economies of scope.[58] Following the interpretation of the synergy hypothesis, the efficiency gains are not generally existent but resulting from merging two specific firms.[59] According to the second economic motive, the monopoly theory, M&A are chosen to achieve monopoly rent through increased market power, basically valid for horizontal and conglomerate M&A. The market power can be enforced by reductions of supply, cross-subsidizing products and deterring potential market entrants.[60] According to Porter[61] these benefits are referred to as competitor interrelations or collusive synergies.[62]

Managerial motives are based on the reasoning that M&A will improve related managerial qualifications and objectives. The first theory assigned to this motive postulates that a firms management is not able to make use of the full potential of a company due to lack of knowledge or qualification.[63]If this management is exchanged due to the M&A to a more competent management, thereby improving the mode of

[55] In Accordance to Karenfort S. 2011 page 10

[56] Rodermann M. 1999, page 54 and Hofmann E. 2004 page 168

[57] Trautwein F. 1990 page 284

[58] Rodermann M. 1999, page 55

[59] Sirower M.L., Müller D.C. 2003, page 375

[60] Karenfort S. 2011 page 8 according to Trautwein F. 1990, page 286 and Rodermann M. 1999 page 137

[61] Porter M. 1985 page 353

[62] Chatterjee S. 1986 page 121

[63] Hofmann E. 2004 page 174

operation of the company, the shareholder value is increased. The second theory, the managerial discretion theory, describes the effect when a firm's management initiates M&A to pursue personal objectives.[64] These personal objectives are often interlinked with the firm's size and therewith optimized after M&A. Finally, the Hubris theory describes the effect of raised purchasing prices in M&A due to over-optimistic assessments of the management of the acquiring firm. [65]

Financial motives are based on the principal agent theory and the portfolio theory which both declare that M&A are realized for meeting financial goals and not because of personal and performance objectives.[66] The first theory belonging to the financial motives is the valuation theory which is based on the assumption of inefficient capital market and asymmetric information. According to this theory, the goal of M&A is to "achieve arbitrary value gains between the market value and the valuation of the acquiring firm as a result of unique information about the target company which is only available to the bidder's management"[67]. The risk diversification theory is based on the portfolio theory which supposes that a diversified portfolio acts supportive towards a reduction of risks. Its main principles are the diversification of activities which results in a reduced volatility of cash flows at the group level with contemporaneous retention of returns. The tax and balanced sheet theory is based on the assumption that M&A are enabled to capture benefits from the combined balanced sheet including offsetting tax profits and losses.[68]

2.3 Overview of Synergetic Categorizations

Besides a clear understanding of the term synergy, the categorization of synergies is the second important basic for being able to understand synergies in the economic context. They are of importance because they are often simultaneously used as the source for the derivation of a scientific synergy concept. Since literature provides different perspectives from which synergies are perceived; the categorization of synergies consequently has different facets which are introduced in this chapter. Depending on the

[64] Trautwein F. 1990 page 287 and Rodermann M. 1999 page 59

[65] Karenfort S. 2011 page 9 in accordance to Trautwein F. 1990 page 289

[66] Hofmann E. 2004 page 179

[67] Karenfort S. 2011 page 9 in accordance to Rodermann M. 1999 page 58

[68] Hofmann E. 2004 page 183

situational context and the matter of interest, for instance M&A, the categorization provides diverse aspects which are to be taken into account in the given context.[69]

From the general perspective, the differentiation into

- Quantitative and qualitative
- Immediate and future
- Positive and negative
- Strategic level-based
- Resource-based
- Cost and revenue
- Financial and functional
- Functional area-based

synergies is an established way to categorize synergies.

The categorization of synergies into *quantitative and qualitative synergies*[70] allows for a systematical approach to evaluate the benefits or accordingly disadvantages of a potential synergy constellation. The effects of the former are measurable directly in terms of common measures, whereas the latter are not measurable directly. Thus, quantitative synergies are advantageous because they are based on facts and their effect is easier to control and monitor, whereas qualitative synergies such as transfer of knowledge need to be operationalized for an ex ante or ex post evaluation. Categorically, both approaches include certain subjectivity when synergy potentials are evaluated; at first sight, the first approach is subject due to forecast inaccuracies and the multitude of parameters to be evaluated, while the latter is subject due to the inaccuracy of operationalizability models. [71]

Immediate and future synergies imply the time frame in which the synergy effect is expected. Within this perspective, the knowledge about the dimensions duration, frequency and date are of importance for evaluating the benefit of the synergy.[72] The consideration of the time-based delimitation is not only important when synergetic effects are expected in the long term, but also when accounting for time-dependent influences on the synergetic benefit. This differentiation is also in line with another one which is common in the scientific context: to distinguish between synergy potentials and synergy effects. Synergy potentials are possible synergies which are present latently

[69] The researchers own synergy categorization is introduced in chapter 5.3

[70] Köppen J. 2004, page 124 ff.

[71] Compare chapter 2.5

[72] Biberacher J. 2003 page 61

and do not have to be used implicitly, whereas synergy effects describe synergies which have already been realized.[73] In a related context, Ansoff additionally distinguishes start-up and operating synergies.[74] Start-up synergies result from mergers and acquisitions, while operating synergies result from organizations which already exist.

The categorization of *positive and negative synergies* implies a bidirectional outcome of synergies and is common in the scientific literature.[75] Positive synergistic effects are consistent with the previously explained synergy concept. In this case, the combination of two entities which were previously independent results in an optimization of the considered effect. Negative synergy effects, or dissynergy, describe effects which were aimed at generating synergies, but resulted in counterproductive effects overcompensating the positive effect. In accordance to Funk and Sigle[76] the following synergies are perceived as negative synergies:

- not implemented positive synergies
- delayed implemented positive synergies
- negative synergies which were detected and avoidable before the integration phase
- negative synergies which were not detected before the integration phase
- negative synergies which were not detectable before the integration phase

Karenfort[77] defines negative in a slightly different way by assigning synergy costs[78] to negative synergies: “negative synergies encompasses all direct expenses related to an acquisition, such as legal costs, relocation costs and costs for the integration and harmonization of the IT infrastructure, as well as indirect expenses and detrimental effect on the income situation”. This dissertation follows the first definition of negative synergies which says that the net effect of a synergistic approach has a negative outcome; the single negative effects leading to the negative effect are referred to as synergy costs.

The most comprehensive categorization of synergies is given by Biberacher, who combined different common synergy categorizations of other authors in one concept.

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[73] Weber E. 1991 page 104

[74] Ansoff I.H. 1965 page 84 Because of their central importance for the scientific world, the synergy concepts of Ansoff and Ansoff are introduced in two separate chapters. These concepts are the basis for most scientific considerations of the synergy concept. Baltes G. 2000 page 44

[75] Ansoff I.H. 1965 page 83 ff., Paprottka S. 1996 page 41, Burde F. 2010 page 5 Biberacher J. 2003 page 54, Kogeler R. 1992 page 41 ff.

[76] Funk J., Sigle H. 1993 page 147. Biberacher J. 2003 page 54

[77] Karenfort S. 2011 page 20

[78] Compare costs of creating synergies in chapter 2.5.1

He categorizes synergies according to the *strategic level* and the respective synergy category which can be found on the specific strategic level.[79] For the clusters on the according strategic levels he applies synergy categorizations which are in line with categories known in literature from other authors. The underlying logic of his synergy categorization is shown in the figure below.

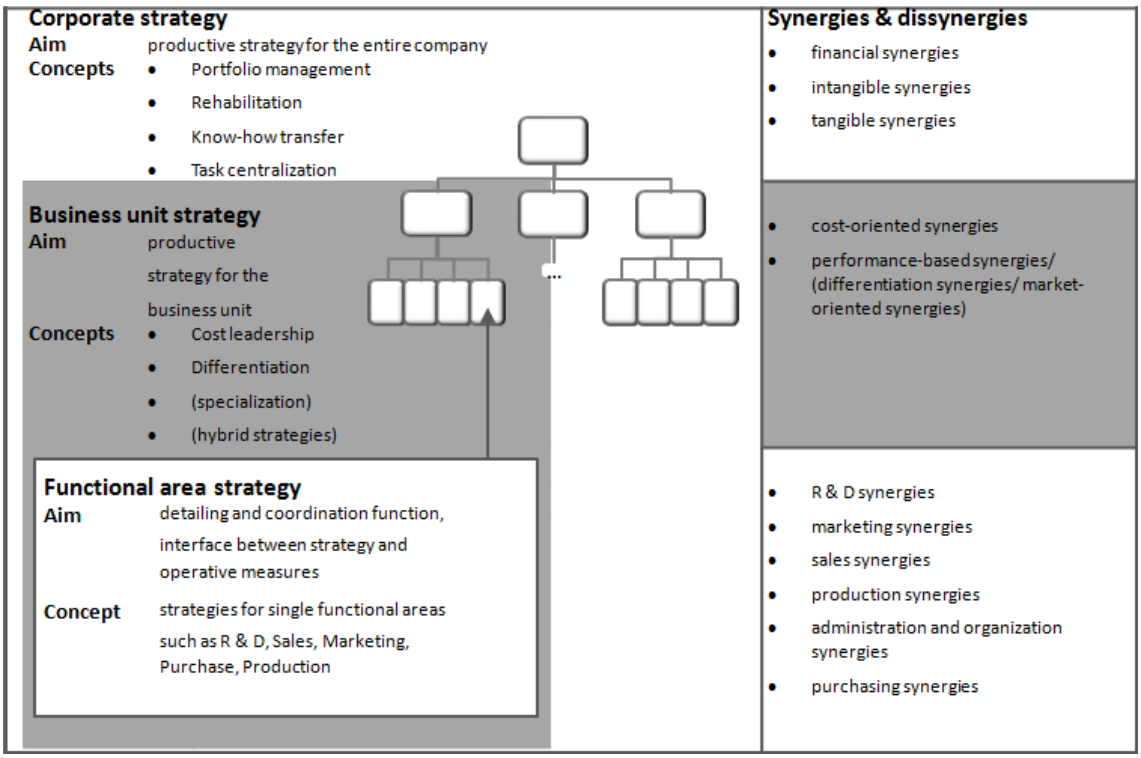

Figure 4: Synergy categories of the three strategic levels according to Biberacher[80]

Biberacher's initial point is that different types of strategies are to be found on different hierarchical levels of the corporation. According to him they need to be considered in the categorization of synergies. In his opinion the different levels need to deal with different aspects of synergies following different systematic for the synergy categories. This is why he defines different synergy categories which are assigned to the three generic strategic levels. The three generic strategy levels according to figure 4 are the

[79] Biberacher J. 2003 page 63 ff.

[80] Biberacher J. 2003 page 64. Additionally Biberacher categorizes synergies according to the measures which are needed to enable the synergy effect. This categorization is introduced by the end of this chapter.

i) overall corporate strategy
ii) division or business unit strategy
iii) functional area strategy

The synergy categories are

1. financial synergies
2. intangible synergies
3. tangible synergies
4. cost oriented synergies
5. performance-based synergies
6. R&D synergies
7. marketing synergies
8. sales synergies
9. production synergies
10. administration and organization synergies
11. procurement synergies

The cluster of the synergy categories chosen by Biberacher can be divided into three additional main categories, which were used in prior synergy categorizations by other authors. The first cluster differentiates according to the resources, making a distinction between i) financial, ii) intangible and iii) tangible. They are applicable for the overall corporate strategy. The second category differs between cost and performance-based synergies, which are applicable for the division or business unit strategy. The third cluster categorizes synergies according to the functional area where they are utilized, thus referring to the functional area strategy.

1. *Financial synergies* mainly have an influence on the risk position, but also on the effects on capital costs, financial strength and taxation.[81] The positive effect usually originates because the cooperation of multiple business areas reduces the non-payment risks for the investor since the existence of multiple cash flows allows for a better equalization of the credits. The result is cheaper external credits. Additionally, uncommitted funds of one business unit can be used to finance another business unit without the need to involve external investors. Independent from investment benefits, financial synergies also allow for saving taxes by making use of different national tax systems when dealing with international organizations or by making use of specific corporate law configurations to reduce the payment of taxes. A summary of financial synergies according to Biberacher is shown on the following figure.

[81] Biberacher J. 2003 page 65

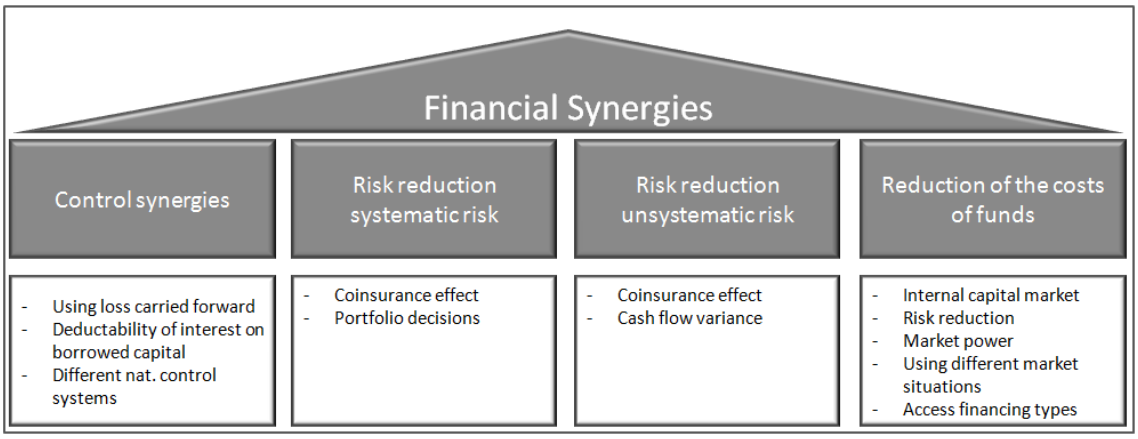

Figure 5: Aspects of financial synergies according to Biberacher[82]

2. According to Biberacher *intangible synergies* on the corporate strategy level are caused by know how transfer from one business unit to the other.[83] This know how transfer might include strategic know how to optimize the market position. In general, they correspond to the previously explained intangible synergies, but include only corporate level relevant items.

3. *Tangible synergies* on the corporate strategic level result from commonalities which allow for combining value chain activities or commonly use the same assets.[84] This requires that processes, resources, products, the supplier and customer base of the corporate units are similar to a given extent.

The synergies on the corporate level can be implemented simultaneously provided that the required commonalities are given. Except from some financial synergies the synergies from the corporate level have an influence on the business unit as well as functional level. The coordination of the synergies resides, however, on the corporate level which includes binding guidelines and targets to put the synergies in practice. Hence, the synergy categories on the corporate level have a bundling character for the other synergy level.

Synergies on the business unit level have to be in line with the corporate strategy. The identification and definition and implementation of synergies happens in the business

[82] Biberacher J. 2003 page 66. Kogeler R. 1992 page 63

[83] Biberacher J. 2003 page 67. Kogeler R. page 38 ff.

[84] Biberacher J. 2003 page 68. Kogeler R. page 38 ff.

units. The alignment of the single business unit strategies including the synergies happens on the corporate level.[85]

4. *Cost oriented synergies* include all synergies which result in cost savings from the cooperation of previously independent units.[86] With this broad definition Biberacher includes most of the synergies mentioned and already explained in this thesis which is the reason why a detailed presentation of those will be omitted. In general, Biberacher categorizes cost oriented synergies in i) capacity-based degression; resulting from optimized capacity utilization, ii) size-based degression; resulting from capacity reduction or increase and iii) lot-based degression; resulting from optimized lot sizes.

5. *Performance-based synergies* aim to realize higher prices and margins on the customer side without proportionally increasing the internal costs.[87] These effects result from differentiation factors which were not present before the cooperation of the business units. They might include the integration of different product features or the integration of services which used to be independent.

Biberacher's cost oriented and performance-based synergies are aligned with the categorizations of other authors. In his M&A based perspective, Karenfort[88] and Hofmann[89] distinguishes between *cost synergies and revenue synergies*. This is in line with Chatterjee's[90] interpretation, although he does not decide to make a further distinction between financial and collusive synergies. In Chatterjee's case, financial synergies are based on reducing costs of capital whereas collusive synergies result in value gains due to an increased market power. According to Karenfort cost synergies constitute of "operational reductions in cost which are derived from the sharing of value chain activities".[91] They are based on economies of scale, learning effects and economies of scope.

Revenue synergies result from value chain linkages enabling differentiation and economies of scope.[92] Differentiation as a revenue synergy results from combined efforts which offer the customer i) an addition of product variants (horizontal differentiation), ii) an improvement of the product quality (vertical differentiation) and

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[85] Biberacher J. 2003 pages 69 ff.

[86] Biberacher J. 2003 page 70 ff.

[87] Biberacher J. 2003 page 73 ff.

[88] Karenfort S. 2011 page 19, Burde F. 2010 page 6

[89] Hofmann E. 2004 page 271 ff.

[90] Chatterjee S. 1986

[91] Karenfort S. 2011 page 20 ff.

[92] Karenfort S. 2011 page 22

iii) innovation (lateral differentiation). According to Hofmann[93], revenue synergies as results from economies of scope are possible due to cross-selling effects with an analog increase in the sales margin.

A related categorization is chosen by Kogeler who distinguishes between i) financial and ii) functional synergies.[94] This classification questions in which general contexts[95] the synergy effects can be realized and divides them into finance and operations. Financial synergies are accordingly optimizing the financial profile of one or more organizations; this is characterized by the capital resources, the asset structure, the cash flow and the earnings. The synergy effect leads to a reduction of risks or gain in profitability. Functional synergies can be found in the operational areas of the company.[96] This categorization is independent from the factual structural organization.

The synergy categories Biberacher suggests for the functional level corresponds to the value chain categorization by Porter which is presented in chapter 2.3.2. Categorizing synergies according to their *functional area* is also common as a basis for explaining synergies. It is the functional-organizational differentiation where synergetic effects are attributed according to their functional allocation, such as sales synergies, production synergies or controlling synergies.[97] Sometimes the functional perspective is additionally categorized in internal and external perspective where the difference is made if the synergy effect results from company internal or external cooperation.[98]

6. The first synergies in Biberacher's functional area categorization are research & development synergies. In accordance with Biberacher, *research and development synergies* have a major effect on the cost structure of the subsequent activities in the value chain since 80% of the product costs are defined in the development phase.[99] Research and development are therefore primarily based on know how transfer between R&D departments as well as process partners from the value chain to reduce costs within the own department as well as later on in production, logistics, sales and service.[100] Additionally, performance-based synergies can be generated by

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[93] Hofmann E. 2004 page 280 ff.

[94] Kogeler R. 1992 pages 33 ff.

[95] In contrast to organizational areas.

[96] Therewith they partially comply with the categorization of synergies according to the functional area, which is introduced in the following.

[97] Angermayer-Michler B., Oser P. 2009 page 980. Biberacher J. 2003 page 33 ff. Ansoff I.H. 1988 page 41

[98] Biberacher J. page 60

[99] Biberacher J. 2003 page 77. Rommel G. et al. 1993 page 75 and Kogeler R. 1992 page 50

[100] Paprottka S. 1996 page 84 ff.

differentiating the product against competitors by implementing knowledge and requirements from the customer in the development phase.

7. 8. *Marketing and sales synergies* on the functional level are based on know how transfer, combined activities, including spill-over effects and cross-selling, and economies of scale.[101] With well positioned brands cross-selling activities can additionally lead to performance-based synergies.

9. Biberacher again divides *production synergies* into cost oriented synergies and performance-based synergies. Cost oriented synergies are again divided into i) capacity-based degression; resulting from optimized capacity utilization, ii) size-based degression; resulting from capacity reduction or increase and iii) lot-based degression; resulting from optimized lot sizes. Biberacher additionally mentions cost-saving effects resulting from know how transfer.[102] Performance-based synergies are derived from know how transfer and accordingly from the learning curve effect. This can result in more efficient and flexible manufacturing plants, leading to a differentiation of the corporation in the economic context. Additional means of differentiation are time advantages or individual customization potentials of the production to customer needs. Synergy potentials are not limited to the exchange of knowledge within the production; this exchange also happens with other functional areas such as R&D, procurement or sales.

10. *Administration and organization synergies* result from combinations of supportive activities from different areas such as controlling or human resources.[103] They are primarily based on the reduction of double work, but also on the exchange of knowledge and integration of these functions into primary functions. It is therefore required that the parties involved have a common basis for this cooperation.

11. The final functional synergies according to Biberacher are *procurement synergies*. These synergies are usually made for a high ratio of the business unit's level cost oriented synergies.[104] They are made possible by coordinating previously independent procurement operations and saving costs in i) procurement operations, ii) procurement prices resulting from discounts on volume and logistics, iii) control and storage resulting from quality improvements and time savings due to a closer co-operation with the suppliers.[105] Performance-based synergies within the procurement result from an

[101] Biberacher J. 2003 page 76. Kogeler R. 1992 page 47 ff.

[102] Biberacher J. 2003 page 75. Kogeler R. 1992 page 53ff.

[103] Biberacher J. 2003 page 78. Kogeler R. 1992 page 60 ff.

[104] Biberacher J. 2003 page 74 and Bisani F. 1990 page 12 ff. and Kogeler R. 1992 page 57

[105] Biberacher J. 2003 page 74 ff. Vizjak A. 1990 page 107 ff. and Paprottka S. 1996 page 78 ff.

optimized negotiation power towards the supplier and the associated possibility to achieve a better product quality. Additional performance-based synergies are possible by exchanging knowledge between different business units such as R&D or Logistics and improving the time-to-market or delivery time which can result in higher prices and margins.

With this categorization Biberacher designs a concept where the synergy categories are not mutually exclusive and collectively exhaustive.[106] Synergies which affect the functional strategy can also have an influence on the corporate strategy or the business unit strategy and vice versa. The fact becomes evident regarding Biberacher's functional level synergies which are always referred to the higher level, business unit synergies. In this case the functional level synergies which are categorized according to the functional area are broken down to cost oriented and performance-based synergies which were again the higher synergy levels categories. Advantages of this categorization are that high level synergies are broken down to the lower levels and functional level synergies are to be coordinated by the next higher synergy level. However, this categorization does not allow for a holistic and consistent definition of synergies per se.

The second categorization Biberacher decides for is the classification of synergies according to the measures which are needed to enable the synergy effect[107], or the sources of synergies, which are

1. Centralization
2. Integration or restructuring
3. Supplementation/access/power
4. Transfer
5. Balance

A different approach of categorizing synergies is followed by Reissner who differentiates the synergy forms or types of i) centralization, ii) balance, iii) transfer, iv) supplementation and v) integration/restructuring.[108]

In addition to the central categorization explained above, the following table gives an overview of the existent synergy categorizations in the scientific context.

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[106] Biberacher J. 2003 page 78

[107] As these categories are also organizational supportive factors they are explained in detail in chapter 2.4.2

[108] Biberacher J. 2003 page 19 and Reissner S. 1992 page 109

Criteria of categorization	Characteristic		
Time reference	Realized synergies	Potential synergies	
Effect	Positive	Negative	
Exploitation	Commodity synergies	Financial synergies	
Functional area	Purchasing	Production	Distribution
Dimension of occurrence	Non-recurring	Recurring	
Consistency of occurrence	Irregular	Permanent	
Period of use	Short term	Long term	
Payoff effect	Cost synergies	Revenue synergies	
Inducement by cooperation partner	Unreal synergies	Real synergies	
Occurrence probability	Certain	Uncertain	
Measurability	Accurate	Inaccurate	
Division to co-contractors	Unilateral	Proportionate	
Quantifiability	Monetary	Non-monetary	
Value added chain approach	Economies of scope	Economies of scale	
Time of occurrence	Immediate	In the future	
Phase relatedness	Start up synergy	Operation synergy	
Cause	Restructuring synergies	Absolute synergies	
Evaluation of occurrence	Synergy<forecast	Synergy=forecast	Synergy>forecast
Cause for occurrence	Market oriented	Cost oriented	Tax oriented
Beneficiary	Buyer	Seller	
Availability	Universal	Endemic	Specific

Table 3: Typologies of synergy effects[109]

After the essential synergy categorizations from different authors were presented in this chapter the following two subchapters introduce the two central synergy concepts of the last decades. These concepts were developed by Igor Ansoff and Michael Porter and influenced most authors dealing with economic synergies.

2.3.1 The Synergy Concept of Ansoff

The starting point of Ansoff's synergy concept, which is in his case one of the major components of the firm's product-market strategy, is based on the effect resulting from the addition of new products or markets on the Return on Investment (ROI). In his

[109] Based on Burde F. 2010, page 7ff., Küting 2007, page 1322

definition of synergies Ansoff sums up the effects of synergies as "the 2+2=5 effect to denote the fact that the firm seeks a product-market posture with a combined performance that is greater than the sum of its parts."[110]

He argues that an integrated firm can realize scale effects with the resulting cost savings which result in minimized operation costs and investments and revenue enhancement compared to those of a firm with the same but independent operations.[111]

Ansoff reverts to the ROI formula for the description of synergetic effects into:[112]

$$ROI_T = \frac{(S_T - O_T)}{I_T}$$

S = Sales, O = Operating Costs, I = Investments, T = total amount of independent products

If all products are unrelated, the return on investment is the sum of all single product returns on investment. However, if a firm integrates the operating costs and the investments by making use of synergies the effect on the return on investment is:

$$ROI_S > ROI_T$$

Since:

$$S_S = S_T$$

$$O_S \leq O_T$$

$$I_S \leq I_T$$

S = total amount of integrated products

The same positive effect can also be achieved by having the same total investment and increasing the sales and decreasing the operating costs.

Based on this formula he differs between the four synergy types:[113]

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[110] Ansoff I.H. 1965 page 79

[111] Chatterjee, S.: Types of Synergy and Economic Value: The impact of Acquisition on merging and Rival Firms, in: Strategic Management Journal. 1986, vol. 7 pages 119 ff

[112] Ansoff I.H. 1988: The new Corporate Strategy, page 56ff. and Ansoff I.H. 1965 page 80 ff.

- Sales synergies
- Operating synergies
- Investment synergies
- Management synergies

Sales synergies are resulting, for instance, from combined distribution channels, sales administration, warehousing or shared marketing activities for a complete range of related products.[114]

Operating synergies are based on an increased utilization of labor and production factors, learning curve effects and quantity discount.

Investment synergies arise, for instance, from the joint utilization of machines, raw materials and common research and development approaches.

Additionally, *management synergies* which are not reasoned by the ROI formula are introduced by Ansoff explaining the effect which occurs when management capabilities and knowledge gained in one industry are made usable in a new industry.[115]

Ansoff's synergy definition includes positive as well as negative synergies.[116] Negative synergies result from attempts to combine resources which do not have a common basis to build on such as using an automotive facility to manufacture furniture. For avoiding negative synergies Ansoff suggests a comparison of competences in defined functional areas which he later on integrates in his synergy framework.

In addition to the synergy types, Ansoff makes the difference between start-up and operating synergies.[117] These refer to the validity period; start-up synergies are one-off effects, whereas operating synergies result from day to day business.

Derived from the synergy types Ansoff introduces also a framework which enables the evaluation of synergy. It is based on the functional areas of a firm such as general management, research and development, marketing and operations. If necessary, a more detailed representation of the functional units is possible. The principle is shown in the figure below:

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[113] Ansoff I.H. 1965 page 82

[114] Karenfort S. 2011 page 14

[115] Ansoff I.H. 1965 page 75

[116] Ansoff I.H. 1965 page 83

[117] Ansoff I.H. 1965 page 84

Functional area	Symmetry effects	Effects due to pooling of competences							
		Startup economies			Operating economies		Expansion of present sales	New product and market areas	Overall synergy
		Investment	Operating	Timing	Investment	Operating			
General management and finance	Contribution to parent Contribution to new entry Joint opportunities								
Research and development	Contribution to parent Contribution to new entry Joint opportunities								
Marketing	Contribution to parent Contribution to new entry Joint opportunities								
Operations	Contribution to parent Contribution to new entry Joint opportunities								

Table 4: Measurement of synergy of a new product market entry[118]

In each functional area three symmetry category effects are shown: i) contribution to parent, ii) contribution to new entry and iii) joint opportunities. The columns show the effects which result from pooling of competences and differ between startup economies,

[118] Ansoff I.H. 1965 page 88

operating economies, expansion of present sales and new product and market areas. These variables are to be considered in connection with the previously mentioned categories; as far as possible numerical values are to be assigned into the columns. The overall synergy is shown on the right side of the table.

In addition to the framework to measure synergies explained above, Ansoff derives a method for comparing profiles of firms which accommodates synergies and strengths and weaknesses in one framework.[119] This framework rates particular skills and facilities against functional areas of the firm and is widely applicable in all industries. The categories suggested by Ansoff in this context are: i) facilities and equipment, ii) personnel skills, iii) organizational capabilities and iv) management capabilities. In these areas the company is rating its abilities/knowledge and resources in comparison to other companies. After rating the own capabilities the synergetic opportunities are defined by comparing the profile with competitive profiles.

An example of the check list for competitive and competence profiles is shown below:

[119] Ansoff I.H. 1965 pages 90 ff.

	Facilities and equipment	Personal skills	Organizational capabilities	Management capabilities
General management and finance	Data processing equipment	Depth of general management Finance Industrial relations Legal Personnel recruitment and training Accounting Planning	Multi-divisional structure Consumer financing Industrial financing Planning and control Automated business data processing	Investment management Centralized control Large systems management Decentralized control R&D intensive business Capital-equipment intensive business Merchandizing intensive business Cyclical business Many customers Few customers
Research and development	Special lab equipment General lab equipment Test facilities	Areas of specialization Advanced research Applied research Product design: industrial, consumer, military specifications System design Industrial design: consumer, industrial	Systems development Product development industrial, consumer, process Military specifications compliance	Utilization of advanced state of the art Application of current state of the art Cost-performance optimization
Operations	General machine shop Precision equipment Automated production Large high-bay facilities Controlled environment	Machine operation Tool making Assembly Precision machinery Close tolerance work Process operation Product planning	Mass production Continuous flow process Batch process Job shop Large complex product assembly Subsystems integration Complex product control Quality control Purchasing	Operations under cyclic demand Military specifications quality Tight cost control Tight scheduling
Marketing	Warehousing Retail outlets Sales offices Service offices Transportation equipment	Door-to-door selling Retail selling Wholesale selling Direct industry selling Department of Defense selling Cross-industry selling Applications engineering Advertising Sales promotion Servicing Contract administration Sales analysis	Direct sales Distributor chain Retail chain Consumer service organization Industrial service organization Department of defense product support Inventory distribution and control	Industrial marketing Consumer merchandizing Department of defense marketing State and municipality marketing

Table 5: Check list for competitive and competence profiles[120]

The example describes a part of a firm competence profile which lists the major skills and competences of the firm rated against firms which have the same capabilities, and

[120] Ansoff I.H. 1965 pages 96/97

not only firms from the same industry or competitors. By comparing the competence profiles with competitive profiles the derivation of synergy potentials is made possible.

In his later work Ansoff defined an approach to assess synergies by means of a square matrix including the synergy receivers and contributors and their respective Strategic Business Areas (SBA).[121] With this matrix interdependencies which often result from common approaches or synergies are shown and strategic decisions about the synergy constellations are made possible. The matrix is shown in the figure below:

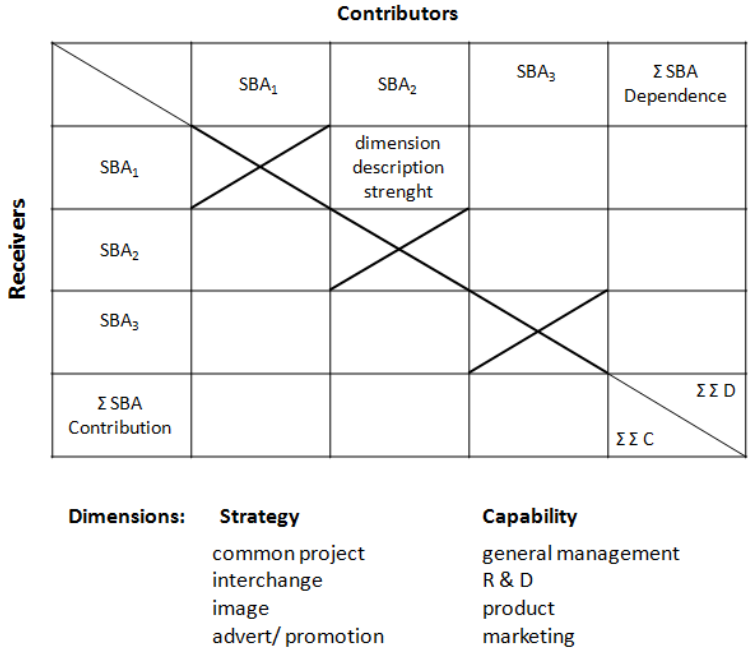

Figure 6: Synergy matrix[122]

The dimensions are based on Ansoff's previously defined synergies among the i) key strategic factors and ii) the capability factors.[123] The key strategic factors describe attributes such as product differentiation, market differentiation and the growth thrust of the SBA's. Capability factors describe SBA attributes for specific functional areas such as innovation, adaption, imitation and creativity for the Research and Development functions.

The first step to fill the matrix is to enter in each box which level of synergy the contributor presently offers to the receiver. This is done with a rating ranging from zero to ten. In a second step the strength of the contributions is summarized by lines and

[121] Ansoff I.H. 1984 page 82 ff.

[122] Ansoff I.H. 1984 page 83

[123] Ansoff I.H. 1984 page 56 ff.

columns, dimension by dimension. Step three assesses the degree of dependence of an SBA on the others; the columns summarize the degree of importance of an SBA to the others. The fourth step is performed to determine key present common threads – including strategy and capability – of the firm. The fifth step repeats the procedure with a focus on future common threads. In the sixth step the current and future threads are used to derive synergy objectives of the firm.

In summary, Ansoff provides important insights into the topic of synergy by introducing the first synergy concept. Even though his synergy models are partially based on merger and acquisitions they can also be used for existent organizations, in terms of operating synergies.

His interpretation of synergy types with the link to the functional areas, however, does not enable the necessary level of detail for the means of this dissertation. Especially the functional focus of his concept does not allow for a proper registration of cross-functional synergies.[124] However, his approach of combining synergy types with parts of the firms organizational structure is a valuable basic approach for this thesis and the own concept to be developed.

2.3.2 The Synergy Concept of Porter

Porter's synergy concept is based upon his assumption that competitive advantage is created in business units instead of concentrating on diversified portfolio strategies to create competitive advantage. This perspective is contrary to the focus on diversified portfolio management, coupled with decentralization approaches in the 1980's when Porter discussed his synergy concept for the first time. Porter reasons that economic, technological and competitive developments are increasing and only companies which can identify and exploit interrelations[125] between different related organizational units are able to maintain a competitive advantage.[126]In his consideration Porter discusses synergies in the context of business strategies, horizontal strategies in particular, which refer to policies and objectives across interrelated organizational units, and pertain to related businesses and not mono-unit organizations.[127] The horizontal strategy does not substitute the (single) corporate strategies, but coordinates their strategic fit with each other.

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[124] Comapre also Biberacher J. 2003 page 64

[125] Porter refers to synergies as interrelations, Porter M. 2004 page 317 ff. Interrelations are a synonym for synergies and will be used as such in this thesis.

[126] Porter M. 2004 page 318

[127] Karenfort S. 2011 page 16

A major point of Porters consideration of the synergy concept is that "the failure of synergy stemmed from the inability of companies to understand and implement it [Synergy], not because of some basic flaw in the concept.[…] Even in instances where companies possessed a genuine opportunity to harness synergy, they often failed because the tools for analyzing it were lacking or they could not overcome the substantial organization problems of implementation."[128] For tackling that problem Porter introduced his value chain approach for identifying synergies which is explained in the following.

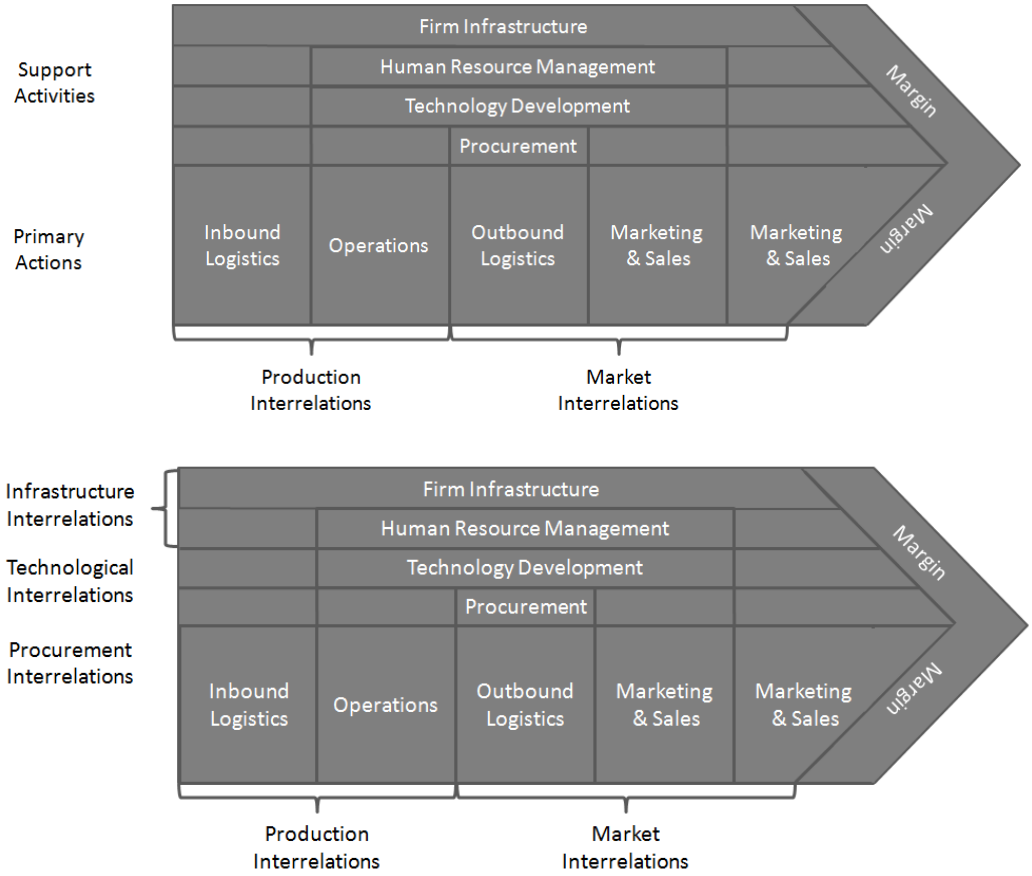

Figure 7: Porter's generic value chain[129]

The figure above shows Porter's generic value chain which is the basis for his synergy identification process. From his perspective, synergies can be realized by identifying and exploiting the right interrelations between the five categories; production, market, procurement, technology and infrastructure, shown on the lower part of the figure.

[128] Porter M. 2004 page 318

[129] Porter M. 2004 page 336 ff.

According to Porter, synergies or interrelations are "tangible opportunities to reduce costs or enhance differentiation in virtually any activity of the value chain."[130] The value chain is the tool to identify synergistic opportunities. It defines nine generic organizational units which are clustered in primary and supportive activities.

In addition to the value chain as a tool, Porter characterizes three generic synergy types, which he refers to as interrelations:[131]

- Tangible interrelations
- Intangible interrelations
- Competitor interrelations

Tangible interrelations describe common operational activities between business units, such as combined procurement or research and development. They imply the existence of a certain source on which the combined efforts are based to render competitive advantages. Tangible interrelations can be defined by means of the value chains of different organizational units. The advantage results in this case from lower costs or enhanced differentiation from the shared activities if the direct results exceed the efforts.[132] Sharing activities is favored to saving costs if the activity is driven by economies of scale, learning, or the pattern of capacity utilization.[133] Additionally, they affect differentiation by i) enhancing differentiation resulting from an increased uniqueness of the process or ii) lowering the costs of differentiation.[134]

Intangible interrelations describe the transfer of management skills and knowledge between different organizational units. The advantage implied in intangible interrelations results from transferring generic skills or know how of managing processes. In accordance with Porter, intangible interrelations lead to a competitive advantage if the improvement in cost or differentiation in the business unit receiving know-how exceeds the costs of transferring it.[135]

Competitor interrelations are present in specific competitive constellations where rival companies compete in more than one industry. Due to this multipoint competition industries are linked together. The synergetic effect results from the ability to adapt the

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[130] Porter M. 1985 page 318, 2004 pages 323 ff. Costs of creating synergies see chapter 2.5.1

[131] Porter M. 1985 page 323 ff.

[132] Porter M. 2011 page 324

[133] Porter M. 2004 page 328

[134] Porter M. 2004 page 330

[135] Porter M. 2004 page 350

strategies in the different spheres of activity to enable an optimized overall result for the entity.

All three interrelations can occur together and are often linked with each other.[136] The synergy identification process is the interface where the value chain and the three generic synergy categorizations are combined.

For the identification of tangible interrelationships Porter suggests to catalog all forms of synergies which are already used in practice and additionally add alternative ideas how it could be done in the future. For doing so, Porter defines five categories of sharing, which are also listed in the value chain:[137]

- Production interrelations
- Market interrelations
- Procurement interrelations
- Technology interrelations
- Infrastructure interrelations

He decides for this cluster due to the different issues which are raised in sharing activities. With this approach he is able to show different commonalities, which are the source of synergies.

For the identification of intangible interrelations Porter also suggests to make use of the value chain, even though the process is not as complete as the identification of tangible interrelations due to the multiplicity of different similarities among business units.[138] As a possible approach he mentions to examine the most important value activities as well as the chain configuration for deriving possibilities where knowledge and/or generic skills can be transferred. For allowing for structuring intangible interrelations Porter suggests the following generic similarities:[139]

- Same generic strategy
- Same type of buyer (though not the same buyer)
- Similar configuration of the value chain (e.g., many dispersed sites of mineral extraction and processing)
- Similar important value activities (e.g., relations with government)

[136] Porter M. 2004 page 325

[137] Porter M. 2004 page 336 ff.

[138] Porter M. 2004 page 350 ff.

[139] Porter M. 2004 page 351

Since some kind of intangible interrelations can usually be found, it should be questioned i) how similar the value activities in the business units are, ii) how important the value activities involved are to the competition and iii) how significant the transferred know-how is to the competitive advantage in the relevant activity. The answers to these questions lead to a better decision if the time and effort is worth to be invested for a specific outcome. Due to the subjective character of intangible interrelations and limited possibilities to operationalize/measure them, intangible synergies are difficult to be evaluated.

For the identification of competitor interrelations Porter suggests to list all businesses of a company and to oppose those with the competing companies in a matrix. Interrelations, which may lead to competitive advantages, are to be derived where a number of business units is in competition with one and the same competitor.

The entity of coordinating the goals and strategies of related business units and their interrelations is summed up by Porter as the horizontal strategy.[140] The explicit need of a horizontal strategy is reasoned by Porter because:

"Business units will value interrelationships differently and not agree to pursue them".[141] The reason for this behavior is that business units rarely benefit equally from interrelations due to their size, strategy or industry. The costs of compromise or coordination might overweight the benefits for one of the parties, even though the overall effect might be beneficial. Generally, large and currently successful business units tend to be resistant towards know-how transfer, or more general to agree upon intangible interrelations.

"*Business unit strategies will evolve in ways that weaken interrelationships*". If the definition of a horizontal strategy is done independently from the general corporate strategy, business units might follow inconsistent directions which hinder the achievement of interrelations.

"*Pricing and investment decisions taken independently may erode firm position*". Solutions in which the overall profit of the company overweighs the results of the single business units might imply a loss situation for one unit for boosting the profits of the other. This can be, for instance, initiated by a decrease of the price of a product, which results in a decrease of the margin of one business unit at the same time, to boost the volume for all units and therewith to increase the firm's overall purchasing negotiation

[140] Porter M. 2004 pages 364 ff.

[141] This finding is simultaneously a reason for resistances against synergies, usually from the side which does not benefit from the synergy effect. Reasons for resistance against synergies are introduced in chapter 2.6

power. However, such effects need to be regarded in the overall as well as single business unit context.

"Business units will have a tendency to go outside to form alliances to achieve interrelations available internally". Outside alliances are often preferred by business partners because they have more control over the relationship. Internal alliances on the other hand have the advantage that all benefits accrue to the firm and the beneficial effect needs not to be shared with a potential competitor. Thus, internal alliances would be preferred even in cases of greater costs of compromise.

"Business units may ignore key potential competitors or the true significance of existing competitors". As vital internal business interrelations might affect the situation of single business units in their competitive environment as important is the overall consideration of the competitors during the process of implementing interrelated strategies. Business units acting independently will rarely consider this perspective.

"Transfer of know-how among generically similar business units will not occur". Especially in similar businesses the exchange of know-how tends to be reluctant in particular from the side with the greater knowledge base. Business units tend to develop their strategies and believe they know their industry best. They rarely believe they can seek out new know-how elsewhere in the firm.

For being able to develop an explicit horizontal strategy the firm needs to implement a systematic mechanism to identify, reinforce and extend interrelationships. According to Porter, formulating a horizontal strategy should include the following steps:[142]

1. Identify all tangible interrelationships.
2. Trace tangible interrelationships outside the boundaries of the firm.
3. Identify possible intangible interrelationships.
4. Identify competitor interrelationships.
5. Assess the importance of interrelationships to competitive advantage.
6. Develop a coordinated horizontal strategy to achieve and enhance the most important interrelationships.
7. Share appropriate value activities.
8. Coordinate strategic postures of related business units.
9. Distinguish the goals of business units.
10. Coordinate offensive and defensive strategies against multipoint competitors and competitors with different interrelationships.
11. Exploit important intangible interrelationships through formal programs for exchanging know-how.

[142] Porter M. 2004 page 368 ff.

12. Diversify to strengthen important interrelationships or create new ones.
13. Sell business units that do not have significant interrelationships with others that make an achievement of important interrelationships more difficult.
14. Create horizontal organizational mechanisms to assure implementation.

In his concept Porter focuses on interrelations of value chains of different branches within a corporation. Interrelations exceeding the corporate boundaries such as competitor cooperation are not taken into consideration.[143]

In conclusion, Porter advanced Ansoff's synergy concept by developing new perspectives such as introducing the value chain for identifying and analyzing synergistic potentials. Additionally, he discussed synergy relevant topics, such as the costs involved in realizing synergies. However, as a result from the general industrial perspective, Porter's synergy approach is only partially applicable for production environments and the exploitation of synergies in this particular field of interest. Especially the application for lower hierarchical levels is vague and not directly applicable.[144] For this reason a new synergy categorization is developed for the application in production environments which is introduced in chapter 5.3.

2.3.3 Sources for Synergy Effects

Besides knowing which synergies are generally usable – they were described in the previous chapter – the management of synergies requires the knowledge which synergy sources are available to make a synergetic effect possible. Sources for synergy effects are the variables which enable the synergy effect and define therewith the value of the cooperation. These factors are of importance because the corporate management can have an effect on them and therewith influence the utilization of synergies. Furthermore, the knowledge about the synergy sources on the management level is essential for synergy definition processes.[145]

Not only the categorization of synergies shows a great variety, but also the categorization of synergy sources and effect implies a multitude of different perspectives. What they all have in common is the precondition of shared resources to realize synergy potentials. Resources were already used as a potential way how to categorize synergies and are categorized in:

[143] Biberacher J. 2003 page 17

[144] Biberacher J. 2003 page 64

[145] Biberacher J. 2003 page 83

- Intangible
- Tangible
- Financial

resources.[146]

Intangible resources include, for instance, patents, the organizational culture, knowhow and management capabilities. *Tangible resources* or material resources include, for instance, buildings, machinery or raw material. *Financial resources* include available financial currency, available credits or other untapped financial means.

Based on the fact that all synergies are somehow enabled through the combination of resources different authors derived ways how to characterize these resource combinations in more detail. Armin Schmiedeberg, who analyses synergies from the M&A perspective in corporate diversification strategies derived the following sources for synergy effects:

Form of value	External improvements	Internal improvements	Third-party transfers
Increased returns	Achieving economies of expansion Pioneering Elevating barriers to entry Overcoming barriers to mobility Facilitating exit Reducing bargainings power: suppliers customers competitors	Harnessing operational economies: economies of scale economies of scope economies of experience Eliminating differential efficiencies: inefficient management growth-resource mismatch subcritical mass undervaluation Eliminating redundancies and overlaps	Increased depreciation Tax shelter from asset Revaluation Increased interest tax Shelter from leveraged acquisition 'Underutilized' net operating losses and tax credit carry-overs Substitution of capital gains for dividend income Bondholder 'expropriation'
Reduced risk		Lowering financial leverage Lowering operating leverage Lowering cash flow cyclicality Lowering elasticity of investor expectations	
Source of value			

Table 6: Sources of synergy value[147]

Partially aligned with this interpretation of synergy sources is the characterization of synergy sources according to Burde. He identifies the following synergy sources:[148]

[146] Burde F. 2010 page 9 ff.

[147] Schmiedeberg A. 1995

[148] Burde F. 2010 page 10 ff.

1. Economies of scale
2. Economies of scope
3. Know-how transfer
4. Deployment of power
5. Transactional cost benefits
6. Reduction of redundant work
7. Quality improvements

1. *Economies of scale* result from efficiency improvements resulting from increased scales of production.[149] More specific, they are caused by fixed costs which are either constant or increasing less than proportional with an increasing production volume. This effect reduces the costs per unit with an increasing amount of output.[150] It is notable that the scale sensitivity is dependent on the output and the corresponding value chain. In this context it is of importance to clearly separate cost savings resulting from optimized capacity utilization and economies of scale. Economies of scale can support optimized capacity utilization, but optimized capacity utilization does not necessarily need to imply economies of scale.

Economies of scale are based on the capacity utilization effect, the economic scale effect and the learning curve effect.[151] The capacity utilization effect derives the reduction of unit product costs from an increasing production volume assuming a maximum production output and constant variable and fixed costs. In contrast to that, the economic scale effect is based on the utilization of more efficient equipment for a higher scale of products which is made possible by combining the needed production resources. The learning curve effect describes the correlation between the piece price and the cumulated production volume which can reduce the production costs by 20-30% by duplicating the production volume.[152]

2. *Economies of scope* occur when combined value chain activities of two or more products are more cost effective than the division of those.[153] Sources for the cost savings are shared production factors assuming that they allow for the multiple uses for different products. Since the sharing of resources is not only restricted to tangible resources or specific steps of the value chain, economies of scope can also occur in different areas of a corporation; they can, for instance, also occur as a result from the

[149] Ziegler M.1997 page 29 and Kogeler R. 1992 page 55 ff.

[150] Karenfort S. 2011 page 20 ff.

[151] Rodermann M. 1999 pages 152 ff.

[152] Henderson B.D. 1984 page 19. The learning curve of the 1930's referred to the production whereas the value chain concept of the 1970 incorporates the effects on the entire value chain.

[153] Lugert F. 2005 page 59, Ebert M. 1998 page 55 ff. and Kogeler R. 1992 page 56 ff.

know-how transfer from one process to another. Economies of scope can also target to improve the quality without affecting the cost structure.

3. Even though *know-how transfer* is principally included in both economies of scale and economies of scope its impact as source for synergies exceeds the basic principle of economies of scale and scope and needs to be listed as a specific synergy source. Due to their central importance, Michael Porter states that synergies resulting from know-how transfer should "encompass all types of cost reduction that results from improving know-how and procedures independent of scale."[154] Know-how transfer is also closely connected with learning curve effects and experience curve effects.[155] The learning curve effect results from efficiency gains due to (short term) learning-by doing effects which are, for instance, present in assembly lines; experience curve effects on the contrary deal with long term efficiency gains which evolve during the entire product life. The knowledge supporting the experience curve effect does not necessarily need to come from the organizational unit where the process is performed. Especially experience curve effects do not necessarily have to be connected with economies since the knowledge to support those can emerge from "everywhere".

4. Synergies can also originate from the *deployment of power*. These effects have their theoretical origin in monopoly theory and describe the correlation between the market size of a company and its profitability.[156] Synergies resulting from deployment of power reposition the corporation towards its suppliers, customers and competitors and lead to optimized base of operation and negotiation. Effects are cost reductions in procurement and sales increases on the customer and competitor side.[157]

5. *Transactional cost benefits* are another source of synergies. Transaction costs are the costs which result from the market participation; they include ex ante costs such as information acquisition costs, initiation costs, and agreement costs and ex post costs such as handling and processing costs, costs of control, and costs for changes. Partial combination of transactional costs which results from cooperation's can lead to cost savings.

6. The *reduction of double work* or even its elimination can be the next valuable source for synergies.

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[154] Porter M. 1985 page 73

[155] Karenfort S. page 21

[156] Lugert F. 2005 page 58

[157] Perin S. 1996 page 12 ff. Köppen J. 2004 page 82 ff.

7. According to Burde, *quality improvements* are also a potential synergy source. These result from the possibility to bundle resources for generating a higher quality status than the independent solution.

A comparable perspective on the synergy sources is presented by Paprottka, who defines the following sources for synergy effects:[158]

- Omission of neutralizing effects
- Avoidance-or respectively ending of redundant activities
- Optimization of factor allocations:
  - Optimized utilization of existent factors
  - Adoption of cost-effective high-performance equipment and enhanced research approaches
- Maximized market power
  - In purchasing and finance
  - In sales market
- Utilization of group acquisition potentials

Compared to the previous elaborations, Michael Porter identifies synergy sources on a higher detail level which is based on his categorization of the value chain:

[158] Paprottka S. 1996 page 44

Production Interrelation	
Source of Synergy	Possible forms of sharing
Common location of raw materials	Shared inbound logistics
Identical or similar fabrication processes	Shared component fabrication
Identical or similar assembly processes	Shared assembly facilities
Identical or similar testing/quality control procedures	Shared testing/quality control facilities
Common factory support needs	Shared factory indirect activities Shared site infrastructure
Market Interrelations	
Source of Synergy	Possible forms of sharing
Common buyer	Shared brand name
Common channel	Cross selling of products
Common geographic market	Bundled or packaged selling Cross subsidization of complementary products Shared marketing department Shared sales force Shared service/repair network Shared order processing system Shared physical distribution system Shared buyer or distributor financing organization
Procurement Interrelations	
Source of Synergy	Possible forms of sharing
Common purchased inputs	Joint procurement
Technological Interrelations	
Source of Synergy	Possible forms of sharing
Common product technology	Joint technology development
Common process technology	Joint interface design
Common technology in other value activities	
One product incorporated into another	
Interface among products	
Infrastructure Interrelations	
Source of Synergy	Possible forms of sharing
Common firm infrastructure needs	Shared raising of capital (financing)
Common capital	Shared cash utilization
	Shared accounting
	Shared legal department
	Shared government relations
	Shared hiring and training
	Other shared infrastructure

Table 7: Synergy sources according to Porter[159]

This list of synergy sources gives a broad overview about potential sources of interrelations and their potential forms of sharing. In addition to the points mentioned in

[159] Chapter 2.3.2 and Porter M. 2004 page 336 ff.

the table, Michael Porter argues that interrelations can have a positive effect on differentiation by enabling the creation of unique processes which enhance differentiation and lower the costs of differentiation.[160]

Regarding the most important synergy category for this thesis, the production interrelations, Porter listed the following determinants of net competitive advantage:

Form of Sharing	Potential Competitive Advantage	Most Likely Sources of Compromise Costs
Shared inbound logistical system	Lower freight and material handling costs Better technology enhances delivery reliability, reduces damage, etc. Sharing allows more frequent, smaller deliveries that reduce inventory or improve plant productivity	Input sources are located in different geographic areas Plants are located in different geographic areas Varying physical characteristics of inputs imply that a logistical system which can handle all of them is suboptimal Needs for frequency and reliability of inbound delivery differ among business units
Shared components (identical components used in different products)	Lower costs of component fabrication Better technology for component manufacturing improves quality	Needs for component design and quality differ among business units
Shared component fabrication facilities (similar or related components are produced using the same equipment and facilities)	Lower components costs Better fabrication technology improves quality Capacity utilization is improved because demand for similar components is not perfectly correlated	High setup costs for different component varieties Needs for component quality of tolerances differ among business units Flexible manufacturing equipment has higher costs than specialized equipment Larger workforce in one location leads to potential hiring, unionization or productivity problems
Shared assembly facilities (similar or related end products are assembled using the same equipment/lines)	Lower assembly costs Better assembly technology improves quality Utilization is improved because demand is not perfectly correlated A shared materials handling system can feed different assembly lines	High setup costs for different products Needs for quality or tolerances differ Flexible assembly equipment is higher costs Larger workforce in one location leads to potential hiring, unionization or productivity problems
Shared testing/quality control	Lower testing costs Better technology increases the extensiveness of testing and improves quality control	Testing procedures and quality standards differ Flexible testing facilities and equipment are higher costs
Shared indirect activities (including maintenance, plant overhead, personnel department, cafeteria, etc.)	Lower indirect activity costs Improved quality of indirect activities	Differing needs for indirect activities among business units Larger workforce in one location leads to potential hiring, unionization, or productivity problems

Table 8: Competitive advantages resulting from production interrelations[161]

In summary, all synergy sources introduced in this chapter are a valuable source for indicating where synergies can be found in organizations in general as well as the production environments in particular. The synergy sources introduced in this chapter give a broad overview, about which general synergy sources are available, the

[160] Porter M. 2004 page 330

[161] Porter M. 2004 page 345 ff.

elaborations of Michael Porter "go a level deeper" and introduce more specific synergy sources as well as potential applications. Thus, all sources introduced in this chapter deliver the next important module which is needed for managing synergies.

Even though no additional synergy sources were observed during the case studies, the synergy sources introduced in this chapter cannot be used in this form for being employed for a holistic synergy management which is the target of this thesis. The reason is that the former synergy sources are to general and additionally require prior knowledge about concepts such as economies of scale and scope. Thus, they do not fulfill the prerequirement of this thesis[162] of a generally and holistically applicable approach. The latter synergy sources introduced by Porter allow for a better usability by a broad user base, but because of their high number, they are not easy to handle. For this reason the synergy sources introduced in this chapter will be used as basis for identifying characterizing synergies, but their form will be adapted to the needs of this thesis.

2.4 Key Influential Factors on Using Synergies

This chapter discusses the main factors or influence regarding a successful utilization of synergies. The knowledge about these factors is of importance for being able to implement and utilize synergies successfully. The results are primary derived from evidence of the case studies as well as expert interviews where it was explicitly asked what influences the utilization of synergies. The findings are supplemented by examples from the case studies. The validity of the statements resulting from the interviews was questioned by observations of the case studies and vice versa. This approach reduced the subjectivity of personal opinions as well as the observations of the researcher by cross comparison. In addition to the key influential factors presented in this chapter business relatedness as a further concept which also influences the utilization of synergies is presented in subchapter 2.4.1. Subchapter 2.4.2 additionally introduces organizational support factors which partially refer to the main influential factors and show ways to support the implementation and utilization of synergies.

The influential factors are divided into *direct* and *indirect influential factors*. Direct influential factors are those which can be affected by the organization, while indirect influential factors cannot be affected directly by the organization. The effect of the single influential factors on the utilization of synergies is dependent on the synergy category as well as the combination of the specific influential factors. However, there is a tendency how these factors affect the utilization of synergies.

[162] Compare chapter 1

Direct influential factors

i. Organizational structure (formal and informal, organizational assignment)
ii. Range of cost center
iii. Range of responsibility
iv. Management behavior incl. top management support
v. Trust in synergy partner
vi. Interpersonal factors
vii. Standards
viii. Technological specifications
ix. Transparency

i. The *organizational structure* has a major influence on how synergies are used in a company. Usually the organizational structure is the basis for how effective specific synergies are used within companies because it acts as a framework for synergy utilization by describing a tendency how functional units cooperate/interact with each other.

Depending on which constellation is chosen, different synergy tendencies are favored. Generally a functionally centralized structure supports the utilization of synergies for this specific function, referred to as horizontal synergies, but hinders cross-functional synergies. A decentralized organizational structure impedes the utilization of functional synergies but supports the utilization of cross-functional synergies, referred to as vertical synergies. Matrix organizations can result in both; functional and/or cross-functional synergies. From the synergy perspective, the organizational structure usually has a negative component on the utilization of synergies. This is because it always sets some kind of boarders which define who is working together; regardless of whether it is a centralized, matrix, or decentralized organizational structure.

However, the degree of synergy utilization can be optimized in each case by implementing organizational counteractions to gain additional synergies. This means that functionally central organized constellations need supportive actions to improve the utilization of cross-functional synergies, and functionally decentralized organizational constellations need supportive actions to improve the utilization of functional synergies. These supportive actions can, for instance, be formal or informal meetings, workshops or knowledge management tools. A general statement on which constellation results in a maximum degree of synergy utilization cannot be given; it depends on how the advantages and disadvantages of the general organizational structures are managed. The principal effects of centralized and decentralized organizations are shown below.

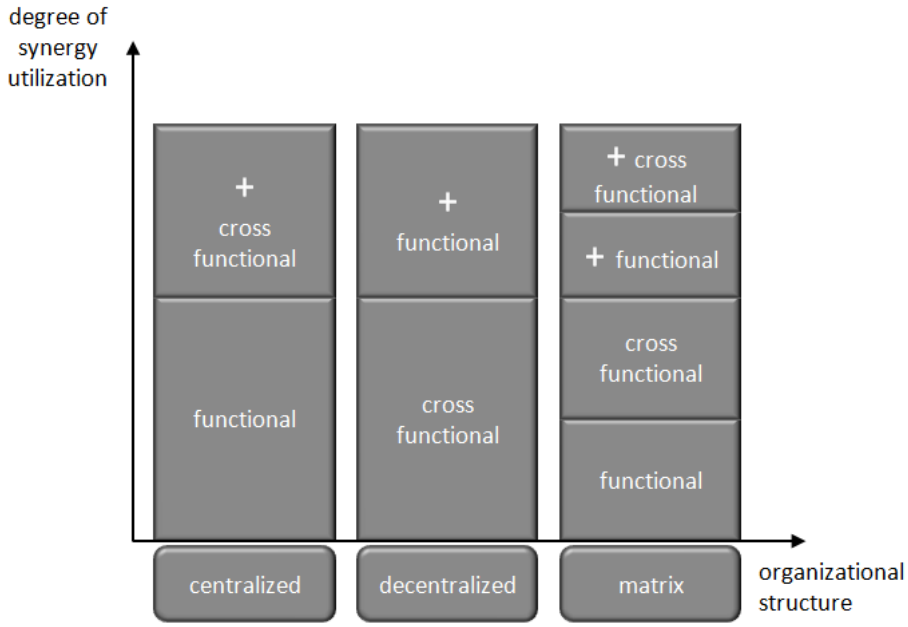

Figure 8: Effect of centralization and decentralization of the utilization of synergies

The results from the interviews indicated clear evidence that the organizational structure has a strong influence on the utilization of synergies. During the case studies the importance of the organizational structure on the utilization of synergies was observed over and over again. In some cases, functional units did not cooperate with each other, even though it would be beneficial, only because they belong to different organizational units. However, in other cases organizational counteractions enabled basically the same organizational units to cooperate with each other, thus making use of synergetic effects. Another indicator for the importance of the organizational structure on synergies was that most synergy optimization discussions questioned if the organizational structure has to be changed for being able to use specific synergies.

Thus the hypothesis that

The organizational structure of a company has major influence on the utilization of synergies.

is confirmed based on the evidence from the case studies as well as expert interviews.

Due to the central importance of the organizational of the corporation on the utilization of synergies chapter 2.4.2 describes supportive organizational options to enhance the utilization of synergies.

ii. Another influential factor is directly linked to the organizational structure of companies: the *range of cost centers*. Cost center, or profit center, are usually based on the organizational structure of a company, reproduce the cost structure of different units but they additionally act as a tool for measuring the financial success of business units. The last fact sometimes results in a negative influence on the utilization of synergies

because synergies are also present between different cost centers which benefit differently from the synergetic effect. Even if the overall effect is beneficial for the corporation some synergies might be unilateral from the cost center perspective and even cause costs for one of the cooperative partners. In this case the side with the negative cost effect is not motivated to cooperate.

Additionally, cost center approaches often involve the question if specific tasks should be carried out by an internal or external partner. When different cost centers decide for internal partners, a distribution of costs from one cost center to another is the consequence. If these costs exceed the cost rate of an external partner a decision for an external partner is more likely. This question or decision is not wrong per se but it can cause additional costs for the company which is not detectable from the single cost center perspective. For instance, if cost center A needs support and a cost center B could provide this support because it has free capacities cost center A still needs to decide if it hires the internal cost center B or an external partner C. If the external charge rate C is lower than the internal cost center charge rate B, A will decide to hire the external company; in the end the company pays both the available free human resources of cost center B and additionally the external company for cost center A.

The existence of cost centers has its advantages like the financial autonomy and the ability to manage business units from the financial perspective. Cost centers do also not necessarily have a negative impact on the utilization of synergies. However, the ability of internal cooperation between different cost centers needs to be configured in a way which allows for reproducing the preferred cooperative behavior between business units. Potential approaches are bonus systems which come into effect when hiring internal business units, or internally charging the lowest external quote.

During the interviews the role of cost centers was regarded as neutral by most experts. However, when examples for potential problems of cost centers for the utilization of synergies were mentioned, the opinion diverged: one group still believed that cost centers have no influence on the utilization of synergies; the other group had the opinion that in specific cases cost centers might have a negative influence on the utilization of the company's internal synergies. The first group was satisfied that the better solution for the company is always chosen, whereas the second group was confident that the best solution for the cost center would be chosen. All experts agreed that potential problems caused by the existence of cost centers are manageable and when taken into consideration the cooperation between different cost centers is made possible.

Evidence from the case study has shown that the negative effect described above indeed occurs. One department had open human capacities for a function x. Another department did not have those capacities and hired an external company which performed exactly this function. When this department was asked for the reason why this function was not performed from the department with the free capacities the answer

was that “it is cheaper” to mandate an external contractor instead of being charged the internal charge rate.

iii. One major influential factor on the utilization of synergies is the *range of responsibility*. This includes the i) functional dimension, ii) personnel responsibility as well as the iii) time dimension. All dimensions are of interest because the potential for optimization is primarily searched in the own area of responsibility. Thus, synergies are also primarily searched in one’s own range of responsibility and the interaction with other units is of secondary interest. This finding can be employed positively by organizing the range of responsibility in a way which favors the utilization of synergies in all three dimensions.

The functional dimension of the range of responsibility is of interest because depending on the specific configuration i) the focus is put on the synergies within the functional unit – in case the range of responsibility is functionally-based, as it is in a central maintenance department – or ii) the focus is put on cross-functional synergies – this is the case in section-based responsibility which includes multiple functions, but is clustered in various sections, such as an integrated operations and maintenance unit.

Evidence from the field was observed in the maintenance departments. These are partially functionally centralized for specific functions, such as robot maintenance, and decentralized for general maintenance functions. The later are organized in the operational areas of the press shop, body in white or assembly reporting to the corresponding general manager. Within the functionally centralized departments the utilization of synergies implied the exchange of knowledge and common projects with other departments in different plants, or the partial support of other departments with specific knowledge and/or operational support in this specific field of operation. Operational support of machine operators was not observed. Within the functionally integrated departments, the exchange of maintenance knowledge with other departments in the same as well as other BMW plants was not present. There were also no common maintenance-based projects with other departments as observed in the functionally organized maintenance departments. The utilization of synergies rather implied synergies which existed within the operational units such as operational support of the machine operators.

The range of the personnel responsibility is of interest for the utilization of synergies because the competence to decide in which area the personnel is employed supports the utilization of synergies. The lack of this authority is one drawback of matrix organizations; even though good synergy solutions are present, one does not automatically have the authority to decide where each employee is employed.

The time dimension of the range of responsibility indicates which time span the manager is accountable for. This perspective is of importance when the decisions taken also influence the results of a later business activity of the corporation. Usually, these constellations occur in engineering and after sales relations, planning and operative relations or buyer and quality relations.

The evidence from the case studies supporting the importance of the time dimension on the utilization of synergies was observed between the technological planning departments and the operative maintenance departments at BMW. The planning departments are centralized units which are organized according to their technological belonging (press shop, body in white, assembly) and internally organized in projects such as project A body in white Munich, project B body in white Oxford. These departments are responsible for the planning activities up to the installation of the equipment in the plants. After the equipment is installed the plants and their according maintenance departments are responsible for maintaining this equipment. Even though this constellation enables the utilization of synergies in the planning phase within the central planning departments, the utilization of long term synergies is suboptimal. Since the planning departments are responsible for the equipment until it is installed in the plants, they focus on the ideal technological realization, standardized solutions and an optimal invest value. They do not explicitly focus on the maintainability of the equipment, local conditions on the maintenance and the costs for maintaining the equipment. Given that the time dimension of the range of responsibility of the planning departments would be extended to the end of the operating live of the equipment, the utilization of synergies which would result in lower life time costs.

iv. *Management behavior* has i) direct and ii) indirect influence on the utilization of synergies. The direct influence results from actions[163] of managers which have an influence on the way how synergies are used between different organizational units such as guidelines on what type of interaction/cooperation with other departments is desired or on target systems which influence the behavior of the employees regarding the cooperation with other departments. This direct influence of managers on the utilization of synergies is important because managers tend to have the necessary overall perspective for being able to detect and influence the utilization of synergies. Generally, a better utilization of synergies is to be expected on the working level when the responsible manager supports the concept of synergies. Therefore, the commitment of the management towards synergies is a viable factor to support the exploitation of synergies in organizations. This attitude can be enhanced by including synergy related targets into the managers target portfolio.

In this regard, the importance of the top management has to be pointed out. Already Ansoff stressed the importance of the top management in the implementation of

[163] Ansoff I.H. 1987 page 147: "[…] management must decide whether synergy is to be an important factor […] This decision depends in the first place, on the basic managerial styles which the firm will use, as it makes major changes in the strategic portfolio. […] two basic managerial styles are widely observable in practice: the synergetic style, under which corporate management vigilantly promotes synergies among the organizational units of the firm, and the conglomerate style under which each division or subsidiary is granted full independence to pursue its own growth and profitability."

synergies. “There is both evidence and reason for suggesting that potential synergy will not be realized, unless top management in the acquiring firm forces synergistic sharing on the newly acquired firm. The reason is simply that synergistic sharing is a disturbing and unwelcome phenomenon to general managers responsible for optimizing the performance of the several parts of the firm.”[164] However, not only in mergers and acquisitions but also in existent organizations the support of the top management is centrally important for enabling the utilization of synergies.

Indirect influence of the management on the utilization of synergies between departments results from general nature of the manager. Characteristics affecting the behavior of his or her employees include the openness to risk, openness to new approaches, trust into the employee’s decisions, willingness to cooperate with others, standing within the company, etc.

The feedback from the interviews strongly supported the central role of the management in the utilization of synergies. They were seen as the ones who are in the right position to detect synergies as well as the prime mover to motivate their employees to make use of synergies. The specific importance of the top management support on the successful utilization of synergies was mentioned by the majority of the interviewees.

Since the researcher had the possibility to cross reference the findings as well as the cooperation behavior of different organizational units at different locations, the evidence from the field proved the importance of the single manager on the willingness to cooperate with other operational units and make use of synergies. One organizational unit perfectly made use of departmental internal synergies but did not cooperate with other organizational units simply because the manager of the department did not see the necessity to do so. His argument was that the other organizational units have different specifications and that the process has been done that way for years and that the cooperation with other business units would not improve the process. This attitude could also be found with most of the employees who work in this organizational unit. The same organizational unit in another plant, however, found a way how to improve the process by cooperating with other departments. This was only made possible because two managers were willing to cooperate with other departments and to do the process in a different way.[165]

v. The *trust in the synergy partner* also influences the utilization of synergies because the result of the combined activity can usually not be influenced directly as it is in case

[164] Ansoff I.H. 1965 page 124

[165] This example does not explicitly evaluate the correct approach, but rather indicates which influence the manager has on the cooperation with other organizational units; irrespective of a potential positive or negative synergy..

of a self-initiated activity. Hence, especially in case of operative synergies, a mutual dependency occurs which might have a negative influence on the decision if a synergy should be used or not. When thy synergy partner is more remote, which can even mean cooperation with a competitor, this effect is enhanced.

Even though this influential factor was mentioned by the minority of the experts interviewed, the examples given by the experts as well as the evidence from the field prove the validity of this point. Examples from the field included evidence where one department did not trust the other to deliver the same quality of results for an operation if it would be performed centrally for both departments because of i) potential own interests of the other department to prioritize its own needs and ii) the inability to deliver the same quality of results due to the belief that the own department is more capable. This influential factor became more important during the third case study where potential synergies with Daimler, a direct BMW competitor, were discussed. In this regard, the question if own interests will be prioritized or if both synergy partners contribute the same efforts was of central importance. Understandably, in case of a competitor, the trust influential factor was of central interest and undermined, in some cases, the utilization of synergies in favor to a better gut instinct

vi. The effect of *interpersonal factors* on the utilization of synergies must not be neglected since the utilization of synergies usually involves the willingness of at least two parties to cooperate. It might affect the utilization of synergies if the personal relationship of the partners involved is good or bad. Especially, if these interpersonal factors occur on the management level, the utilization of synergies can be influenced in a positive or negative way.

Results from the interviews support that interpersonal factors have an influence on how synergies are utilized. Evidence from the field has shown that good interpersonal relations can have a positive effect on the utilization of synergies. Even though the painted body case study was supposed to be restricted to the definition of synergies in this particular main department, one General Manager started to search for logistics synergies with his two counterparts from the assembly and engine plant, which are organized in two different main departments. This approach was primarily driven by the fact that the three General Managers had good interpersonal relations. Even though no evidence was found for the negative influence of interpersonal relations they are likely to be present.

vii. Major influential factors on the utilization of synergies are *standards*. Included are product, process and equipment standards. The existence of standards allows the synergy partner approaches such as exchanging knowledge, operational support or central execution of processes and the shared use of equipment. Standards do not only support the utilization of synergies; they can also be a direct result of synergetic approaches such as the exchange of knowledge. The principle is shown below.

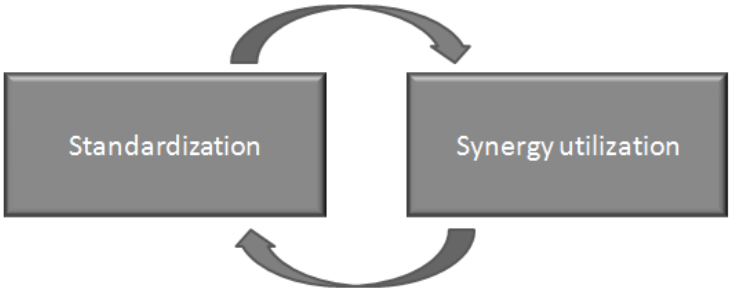

Figure 9: Supportive effect of standardization and synergy utilization

Whether the standardization is the initial point for synergy utilization or vice versa is case dependent.

Standards were perceived as a major influential factor on the utilization of standards. Every expert supported that standards are centrally important to allow for synergies. Almost every expert had ideas about which additional synergies would be possible if certain standards would exist.

Evidence from the case study supports the central role of standards on the utilization of synergies. Additionally, the theory exists that using synergies can result in standardization; shown in Figure 9. In the case study Maintenance Triangle in the United Kingdom the mutual support on robot maintenance and refurbishment was hindered by the utilization of different robot types in the different main departments. It is noteworthy that these different robots are a result of main departmental synergies where the same main departments e.g. paint shop decided on worldwide standards, rather than no standards between the main departments. If the same robot manufacturer would have equipped all main departments in the United Kingdom, the maintenance and refurbishment could have been done by one team, resulting in an optimized personnel placement and learning curve effects.

In the same case study the initiation of improving storage synergies between the main departments resulted in the definition of equipment synergies and the derivation of operational maintenance synergies. The initial point was that the main departments wanted to utilize synergies in their storage activities; the primal goal was to reduce the storage area costs for stock. After the first comparison of what is stored by which department, it was evident that electrical motors had a larger amount on the cost of stock in each department. The idea came up to reduce the total stock of electrical motors by having one stock for all main departments. With this approach the risk of breakdowns and the resulting amount of motors would be shared between the departments resulting in a lower total amount of motors. However, because the motors differed regarding the i) manufacturer as well as the ii) installation in position the participants of the workshop decided to standardize the electrical motors where possible. The existence of the high variety was not needed and only a result of a long-lasting lack of communication between the departments. In the same turn the idea was derived that if the same electrical motors are used in all departments, one team could be

responsible for preventative maintenance, refurbishment as well as optimization of the operating time of the motors.

viii. Different *technological specifications* are the next influential factor on the utilization of synergies in the production environments.[166] Technological specifications describe the variations between different operational units in production environments which result from technologically-based specification. They can impede the utilization of synergies because of existent differences which must not be undervalued only to implement supposed synergies. Different technological specifications have a general negative influence on the utilization of synergies. It is centrally important that the different technological needs are understood and respected.

Even though the influence of different technological specifications was mentioned by the minority of experts interviewed, everyone agreed on the general idea that technological specifications are existent which do not allow for the realization of cross-organizational synergies. However, the reasonable argument was added that pretended technological specifications can also be used as an excuse why unwanted synergies are not implemented.

Findings from the case studies prove that both perspectives are true: i) that technological specifications are present which need to be respected and ii) technological specifications are used as an excuse why unwanted synergies are not implemented. An example for the first statement was the idea to utilize the robot experts of the body shop for improving the robot technology in the paint shop. In general, the experts from the body shop had a deep knowledge about all details which are needed to improve robot-based operations, mainly welding, in the body in white. However, from the process perspective other details such as knowledge about specific end-effectors for paint and sealing applications and the according operational parameters of the robots were needed to truly improve the robot applications in the paint shop. In this case the potential synergy of using the same staff for multiple processes would have resulted in negative synergies, simply because they would not have been able to deliver the needed results.

However, potential technological specifications between the departments were sometimes also used as excuses for not implementing unwanted synergies. During the painted body case study a general rejection was present regarding synergies between the maintenance departments of the body shop and the paint shop; the reasoning was set up based on the technological specifications of the two departments which do not allow for common maintenance approaches. The case study of the Maintenance Triangle in the

[166] Technological Specifications are also connected to the concept of business relatedness which is presented in subchapter 2.4.1

United Kingdom proved the opposite: even though some technological specifications existed which hindered the utilization of specific synergies there were enough synergy approaches which were achievable because the technological requirements of the departments were not differing in a general way.

ix. *Transparency* is the next major influential factor on the utilization of synergies. Transparency includes the knowledge about what is done by other organizational units, to what extent and with which specifications. This knowledge is of importance for being able to derive cooperation approaches between different organizational units and centrally supports the utilization of synergies.

Transparency of, or the knowledge about which processes take place in all organizational units was also one of the most important influential factors stated in the expert interviews. According to the interviews as well as the evidence from the case studies, it is not only important to know which functions are to be found in the different organizational units but also to know what is really done within these functional units.

Evidence from all case studies has shown that this detailed knowledge about what is really done, or which processes take place, in the organizational units is the key to derive potential synergies. Sometimes gathering this knowledge, how different processes are executed in other organizational units, already results in gaining knowledge synergies by deriving new operational approaches for the own organization.

During the Maintenance Triangle case study in the United Kingdom the transparency for all organizational units performing maintenance needed to be developed at the beginning of the project. Even though at the beginning all participants generally roughly knew what the other organizational unit is doing, the detailed information on how the processes are really carried out resulted in multiple synergy potentials. There is one example for the knowledge exchange directly resulting in improvement of processes: the exchange of information on how preventative maintenance was carried out in different departments and on the derivation of ideas for improvements for the own organization. After the detailed approach how preventative maintenance was performed in the departments of the Maintenance Triangle was exchanged, the participants realized that i) their approaches how they do preventative maintenance were different and ii) the extent of preventative maintenance compared to trouble shooting was differing. They mutually derived i) which extent of preventative maintenance is optimal for the different operational units,[167] ii) which approaches are best practices for performing preventative maintenance, such as the use of thermal cameras or lubricant analysis for

[167] Based on the technological equipment used in the press shop, body shop, paint shop and the assembly the extent of preventative maintenance compared to trouble shooting is to be valued differently. E.g. the breakdown of a press is more severe than the breakdown of a handling manipulator in assembly.

indicating signs of wear, iii) which preventative maintenance operations can be carried out mutually and iv) where mutual equipment can be used.

The other way around, transparency about processes can also result in denying previously defined synergy potentials. This fact was also observed during the case studies where primarily defined synergies were rejected after the detailed knowledge about the process was known. In the painted body case study, the synergy potential was defined after which the qualification and optimization of the gluing applications from the body in white and the paint shop should be centrally done by one expert instead of two. This idea came up after all general processes of the painted body were defined and the optimization ideas were derived; in a phase where detailed process knowledge was not given. In the detailing phase the two experts compared the gluing applications in both departments and concluded that neither department could perform the process for the other due to the different technological process requirements in the paint shop and the body shop.

Besides the direct influential factors, which can be affected to the greatest extent by the organization to favor the utilization of synergies, *indirect influential factors* are given which can also affect the utilization of synergies. In contrast to the direct influential factors the organizations' influence on the indirect influential factors is limited or difficult to implement.

Indirect influential factors are:

i. Corporate culture
ii. National culture
iii. Size of enterprise
iv. Economic situation

i. The *corporate culture* has a general influence on how employees and organizational units cooperate with each other and with external partners and thus how the utilization of synergies is supported in the organization. Since changing the organizational culture is only possible in the long term and needs to be initiated by the highest hierarchical level of the company, potential supportive effects on the general utilization of synergies are limited. However, the cooperative culture including the way how different organizational units cooperate witch each other has an effect on the utilization of synergies which must not be underestimated. The corporate culture indirectly also influences the direct main influential factors explained before.

The influence of the corporate culture on the utilization of synergies was observed during all three case studies. In particular, the case study Purchasing and Supplier Network, where the researcher had insight into other organizations and their utilization of synergies, provided evidence for the importance of the corporate culture on the utilization of synergies. However, culturally there are clear boundaries between specific main departments which also hindered the cooperation across all main departments.

This fact was not only observed in one single BMW plant but is present throughout the organization and is part of the corporate subcultures of the i) press shop, ii) body in white, iii) paint shop and iv) assembly.

Evidence from all three case studies has shown that the BMW corporate culture generally supports the utilization of synergies with its open, cooperative attitude. However, the high authority which different organizational units have is in some cases contra productive for the utilization of synergies. Compared to other companies observed during the case studies a stronger central guidance and cross-organizational standards proved to be better for the utilization of cross-organizational synergies which are even used on different locations. A highly competitive corporate culture which measures different organizational units against each other proved to be the worst scenario for the utilization of synergies.

ii. The *national culture* can also influence the utilization of synergies, especially if they are to be derived from an international cooperation. As with the corporate culture, national cultures can have an influence on the direct influential factors of utilizing synergies, because the openness towards cooperation's can differ between different nations.[168]

iii. The *size of the enterprise* can also have an effect on the utilization of synergies. In smaller companies where the amount of employees is smaller and hierarchies are flat the cooperation between single employees and organizational units is easier. Direct influential factors are tendentially positively influenced; the organizational structure is flatter, cost centers have a broader extent, the range of responsibility if wider and the transparency about all operations is usually better in a smaller company. Smaller companies will also tend to use more cross-functional synergies than larger corporations do, simply because they often cannot afford specialists which perform single processes, as they might exist in larger corporations. However, the tendency that it is easier to utilize synergies in smaller companies should not lead to lose sight of the fact that the absolute synergetic effect in total is usually higher in larger companies due to economies of scale and learning curve effects.

iv. The *economic situation* can also have an effect on the utilization of synergies. Depending on the overall economic situation as well as the company's economic situation organizations can change their synergy configuration. Especially downturns motivate organizations to look for room for improvement which also includes the search for synergies. However this observation might not be generalized since there are different ways how to react on a crisis situation.

[168] See also chapter 2.6 and Porter M. 2004 page 386 ff

Evidence from the case study as well as results from the interviews does not clearly indicate that there is a direct connection between the economic situation and the utilization of synergies. Even though the painted body case study was initiated during an economic downturn and the Maintenance Triangle case study had its initial point during that time the search for synergies as well as the utilization of those did not change during the economic rebound. In the contrary, participants of both projects reasoned that finding the ideal synergy constellation would support the successful management of the next crisis. Results from the interviews indicate that a crisis situation can motivate key management persons to initiate synergy programs to safe costs but the utilization of synergies does not change tremendously.

In summary all main influential factors need to be taken into consideration when dealing with synergies. Especially in the implementation and utilization phase the knowledge about the influential factors is vital to enable a successful synergy management including counter measures determining if certain factors should hinder the successful utilization of synergies. Thus they act as a valuable tool for the synergy manager. In contrast to the synergy sources the knowledge about the key influential factors is not needed for a broader user base in the organization for enabling a successful utilization of synergies.

After the key influential factors of using synergies were introduced in this chapter the concept of business relatedness is presented in the following subchapter. Business relatedness is closely linked to the key influential factors but not listed as one, because it cannot be influenced directly by the organization in a manner as the direct and indirect key influential factors can.

2.4.1 Business Relatedness

Business relatedness or relatedness is the degree of diversification of companies which is combined with the basic question whether diversification strategies increase shareholder value in M&A. It deals with the basic question which influence the relatedness of certain organizational units has on the successful cooperation of these.[169] As a rule of thumb, the concept indicates that value chain activities of highly diversified corporations have a low degree of relationship; those of non-diversified corporations have a high degree of relatedness.[170]

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[169] Compare amongst others: Chatterjee S., Wernerfelt B. 1991 , StimpertJ.L., Duhaime I.M. 1997, Chatterjee S. 2007

[170] Hofmann E. 2004 page 255 ff.

The significance of this concept for this thesis is given by the general problem how (process-) relatedness affects the successful exploitation of synergies in general and synergies in production environments in particular. Relevant insights are about this relationship are given by Karenfort[171] who investigated the topic of "Synergy in Mergers and Acquisitions" including the research question "To what extent does business relatedness impact synergy in M&A?"[172]

For that purpose, Karenfort introduces the general measures used for the identification of the degree of relatedness which are: [173]

- Continuous product-count measures, including:
  - Standard Industrial Classification, "a numerical catalogue of the federal government classifying all types of economic activities in the US economy"[174]
  - Federal Trade Commission, which "groups M&A into five mutually exclusive groups 1. Horizontal 2. Vertical 3. Product Extension 4. Market Extension 5. Unrelated transactions"[175]
- Categorical measures based on researchers assessments, including:
  - Product Market Attributes
  - Resource Attributes
  - Value Chain Attributes
- Managerial perceptions, where "…managers select, interpret and discuss information while relying on their personal perceptions."[176]

By adapting the managerial perceptions measurement approach Karenfort statistically proves that business relatedness has significant impact on the realization of synergies.[177] The findings are based on the following multi-measure approach:

[171] Karenfort S. 2011

[172] Karenfort S. 2011 page 54

[173] According to Karenfort S. 2011 pages 27-34

[174] Karenfort S. 2011 page 28

[175] Karenfort S. 2011 page 29

[176] Karenfort S. 2011 page 32

[177] Discussion of Karenfort's research findings: Karenfort S. 2011 pages 96 ff.

Factors:	Factor 1 Product Technology	Factor 2 General Management Skills	Factor 3 End Customers	Factor 4 Brand Recognition	Factor 5 Supply Channel Types
Cronbach Alpha	0.79	0.83	0.72	0.71	0.60
Items	▪ Product Technology ▪ Product Use ▪ Product Design ▪ Pricing	▪ General Management Skills ▪ Technical Skills ▪ Administrative Skills	▪ End Customer Types ▪ Sales Channel Types ▪ After Sales Services	▪ Brand Recognition ▪ Brand Identity	▪ Supply Channel Types ▪ Suppliers

Table 9: Effects of business relatedness on the utilization of synergies[178]

The relevant statistical statements[179] resulting from Karenfort's research for this thesis is that "the synergy realization is largely contingent on similarities concerning product technology which have revealed a positive and statistically significant correlation with total synergy achievement. This finding suggests that performance gains are primarily achieved in the area of production." And that "A significant positive relationship was revealed between technological relatedness and total synergy realization […]."[180]

Hofmann[181] also supports the relevance of the relatedness concept to the utilization of synergies. He states that based upon the underlying logic of synergies, which aims at a value-adding cooperation between organizational units, a comparable "synergetic fit" is needed for enabling synergies. For this purpose he defines two degrees of relationships which need to be fulfilled for enabling synergies:

- Similarity
- Complementarity

Similarity is given when the same input factors can be used, such as raw materials. *Complementarity* is given when matching input factors exist which extends the range of provided services and products. Both degrees of relationship can enable supraadditive effects and hence synergies. Based on the multitude of dimensions of an organization the spectrum for similarity or complementarity covers a wide range.

Even though relatedness was not defined as a key influential factor for the utilization of synergies it is a prerequirement for enabling synergies in the first case. If no relatedness in general, or similarity or complementarity in particular is given, the cooperation between business units will not lead to synergies.

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[178] Karenfort S. 2011 page 52

[179] Based on 110 completed questionnaires

[180] Karenfort S. 2011 page 96

[181] Hofmann E. 2004 page 255 ff.

After the key influential factors and the requirement of a certain relatedness are known, organizational support factors for utilizing synergies are introduced in the following chapter.

2.4.2 Organizational Support Factors for Utilizing Synergies

With reference to the previous chapter it becomes evident that a successful implementation and utilization of synergies needs to consider multiple influential factors. In case certain factors are not fulfilled, counter measures need to be implemented for enabling the aimed synergies. Organizational support factors as one specific group of potential counter measures, which can act as general supportive factors, are introduced in this subchapter.

Organizational support factors may not be misinterpreted as structural organizational changes. Even though synergies involve the cooperation of different organizational units, and are thus often associated with organizational changes, these changes are not always a necessary prerequirement for enabling synergies. Chandler's postulate "structure follows strategy"[182] was already proved as generally not valid from the strategic perspective and is in the same way no requirement for the utilization of synergies.[183] Below multiple direct and indirect organizational supportive factors are introduced which support the utilization of synergies.

Biberacher, who integrates the measures for enabling synergies in his categorization model[184], lists the following organizational support factors to utilize synergies:

1. Centralization
2. Integration or restructuring
3. Supplementation/access/power
4. Transfer
5. Balance

1. *Centralizing* organizational functions can result in optimized capacity utilization, a more rapid exploitation of the learning curve effect and the minimization of duplication

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[182] Chandler A.D. 1962 page 14

[183] Biberacher J. page 245 ff. referring to Bower J.L. 1970 and Whittington R., Pettigrew A., Ruigrok W. 2000 page 10

[184] Chapter 2.3 and Biberacher J. 2003 page 78 ff.

A comparable set of organizational support factors to Biberacher's list is provided by Hofmann E. 2004 page 257 ff. who suggests the following organizational options:[184] i) Integration (centralization) ii) Insourcing and outsourcing iii) Supplementation and balance and iv) Transfer.

of work. Centralization requires organizational change. Negative effects of centralization are a loss of flexibility.[185]

2. *Integration or restructuring* is based on the combination of previously independent functional units of related elements of the value chain. Synergy potentials based on integration are derived from a more efficient way to manage the organizational units and are comparable to the effects resulting from centralization. In contrast to the centralization of functions, the integration requires an active adaption of the functional units to each other. Integration or restructuring requires organizational change.

3. Supporting the utilization of synergies based on *supplementation/access/power* is the mutual assistance of independent functional units in their operations without the need to change the organizational structure. The effects include those of the previous two supportive factors, plus explicitly the access to options which were previously not available, such as new markets, new technologies or services. In contrast to the first two supportive activities, organizational change is not necessarily required.

4. The support through *transfer* includes the exchange of vital knowledge or skills between organizational units. In contrast to centralization or integration, the similarity of the value chain is not of interest, while the productive usability of what is transferred is. Transfer does not require organizational change.

5. *Balancing* assets between organizational units are a special case of supplementation and are specifically effective for financial synergies. They do usually[186] not require any organizational changes.

The relevance of the single organizational support factors on the previously defined synergy categories according to Biberacher is shown in the table below.

[185] Biberacher J. 2003 page 244

[186] Referring to saving taxes international organizational changes might be required.

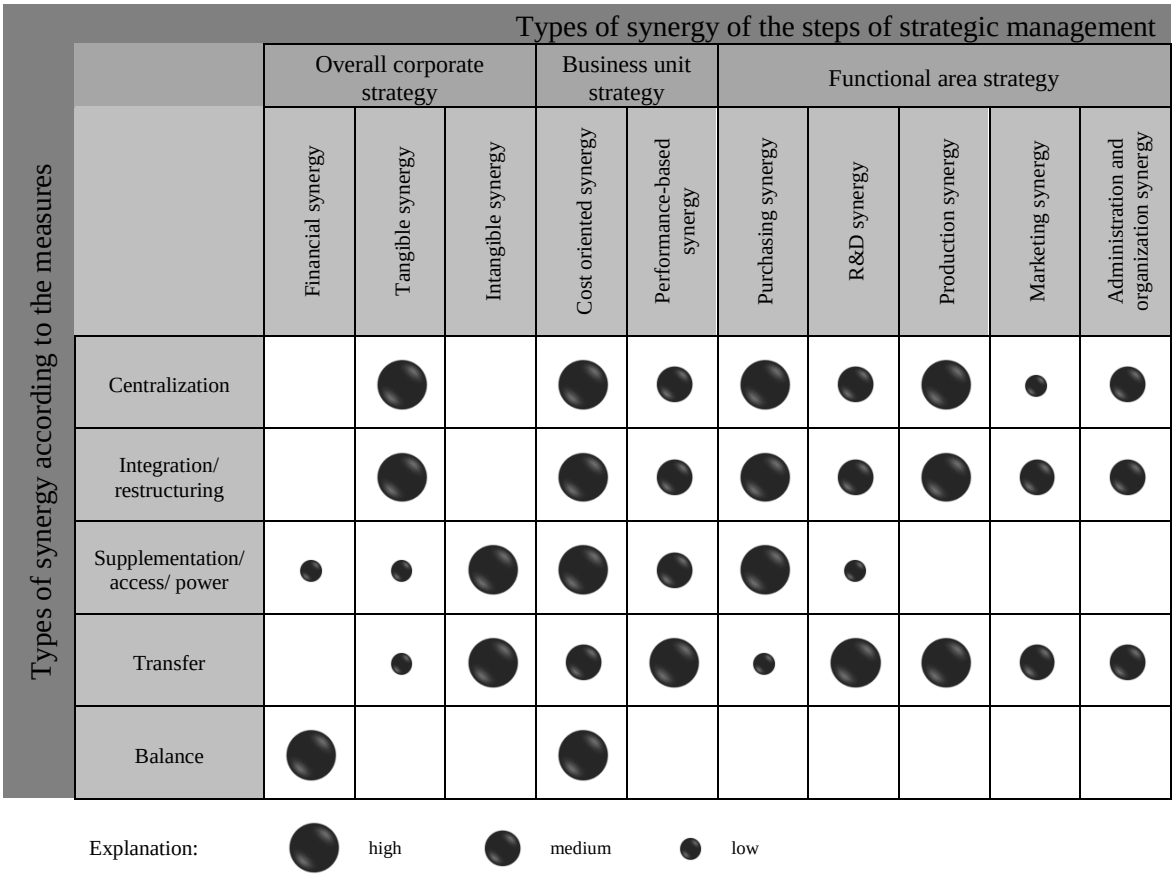

Table 10: Synergy matrix according to Biberacher[187]

The table underlines the statement that organizational changes support the utilization of synergies but are not always required to enable synergies. It shows the generally positive effect of organizational changes by centralization or integration on the utilization of synergies. At the same time, both have no effect on the utilization of financial as well as intangible synergies which are optimally supported by supplementation or transfer. In the same turn, the positive effects of transfer, which does not require any structural organizational changes, is made evident. Balancing of resources only has a strong positive effect on supporting financial as well as cost oriented synergies.

In general, the figure gives a good overview which stresses that organizational measures are dependent on which kind of synergy is aimed. For the specific case of knowledge-based synergies, for instance, Biberacher suggests the formation of expert groups,

[187] Biberacher J. 2003 page 79

forums for communication, using personal networks, doing job rotation and initiating mentor programs.[188]

However, especially this kind of synergies is often underestimated according to Biberacher. He detected the following barriers which lead to a non-sufficient exchange of knowledge and the utilization of the according synergies:[189]

- Shortage of time
- Lack of knowledge about the needs for knowledge of others
- Lack of awareness for the importance of knowledge transfer
- Unwillingness to share knowledge
- Missing transparency about knowledge sources and carriers
- Strong specialization of employees
- Lack of organizational facilities to exchange knowledge
- Organizational culture
- Incentive systems
- Hierarchical structures
- Improper IT solutions

An additional perspective on how synergies can generally be supported by means of organizational measures is introduced by Porter. According to him, organizations can implement supportive organizational practices to enable interrelations or accordingly synergies. He refers to these practices as horizontal organization. The generic categories of the horizontal organization are according to Porter:[190]

1. *Horizontal structure:* Organizational devices that cut across business unit lines, such as grouping of business units, partial centralization, interdivisional task forces, and market or channel focus committees.
2. *Horizontal systems:* Management systems with a cross business unit dimension, in areas such as planning, control, incentives and capital budgeting.
3. *Horizontal human resource practices:* Human resource practices that facilitate business unit cooperation, such as cross-business unit job rotation, management forums and training.
4. *Horizontal conflict resolution processes:* Management processes that resolve conflicts among business units. Such processes can be distinguished usefully

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[188] Biberacher J. 2003 page 186

[189] Biberacher J. 2003 page 187 based on a survey of 201 companies with a turnover of 5-500 million Euros

[190] Porter M. 2004 page 394 ff.

Details on the following Pages according to Porter.

from horizontal structure and systems, and relate more to the style of managing a firm.

1. The first *horizontal structure* is the *group or sector*, where different business units report to a single executive. The sector executive is usually responsible for the review and approval of business unit strategies and coaches the business unit managers. Due to their position and the inherent overall perspective sector executives are predestinated to have a vital role in identifying, pursuing and managing synergies. Given that the boundaries of the sector were defined appropriately to enable interrelations and the executives have the needed skills, authority and power of decision, this organizational configuration can support synergies.

How close the connection between the groups is and how the groups are organizationally defined depends on the industry and firms internal and competitive situation; it may vary from group to group. Generally, business units should be grouped based on the strategically most important interrelation.

The second type of horizontal structures is *partial centralization*, where specified value activities are centralized for enabling an overall optimum while the profit responsibility remains in the business units. Common examples for this kind of organization are to be found in central sales, procurement or logistics departments. The reporting relationships for shared activities can vary. It is case dependent weather a formal control, a dotted line relationship to one business unit, or a reporting system to all business units or the corporate headquarter is chosen.

For the successful implementation of a partially centralized organization, appropriate incentive and organizational structure needs to be developed for enabling a self-organized unit. Another option is the designation of those activities to one line executive who has the authority over the business units involved.

The previously described possibilities of horizontal structures are the strongest forms of organizational interventions for supporting interrelationships. Besides that, organizations also have the possibility to make use of matrix-organized cross-unit horizontal structures, which partially can have a temporarily character, to enhance the exploitation of interrelations such as i) *market focus committees*, ii) *technology, channel and other interrelationship committees* and iii) *temporary task forces.*

Market focus committees are formed when interrelations for market specific conditions can lead to a competitive advantage across the business units. They are of interest if a firm is organized around products or technologies and can even act as an interim step in shifting to a market-based organization. Participants of such committees can be senior managers of business units serving the according market. They meet regularly to supervise market research, identify and define the exploitation of interrelations and define gaps to strengthen the overall position in the market. Specific synergy projects are then delegated to line executives in the business units.

Based on the principle of market focus committees, also *other interrelationship committees* are possible for focusing, for instance, on logistics or production.

Interrelationships which do not require a standing committee structure can be organized by means of *temporary task forces*. This kind of horizontal structure is in particular of importance for intangible interrelations. They can address various types of interrelations and focal points. Additionally, temporary task forces can act as a device to question and recommend permanent ways to achieve synergies.

Another option to organizationally structure and support interrelations is by means of *group or corporate interrelationship champions*. They are responsible for identifying key interrelationships in their areas and subsequently working with the affected areas to realize the synergies. The champions can also assist in yielding needed organizational structures as explained before.

Whatever horizontal structure is decided for, a cross-business unit management needs to be implemented. The reporting should be "made" to a senior line executive for ensuring a focus on important issues and the needed attentions within the company. The cross-business organization should be headed by an executive who is not closely linked with a business-unit perspective and responsible for the results of the interrelationship. Top management can support effective results by assigning line executives from the correspondent business units who are held responsible for implementing the needed interrelation actions. The managers should be senior enough to influence their units to action. For the implementation a certain staff capability is to be considered.

2. The second generic category of horizontal organizations is *horizontal systems*, which describe management systems which support the coordination and implementation of interrelations. The first supportive system is *horizontal strategic planning* which supplements the standard vertical strategic plans with a horizontal perspective. Therefore, it is possible to expand the responsibility of the corporate planning department with the responsibility to identify interrelations and initiate actions to exploit them. Another potential approach is to make the group and sector executives responsible for horizontal strategy. Finally, the management of interrelations can also be implemented into the business unit strategic planning. Since no business unit will have the perspective to recognize all synergies and the approaches are not mutually exclusive, several approaches for horizontal strategic planning can be pursued simultaneously.

Horizontal procedures are needed to facilitate the cooperation between different business units for issues such as capital budgeting for interrelated projects or revenue/cost sharing for joint projects. Companies being successful in exploiting interrelationships support their in-house purchasing departments as their most important buyers with the correspondent incentive systems so that internal suppliers are preferred rather than external ones.

Horizontal incentives support interrelations by rewarding cooperative approaches within the company. Without those, interrelations are limited due to the missing incentives or even disincentives to agree on internal cooperation's compared to the individual results which are usually of interest in common incentive systems. The decision for horizontal incentives should remove any biases that support external investments or cooperations in favor to internal ones. Additionally, performance targets for managers should indicate that the manager is a part of a broader entity, where it should not be common practice to solely reward their individual business unit results. Since the business unit's contribution cannot solely be measured quantitatively, especially in dealing with interrelations, a subjective component should be contained.

3. *Horizontal human resource practices*[191] are the third generic category of the horizontal organization. They include policies for hiring, training, and managing human resources to support cross-business interrelations and centralized functions.

The first practice is *personnel rotation among business units* which helps to reduce cultural and procedural differences, to create personal relationships, to educate managers about potential areas for interrelationships and promotes a corporate identity in addition to the business unit identity.

Firms can also implement *some firm-wide role in hiring and training* to build a corporate overall identity. These corporate orientation and training programs educate managers in a broader understatement of the firm, encourage personal relationships between managers of different organizational units and facilitate therewith the interrelationships between different units.

Promotions from within support interrelations by reinforcing the corporate perspective, exchanging knowledge carriers from different business units and broadening the personal internal network. This together has a positive effect on exploiting synergies.

Cross-business unit forums and meetings bring managers from different business units together, thus acting supportive for discovering and initiating interrelations.

For a successful exploitation of interrelations key managers should understand the strategic logic and concept which is why *education on interrelationship concepts* is a vital supportive approach. This education can be handled as a part of standard management development programs, companywide meetings or other forums. According to Michael Porter "[…] top management often understand the concept of

[191] Specifically for knowledge management-related synergies compare also Biberacher J. 2003 page 186

interrelationship, middle managers frequently do not and changes in their behavior will make or break the achievement of interrelationships in practice"[192]

4. The forth generic category of horizontal organizations are the *horizontal conflict resolution processes*, which support the conflict management between the business units. They act supportive where the organizational structure and formal procedures are not sufficient, particularly where responsibilities are not clear, to exploit interrelationships.

In addition to the approaches of the horizontal organization, Michael Porter underlines the supportive role of chief executives on the exploitation of interrelationships.[193] In his opinion a pure bottom-up approach for identifying and implementing interrelations will rarely succeed. What is needed is a strong commitment of senior management to define the overall corporate purpose, to underline the importance of interrelations and to support cooperative behavior across the business units.

For enabling a successful exploitation of synergies in horizontal organizations,[194] it is not sufficient to institute an array of horizontal practices. The practices have to be tailored depending on the specific organizational situation which also takes the previously introduced key influential factors into consideration.

This subchapter has provided major organizational support factors for the utilization of synergies. These can be used to make organizations aware of which general options exist for making certain synergies possible. Particularly, for the implementation of synergies this information can be used actively for deciding for the proper options for certain synergy scenarios.

2.5 Quantification of Synergies

Due to different synergy characteristics and sources the clear quantification of synergy effects is a challenging task. Synergies in procurement, finance or the reduction of double work are easier to quantify than synergies which result from non-directly measurable sources.[195] Especially the quantification of synergies which are based on

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[192] Porter M. 2004 page 407

[193] Porter M. 2004 page 408

[194] The basic concept of the horizontal organization has a strong reference to the concept of business process management or process orientation which are introduced in chapter 3.3

[195] Wala T., Messner S. (2007) page 9

intellectual capital[196] are, if at all, difficult to measure.[197] Since synergy effects are affecting future values, additionally a certain subjectivity of the performance in the future is given.[198]

Frank Burde, who analyzed scientific approaches to assess and forecast the value of synergies, concludes that even though a large variety of approaches does exist, none is able to redress accompanying uncertainties resulting from the synergy concept. That is why the assessment of synergies including the extent of the effect, its lifetime, realization costs and risk adjustment underlies certain subjectivity in theory and practice.[199]

Johannes Biberacher who composed a book about synergy management and synergy controlling with a focus on synergy assessment also refers to the limits of the quantifiability of all synergies. According to him, the first challenge is that a majority of synergies does not have a directly quantifiable effect. These effects can only be measured by means of indirect approaches. The second challenge is the time horizon, specifically the future orientation of synergy effects, which complicates the direct quantifiability of synergies.[200]

Despite these limitations the general categorization of quantification and assessment approaches for synergy effects and potentials is as follows[201]

- Indirect Measurement Methods
- Direct Measurement Methods
    - Qualitative Measurement Methods
    - Quantitative Measurement Methods

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[196] According to Biberacher J. 2003 page 133 including amongst others

i) human capital: know-how, motivation, creativity, leadership qualities

ii) customer capital: distribution channels, customer loyalty, brands, image

iii) supplier capital: supplier relationship quality, reliability, supplier quality, exclusivity

iv) investor capital: ownership structure, relationships to banks, investor loyalty

v) process capital: organizational and operational structure, IT systems

vi) location capital: locational advantages due to production factors, taxes and market structure

[197] Biberacher J. 2003 page 133

[198] Biberacher J. 2003 page 374

[199] Burde F. 2010 page 55

[200] Biberacher J. 2003 page 123 and 270 on the future aspects of synergies on synergy management. Rockholtz C. 1999 page 158

[201] Biberacher J. 2003 page 123

Indirect measurement methods are primarily used for empirical studies which try to assess synergies from an external perspective.[202]

Direct measurement methods are further classified into qualitative and quantitative measurement methods. With quantitative methods a clear value is assignable to the synergetic effect, while with qualitative methods a clear attribution of values is not possible. Where possible, the results from qualitative measures should be supported by additional quantitative measures to minimize the subjectivity of the assessment.

Based on the synergy matrix[203] introduced by Ansoff, a multitude of methods was developed to qualitatively assess synergies.[204] *Qualitative measurement methods* include, amongst others, i) check lists,[205] ii) scoring models,[206] iii) scenario techniques and iv) cost-synergy-analyses.[207]

Scoring models were originally developed to support the decision-making process in research and development. For synergy assessment, applications offer the advantage that already defined synergy potentials can be rated according to predefined attributes and weather these are achieved or not. By following this procedure, companies are able to derive decisions which are based on evaluation criteria which are adaptable to the company's general strategies. Biberacher suggests the following procedure for assessing synergy potentials with a scoring model:

- Formulation of rating criteria
- Derivation of weighting factors for the criteria
- Selection of relevant criteria
- Rating of the alternatives by experts
- Determination of use values and classification according to the score

An example of a scoring model for assessing synergy potentials is shown on the next side:[208]

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[202] For indirect measurement methods Biberacher J. 2003 pages39 ff.

[203] Ansoff I.H. 1965 page 88 ff. compare also chapter 2.3.1

[204] Biberacher J. 2003 page 124

[205] Rodermann M. (1999) page 1999, Clarke C.J. (1987) page 15 ff.

[206] Rodermann M. (1999) page 205 ff.

[207] Ziegler M. (1997) page 129 ff.

[208] Biberacher J. 2003 page 128

Evaluation criteria for specific area	Highly negative -30	Negative -20	Slightly negative -10	None 0	Slightly positive +10	Positive +20	Highly positive +30	**Weighting** (∑=100%)	**Scores**	**Weighted score**
Customer benefit			●					10%	-10	-1,00
New products						●		7,5%	+20	+1,50
Time to market				●				8%	0	0,00
Throughput time							●	3,5%	+30	+1,05
Cost efficiency						●		8%	+20	+1,60
Quality							●	15%	+30	+4,50
Production efficiency		●						7%	-20	-1,40
Complexity			●					5%	-10	-0,50
Employee qualification				●				7%	0	0,00
Implementation efforts					●			9,5%	+10	+0,95
…					●			19,5%	+10	+1,95

∑=8,65

Table 11: Example of scoring model

Scenario techniques describe what different future scenarios could look like if specific decisions were taken. Associated with the assessment of synergy potentials scenario techniques can be assessed to evaluate the synergy effects on the future cash flow, the

competitive potential, the market situation or growth opportunities. An exemplary process routine of a scenario analysis is suggested by Biberacher as follows:[209]

1. Definition of the object of investigation and needed strategic decisions
2. Identification of relevant decision factors
3. Identification of key internal and external influential forces
4. Analysis of influential forces
5. Definition of the scenario logic
6. Design of potential scenarios
7. Analysis of effects on decision relevant factors
8. Analysis of effects on strategies and decisions

In comparison to scoring models, scenario techniques have the advantage that they do not reflect personal opinions of persons who perform the rating. As a result future developments are principally better accounted for.

Even though *quantitative measurement* of synergy effects is not always possible there are existent approaches which are able to reflect the synergy effect as a value. For this purpose Biberacher provides a collection of approaches how to quantify the previously defined cost oriented, performance-based and financial synergies.[210] These measures are primarily based on a comparison of the cash flow statements before and after the utilization of the synergy as well as measures which reflect the value of the synergy effect.

For quantitative measures of cost oriented synergies he suggests to use statements of cash flows as well as the learning curve to derive which value the synergy effect generated for the organization. The results are based on a comparison of the status quo with the synergy solution. Synergies which are based on learning curve effects can be determined as follows: [211]

[209] Biberacher J. 2003 page 132

[210] Biberacher J. 2003 page 144 ff.

[211] Burde F. 2010 page 32 ff. in reference to Bauernhansl T. page 129

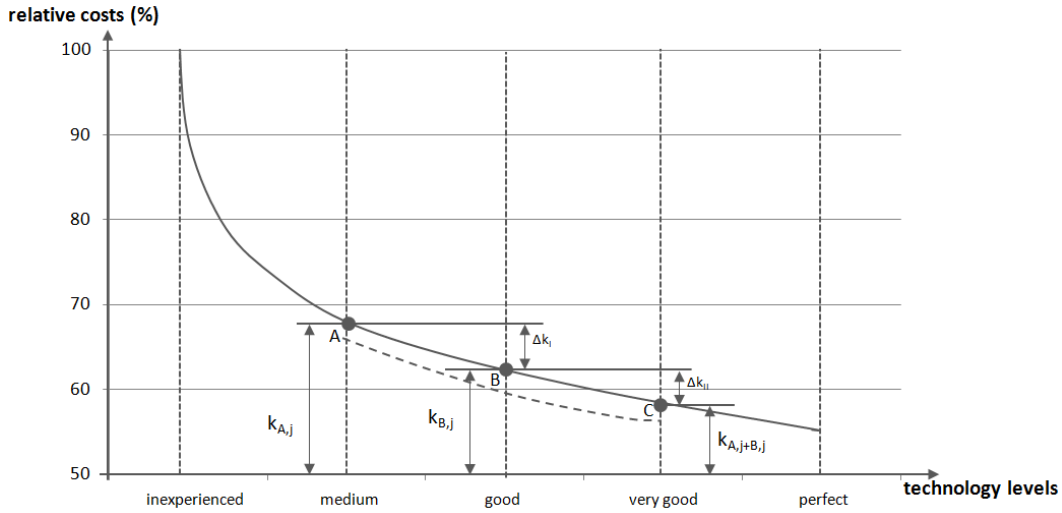

Figure 10: Synergies resulting from learning curve effects

The figure indicates that the cooperation of organizational units results in first order synergies and second order synergies. The former occur in the organizational unit thanks to benefits from the knowledge from the other organizational unit; these effects only affect one of the organizational partners. The latter result from a higher production rate which benefits both organizational units. Synergies of the first and second order can be calculated as follows:[212]

$$\Delta K_j = K_{A,j} - K_{B,j}$$

$$S_{Ij} = K_{A,j} * (\frac{\Delta k_j}{k_{A,j}})$$

$$\Delta k_{II} = k_{B,j} - k_{AB,j}$$

$$S_{IIj} = K_{A,j} * \left(\frac{\Delta k_{II}}{k_{A,j}}\right) + K_{B,j} * \left(\frac{\Delta k_{II}}{k_{B,j}}\right)$$

$$S_{tot/j} = S_{Ij} + S_{IIj}$$

$$k_{A,j} = relative\ costs\ of\ organizational\ unit\ A\ with\ technology\ j$$

$$k_{B,j} = relative\ costs\ of\ organizational\ unit\ B\ with\ technology\ j$$

[212] Burde F. 2010 page 35

$k_{AB,j} = relative\ costs\ of\ cooperational\ unit\ AB\ with\ technology\ j$

$K_{A,j} = absolute\ costs\ of\ organizational\ unit\ A\ with\ technology\ j$

$K_{B,j} = absolute\ costs\ of\ organizational\ unit\ B\ with\ technology\ j$

$S_{Ij} = first\ order\ synergy\ potential\ with\ technology\ j$

$S_{IIj} = second\ order\ synergy\ potential\ with\ technology\ j$

$S_{tot/j} = total\ synergy\ potential\ with\ technology\ j$

The synergy potential (P_A) resulting from economies of scale can be measured by comparing the piece prices of the independent (c_A) and the synergy solution (c_{AB}) and multiplying it with the total quantity (x_A):[213]

$$P_A = (c_A - c_{AB}) * x_A$$

If the number of employees (NoE) is affected by the synergy, the savings of employees (S) in the organizational units (i) can be determined by means of the value driver (V) which indicates what the employee does:[214]

$$S = \frac{\sum_{i=1}^{n} V_i}{\max_i(\frac{V_i}{NoE_i})} \sum_{i=1}^{n} NoE_i$$

In general, performance-based synergies are difficult to be quantified based on their nature, since they include synergy effects such as first mover advantages, gained market power[215] or differentiation with competitors, and because their effects are additionally affected by external factors such as competitors, customers or suppliers. With these characteristics performance-based synergies also only allow for a comparative cash flow statement of the status quo with the synergy solution. Additional approaches which can be used for this purpose are such which operationalize the synergy effect in measures. If, for instance, the aimed synergy effect is quality improvements of the product, customer surveys about the perceived quality of the product before and after the synergy solution can be conducted.

[213] Burde F. 2010 page 31

[214] Burde F. 2010 page 31 referring to Rockholtz 1999 page 172

[215] For the quantification of a gained market power: Burde F. 2010 page 37 ff.

For the quantification of financial synergies, which include, amongst others, tax and funding synergies, Biberacher utilizes the payment difference between the status quo and the synergy solution for tax relevant synergies as an indicator for the value of the synergy as well as the difference of the funding costs of the status quo and the synergy solution for deriving the value of the synergy.

The quantification methods introduced in this chapter can be used to assess and validate the aimed effects of already implemented as well as potential synergies. However, due to major limitations they need to be critically questioned for each case of application. Especially the comparison of a status quo with the synergy solution contains the inaccuracy that the factual outcome of one synergy application of the solutions is not known; if the synergy solution is decided the outcome of the individual solution, which is needed for the comparison with the synergy solution, can only be estimated and vice versa. Depending on how this estimation is derived vague and subjective results can be generated which favor the anticipated result.

However, even though synergies can often not be quantified perfectly, the process itself supports to question the results of the synergy as well as the risks involved. The latter are sometimes not directly linked to the synergy effect but include additional costs which are created through the cooperation. These costs are introduced in the following subchapter.

2.5.1 Costs of Creating Synergies

Even though the aim of the utilization of synergies is to result in beneficiary effects, the implementation as well as the utilization is often coupled with additional costs. According to Michael Porter, the utilization of synergies, which he refers to as interrelations, can lead to the creation of three groups of costs which are caused by combined activities:[216]

- Costs of coordination
- Costs of compromise
- Costs of inflexibility

Coordination costs originate from the need of coordinating operations planning, priority definition, or problem solving processes for enabling a common approach. They occur in terms of time, personnel, and perhaps money.[217] The costs differ depending on the

[216] Porter M. 2010 page 426 and Porter M. 2004 page 331

[217] Porter M. 2004 page 331

kind of cooperation or sharing of processes. A combined operation of different organizational units is usually more cost-intensive than a yearly purchase of goods.

The second cost group of cooperation approaches is *costs of compromise*. Combined realizations of activities usually imply the harmonization of the needs of the parties involved. Depending on the situation the costs which are caused by the compromise which needs to be taken compared to the differentiated solution, can result in an insignificant effect up to the "destruction" of the synergetic effect. It has to be noted that the costs are usually unequally distributed across the parties involved. This can lead to resistance from the party which is not positively affected.[218] Usually, compromise costs are smaller when the strategic perspective of the parties involved is similar or even alike.

Thirdly, combined approaches can lead *to inflexibility costs*. Flexibility includes action, process and structure flexibility.[219] There are two main effects which cause inflexibility costs i) potential problems to react on competitors and ii) exit barriers. The first case is reasoned by the possibility that combined activities of two or more organizational units can hamper the ability to react appropriately on competitive situations because only one unit is affected by it. The reaction of both parties could undermine, or minimize the result of the synergetic effect of the overall effect. Secondly, mutual solutions can lead to exit barriers such as investments into mutually used resources or organizational changes which are non-reversible without financial loss. Inflexibility costs are no operating costs but only occur in the given situation.

In general all benefits of combined approaches always need to be balanced against the costs which occur as a result of the cooperation. Some apparent synergies might result in dissynergies if the costs to create the desired effect are taken into consideration. If possible, these costs should already be taken into consideration when potential synergies are searched; but at the latest during the implementation of the synergies all costs involved should be known.

Costs which are associated with synergies are not the only challenges when dealing with synergies. The following chapter introduces general challenges which need to be taken into consideration when dealing with synergies in general and the implementation of synergies in particular.

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[218] Compare chapter 2.6

[219] Biberacher J. 2003 page 244

2.6 Challenges of Synergy Utilization and Implementation

Both the implementation and utilization of synergies as well as process orientation, which plays a central role in this thesis, are challenging even for companies with a high level of experience in change management. Michael Porter, who has experienced the implementation of interrelations or synergies in multiple major companies' states: "As many companies have discovered, organizational structure alone is not sufficient [for achieving interrelations]. Instituting horizontal organizational mechanisms [which enable synergies] throughout the firm is usually necessary […] This process takes time, and cannot be expected to occur just because the potential for interrelationships is discovered."[220] Michael Hammer who has observed hundreds of companies trying to implement a process oriented perspective states that "In spite of their intentions and investments, many have made slow or little progress. […] All change projects are tough to pull off, but process-based change is particularly difficult. […] To make new processes work, companies must redefine jobs more broadly, increase training to support those jobs and enable decision making by frontline personnel, and redirect reward systems to focus on processes as well as outcomes."[221] For being able to implement synergies and process orientation successfully in existent organizations, the elaborations presented in this subchapter are to be taken into consideration.

This chapter introduces findings about synergy specific challenges and countermeasures in dealing with synergies as well as process orientation. This knowledge is importance for the implementation of synergies because it presents challenges as well as enablers for the synergy implementation phase. In literature different authors introduced synergy specific challenges and counter measures to deal with the implementation and utilization of synergies. Hofmann is characterizing *external* and *internal challenges* which might occur when dealing with synergy management and the implementation of synergies in particular.[222] *External challenges* are further subdivided in risks of:

i. Innovation
ii. Imitation

i. Innovation and imitation have common features which are primarily based on the management principles as well as technologies used in the value chain. The differences between both stem from the fact that innovations are not necessarily initiated by competitors, while limitations are.

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[220] Porter M. 2004 page 410

[221] Hammer M. 2007 page 1

[222] Hofmann E. 2004 pages 253ff.

Risks of innovation are present if the combined effect is primarily based on technological innovations which can be made obsolete. These innovations might include both, process as well as product innovations.

ii. Risks of imitation are present if the synergy resulting from the combined effect is imitable by competitors. According to Hofmann, this risk is of particular relevance if competitors have access to the needed resources, knowledge or capabilities the synergy is based upon.

Internal challenges are subdivided by Hofmann into the synergy barriers of:

i. "not knowing"
ii. "not wanting"
iii. "not being able to"
iv. "not being allowed to"

i. The first internal synergy barrier is based on the fact that not all resources, knowledge and capabilities of other organizational units are known which might act as a basis for synergies. Even if this knowledge exists, it is not a sufficient criterion to utilize synergies because the single elements still need to be configured in a way that its interactions result in synergies.

ii. When the organization was able to detect the synergy potentials, the next barrier is the resistance against their implementation. Hofmann calls this element as "not wanting". Hofmann states in this context that single employees, groups or organizational units could rather be motivated opportunistically and resist the implementation of a combined solution which is not of value for their egoistic needs.

iii. The third resistance element comes into effect when organizations are not able to provide sufficient capacity for synergy management. Thus the parties engaged in the process are not able to understand their needs properly which can lead to dissynergies.

iv. Missing mechanisms for the implementation and management of synergies in organizations are the main reason for the fourth barrier. According to Hofmann, in many organizations there is a lack of formal planning and controlling mechanisms as well as formal and informal organizational mechanisms to make synergies possible.

A comparable and more detailed result is provided by Rodermann who conducted a survey with 500 executives asking the question which problems were observed in the

implementation of synergies and summarized the following points according to their importance: [223]

- Resistance from employees - 22,8 %
- Overall coordination - 12,5 %
- Prejudices, vanity - 10,8 %
- Incentive structure - 9,9 %
- Organizational culture differences - 9,9 %
- Conflict of objectives - 7,3 %
- Choice of supportive instruments - 5,6 %
- Breaking up of existing structures - 5,6 %
- Departmental egoism and thinking - 5,2 %
- Focus on synergies - 2,2 %
- High implementation costs - 2,2 %
- High implementation efforts - 2,2 %
- Business policy - 1,3 %

In addition to these findings Michael Porter introduces further synergy specific challenges which also need to be considered. According to Porter, it is of importance to take account of that even if interrelationships can have a beneficiary effect on the competitive situation of a company, interrelations should not be i. pursuit or in contrast ii. ignored.[224]

i. The risk of *pursuing* interrelations includes the misinterpretation of the potential to share or transfer know-how. Intangible interrelations are often chosen to justify the need for cooperation. At the same time they usually involve compromises and costs. For this reason the net benefits of transferring know-how need to be known and not suspected.

The second pitfall of pursuing interrelationships is involving activities that are small, have few scale or learning economies, or have little effect on differentiation. Even if these benefits are present, the business units involved should not put too much effort into these effects or even build a horizontal strategy around them.

The third difficulty that might occur in pursuing interrelationships is illusory interrelations. They occur when interrelations are based on superficial similarities like technologies, logistical systems or buyer groups. Even if some approaches might look beneficiary, it is necessary to analyze the real potential before starting a cooperation in a field without, or a negative, effect on the business units.

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[223] Rodermann M. 1999 page 176

[224] Porter M. 2004 page 380 ff.

ii. The drawback effect occurs when interrelationships are *ignored*. First, the company might misread the strategic contribution of business units if it fails to understand the interrelations and only focuses on the standalone basis. This effect motivates business units to take actions which undermine interrelationships.

The second drawback is that these firms also misread the position of vis-à-vis competitors, which causes problems, especially for diversified firms.

The third problem might occur due to portfolio management. Portfolio management is based on financial figures which do not directly describe the beneficiary effects of interrelations. "Horizontal strategy is more difficult to formulate than portfolio strategy, but in the way a diversified firm creates true economic benefits for its business units"[225]

In addition to the pitfalls mentioned above, Porter states impediments to achieve interrelationships.[226] His argumentation how the achievement of synergies is impeded starts with the effects caused by decentralization which supports the principle of autonomy and business unit profit responsibility. Based on that business unit managers are often steered by maximizing their unit performance and not the cooperation's. Other organizational practices such as incentive plans and transfer pricing policies also hinder the use of synergies. According to Porter

"The organizational difficulties of achieving even clearly beneficial interrelationships is perhaps the single biggest reason many managers have rejected the concept of synergy"

Other sources of impediments in the implementation of synergies are according to Porter:[227]

1. *Asymmetric benefits:* They arise from differences in size and strategy of business units and result in different beneficiary affects for the business units involved; sometimes even negative effects on one business unit. When the motivation system does not reflect these differences, the exploitation of asymmetric synergies remains untapped.

[225] Porter M. 2004 page 381

[226] Porter M. 2004 page 385 ff

[227] Porter M. 2004 page 386 ff

Details below according to Porter

2. *Loss of autonomy and control:*

Protection of turf: Since autonomy is of importance in many firms, managers tend to protect their control over all functions and repel combined approaches which might affect it negatively.

Perceived dilution of buyer relationships: Business units are often reluctant towards interrelationships because they fear that their buyer/seller relations might be damaged, the sister units would steal "their" buyers, damage their image or create other unwanted situations.

Inability to "fire" a sister division: Managers rather prefer to cooperate with a partner outside the company because this partnership can be ended easier if the interrelation fails. Cooperation with internal partners is perceived to have more exit barriers.

Conflicts over priorities in shared activities: Business units tend to resist sharing resources with other units because they do not have the full autonomy over these resources. They worry that the resources might be allocated in favor for the other party.

Unfair blame for poor performance: With interrelations managers give up a part of their own control over their destiny. They fear that they will be blamed for failures of an interrelationship where they were not fully responsible for.

3. *Biased incentive systems:* They are closely linked with a positive incentive to participate in interrelations. Some incentives even support external interrelations in preference to cooperation with internal business units.

Lack of credit for contribution to other units: Usually, only the business unit's internal contribution is measured, leading to a situation where interrelations contributing to other business units are misinterpreted as a lack of efficiency. Or as Hammer and Champy state "Often the efficiency of a company's parts comes at the expanse of the efficiency of its whole".[228] For this reason managers are reluctant to use their own resources for synergy effects if they are not valued.[229]

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[228] Hammer M. Champy J. 2006 page 10. For explaining that effect Hammer and Champy give an example where a plane in need of a minor repair had do stand idle for one day on the airport because the manager of the required mechanic refused to pay the bill for the hotel which would have been needed for a short-term repair of the plane- the manager did nothing wrong from his cost centre perspective.

[229] Suter A. 2004 page 18

Measurement biases: Depending on how revenues, costs, or assets are measured and allocated, interrelationships can diminish the results from a controlling point of view. Business units which are controlled by means of return on sales will rather tend to invest in assets than reducing their profitability by means of cooperative actions. In the worst case firms might even tend to outsource processes even though the resources might be available in an internal business unit.

4. *Differing business unit circumstances:* They reduce the willingness to cooperate with other business units due to the differences which are present between the potential interrelation partners.

Strong business unit identities: In situations where business units have distinct histories and identities the exploitation of interrelations is aggravated. In such cases the business unit and its managers tend to identify more with the business unit than with the parent company.

Differing cultures: Interrelations are more complicated when different cultures including different norms of interpersonal behavior, terminology and basic business philosophy have to work together. Sometimes the different culture is also perceived as a threat to the distinct culture of the own business unit.

Management differences: Due to different management skills and styles interrelations between business units can be complicated.

Differing procedures: Differing procedures make the achievement of synergies difficult and cause extra costs of coordination.

Geographic separation: Distances reduce the ability to exchange important information and the necessity to work out problems. Along with cultural differences they are the second factor reducing the ability to coordinate distant business units.

5. *Fear of tampering with decentralization:* The reasons mentioned before are rather motivated by business unit management. Interrelations also include reasons why corporate management might be hesitant towards tempering decentralization approaches.

Dampening entrepreneurship: Even though no fundamental contradiction exists between entrepreneurship and interrelations, they are often perceived as contra-productive due to their autonomy-limiting character.

Desire for a consistent organization: The idea of organizing all business units identically to allow for an easier manageability of the entity is inconsistent with interrelationships. They imply that a certain variety of autonomy is needed such as different measures of performance and objectives.

Difficulty of measuring performance: Due to the subjectivity of many interrelationships firms which base their performance measures only on quantifiable criteria such as profitability struggle to implement synergy measures into their incentive system.

Fear of providing "excuses": Since interrelationships often obscure clear responsibilities for specific business units, managers fear that interrelations might be used for excuses for poor performance.

There are general differences concerning the extent of impediments among firms. They are resulting from the firm's history and background, the mix of businesses, the organizational structures and policies. The following conditions tend to cause difficulties according to Porter:[230]

- Highly decentralized firms with many small business units
- Firms with a strong tradition of autonomy
- Firms built through the acquisition of independent companies
- Firms that have made little or no effort to create a corporate identity
- Firms that have made little or no history of interrelationships, or who have had a bad experience in attempting to pursue an interrelationship

In addition to the synergy specific findings by Porter, Hofmann and Rodermann, Hammer and Hershman recommend the following dos and don'ts specifically for processes of change management related to business process management:[231]

- Do be sure the top leadership fully understands all that is involved in implementing process and the gravity of the change the organization is about to undertake; this isn't about flow and organization charts.
- Do ensure that the leaders can relate process initiatives to business goals and that mistakes and innovation are encouraged and expected.
- Do prepare the leaders for the fact that they may have to make some tough personnel decisions.
- Do encourage each committed leader to help recruit other leaders.
- Do make it clear to the leaders that process is a way to run the business, not just a quick fix to some crisis or problem.
- Do be brutally candid about what your organization's culture is, looking at past success and failures of large-scale initiatives to understand the organizations strengths and weaknesses.

[230] Porter M. 2004 page 393

[231] Hammer M. Hershman L. 2010 page 178 ff.

- Do understand your organization's capacity and appetite for change so that you don't overwhelm people with too much change too fast.
- Do understand that culture is a by-product of leadership and that if the leadership doesn't change, neither will the culture.
- Don't assign the responsibility of process to a leader who isn't well respected by the organization, including peers and subordinates.
- Don't expect change overnight.
- Don't allow friendships, including among peers, to get in the way of making tough decisions for the greater good of the organization.
- Don't set incremental or uninspiring targets that waste all the effort that goes into process design.
- Don't overlook the need to sustain process beyond the initial rollout. Institutionalize the language and culture of process.
- Don't be impatient.
- Don't forget to train new people in process and to recruit leaders and process owners with process experience.

To sum up, all introduced findings of this chapter can be of relevance when dealing with synergies in general and the implementation of synergies in particular. The challenges introduced should be known for being able to understand problems which might occur when implementing or using synergies and accordingly derive counter measures. [232] The findings of this chapter are further derived as part of the synergy enablers which are introduced in chapter 5.3.6.

Which of these findings are of relevance is case dependent. If minor synergies are introduced which only affect small organizational units and do not have any additional effects on the organizational structure the knowledge about general challenges of implementing synergies might be sufficient to successfully implement the aimed synergies and ensure their utilization within the organization. In contrast, if the changes which are initiated by the aimed synergies are far reaching and affect larger portions of the organization a detailed planned implementation scenario is needed; otherwise the implementation will most likely fail.

After this chapter has introduced the central findings about synergies including the definition of synergies in chapter 2.2, the overview about synergy categorizations in chapter 2.3, the key influential factors on using synergies in chapter 2.4, the quantification of synergies in chapter 2.5 as well as challenges of synergy implementation in this chapter the following main chapter introduces the basics about organization and process orientation.

[232] For general advice on change management: J. Kotter 1996

3 Organization and Process Orientation

3.1 Introduction and General Consideration

Organization plays a central role for the utilization of synergies as well as the scientific problems of this thesis. In chapter 2.4 the organizational structure was detected as one of the key influential factors and evidence from the case studies also proofed its central importance for a successful utilization of synergies. This chapter introduces the essentials about organization in general and process orientation. The latter, as an additional way of organizing firms, is of interest because it includes features which are valuable for the utilization and management of synergies. The target of this chapter is i) to provide a theoretical basis for further developing the question how process orientation can be utilized to enhance the utilization of synergies and ii) to support answering the scientific question which effect the organization has on the utilization of synergies.

This main chapter consists of two chapters. Chapter 3.2 introducing the basics about the organization of firms, including subchapter 3.2.1 introducing the basics about Taylorism and Fordism, subchapter 3.2.2 giving details about the organizational structure of firms, subchapter 3.2.3 introducing the organizational chart and subchapter 3.2.4 showing problems of traditionally organized firms. Chapter 3.3 introduces the concept of process orientation including subchapter 3.3.1 which presents the definition of business processes, subchapter 3.3.2 which introduces business process reengineering, subchapter 3.3.3 defines process orientation, subchapter 3.3.4 elaborates business process management, subchapter 3.3.4.1 introduces the essentials about business process measures and subchapter 3.3.5 identifies the essential principles of business process orientation.

3.2 Traditional Organization

3.2.1 Taylorism versus Fordism

In the modern corporate world the impact of the work of Frederick Winslow Taylor and Henry Ford on organizations can still be perceived. One century ago these two business men have paved the way for the organizational structure in today's companies and have founded approaches which are still valid today; this is known as Taylorism and Fordism.

Frederick Taylor's legacy is the scientific management which gives a systematic guide on how to yield efficient work by controlling processes through a management system; he defined five principles of scientific management:[233]

- A clear division of tasks and responsibilities between management and workers.
- Use of scientific methods to determine the best way of doing a job.
- Scientific selection of the person to do the newly designed job.
- The training of the selected worker to perform the job in the way specified.
- Surveillance of workers through the use of hierarchies of authority and close supervision.

Other managers continued Taylor's work. It was, for instance, Frank Bunker Gilbreth and his wife Lillian Moller Gilbreth who contributed to the scientific management approach by introducing specified techniques for measuring the performance of the workers, such as time-and-motion studies, thus finding a way to reduce the workers' exhaustion and enhancing their productivity. Also, Henry Laurence Gantt, assistant to F.W. Taylor, improved his model by focusing on the workers' psychological needs and initiating a task-and-bonus payment scheme as well as the 'Gantt Chart' which is still employed today.

While Taylorism concentrated on the efficiency of single processes, tasks or workers, the main focus of Fordism lays in the evolution of mass production and with it the increased use of machinery. Henry Ford's intention was to increase his control on the labor by reducing or eliminating uncertainty;[234] this aim was achieved by using three major principles:

- Analyzing jobs with the help of time-and-motion techniques
- Installing single purpose machine tools to manufacture standardized parts

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[233] Buchanan D. and Huczynski A. 2010 page 423

[234] Buchanan D. and Huczynski A. 2010 page 431, referring to Ford and Crowther 1924

- Introducing the mechanized assembly line

Ford used the concepts of system and control to organize the manufacturing processes within the factory, but also the sale of the car. Through this logical organization of the plant he i) established the features of mass production work and ii) raised the living standard of the community.

Both concepts, which share commonalities, but also show reasonable differences, gained considerable attention when they were introduced and have ever since been used and further developed by numerous managers and firms.

3.2.2 The Organizational Structure of Firms

An organization can be determined through its structure. It serves to subdivide activities into sub-units and to coordinate and control these; a process aimed to achieve the organization's goals. It consists of seven major elements, each of which needs to be delegated by the corresponding authority:[235]

i. Work specialization
ii. Hierarchy
iii. Span-of-control
iv. Chain of command
v. Departmentalization
vi. Formalization
vii. Centralization

i. In the step of *work specialization* the authorities decide how tasks are subdivided and if workers need a high or a low specialization; a fact which will imply different time spans, costs of training and employee motivation.

ii. Continuing with the *hierarchy*, it is important to distinguish between flat and tall organizations, or firms with a low or a high number of hierarchical levels. The decision for the number of authority levels depends on the actual size of the organization; while the army displays many different hierarchical positions due to its high number of members, the little family-held firm next door will only have a two or three level hierarchy.

iii. On this basis, the *span-of-control* is determined: the number of subordinates a supervisor or manager is responsible for results in a wide or a narrow span-of-control.

[235] Buchanan D. and Huczynski A. 2010 page 453. Details in the following according to Buchanan D. and Huczynski A.

Consequently, a manager working in a tall hierarchy will have a narrower span-of-control than a manager working in a flat hierarchy; making it more intricate for the latter i) to effectively control and coordinate the tasks of his or her subordinates and ii) to achieve a fine communication with his or her underlings.

iv. Furthermore, the *chain of command* defines to which superior a worker or a team should report; at the same time determining stringent ranking of authority along the vertical dimension of the organizational structure.

v. Within the principle of departmentalization, the tasks are assigned either i) functionally, i.e. according to common know-how, ii) according to the product or service offered, iii) according to the geographical area, or iv) according to the type of customer being served. Depending on the division chosen, the employees are allocated to different departments.

vi. In an organizational structure it is also crucial to define the rules, records or procedures to be used for controlling the jobs or workers. One distinguishes between a high *formalization* (a high number of rules) and a low formalization (a low number of rules).

vii. The element of *centralization* identifies if decision-making should take place centralized (in the senior management area) or decentralized (in the junior management area).

A potential way of showing the vertical and horizontal dimension of an organization is the pyramidal form.

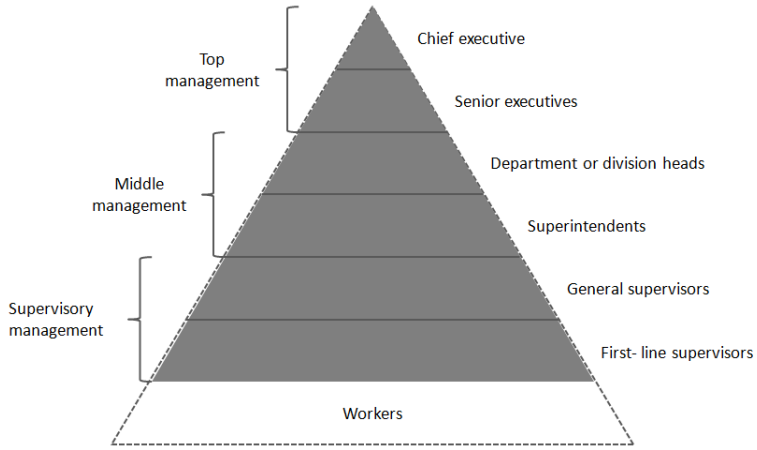

Figure 11: Organizational structure[236]

Although this image gives a good general overview over the three basic management groups (on the left side) and the six specific management titles (on the right side), it is important to note that this view is not sufficient to demonstrate all existent or necessary connections of an organization, such as technology, tasks or human components.[237] In the Leavitt diamond, introduced by Harold Leavitt, the four individual principal elements which are interacting mutually are illustrated; structure, objectives, technology and people. They are not only influencing each other, but are also effected by environmental factors; resulting in different organizational structures.

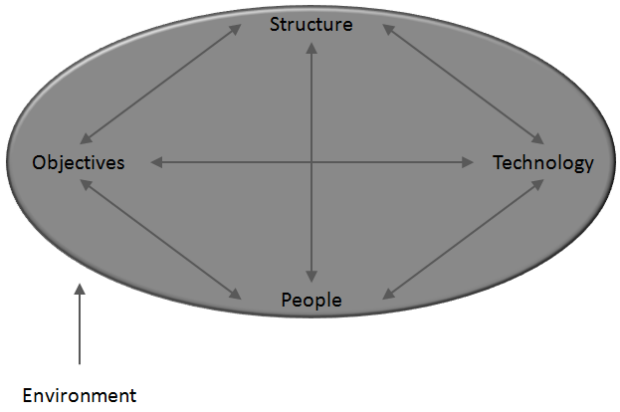

Figure 12: Leavitt diamond[238]

[236] Buchanan D. and Huczynski A. 2010 page 455

[237] Buchanan D. and Huczynski A. 2010 page 453, referring to Duncan, R. 1979 page 59

[238] Buchanan D. and Huczynski A. 2010 page 456

Both designs give a perfect general outline of the organizational structure; yet, a more detailed approach needs to be configured. This approach is the organizational chart which is introduced in the subsequent chapter.

3.2.3 The Organization Chart: Traditionally Organizing Firms

A main topic concerning organizations is the differentiation of relationships into line, staff and functional whose explanation is dependent on the concepts of authority, responsibility and accountability.[239]

The *authority* implies the permission to manage individuals, a team or the respective task. It is defined within an organization's position, rather than an individual and is found along the chain of command.

A person's *responsibility* implicates a certain commitment of execute a task function or assignment allocated by a superior.

When a manager is first given the authority to do a task, and hence has to take the responsibility for its outcome, he or she will be taken *accountable* for the result. This means reporting to the superior about the negative result of the task he or she was made responsible for. In this context it is of importance that a job holder possesses a well balanced division of tasks, authority and responsibility.[240] A manager should for instance not be made accountable for a task for which he was not provided with the required authority.

Within a traditional organization of a company there are three types of relationships:[241]

- Line relationship
- Staff relationship
- Functional relationship

The *line relationship* typically occurs in the conventional pyramidal form of an organization and shows the relationships or managerial control from top to down, i.e. within the chain of command. Hence, the chief executive has managerial control over his direct subordinates, such as the director of accounting, director of sales, director of

[239] Buchanan D. and Huczynski A. 2010 page 464

[240] Haberfellner R. 2010 page 56 and Haberfellner R, de Weck O.; Fricke E., Vössner, S. 2012 pages 172ff.

[241] Buchanan D. and Huczynski A. 2010 page 464 ff.

marketing, etc.; each of whom in turn has control over their corresponding direct subordinates, and so forth.

By contrast, the staff departments, i.e. HR, IT and legal department, stand outside the typical line of an organization, thus modifying the traditional line structure. While each staff department itself still has an individual line relationship, it uses its special up-to-date knowledge to give advisory support of the other departments or managers within the overall line of the organization. The supportive function in connection with the lack of authority of these staff specialists indicate the *staff relationships* of an organization.

The functional relationship relies on the principle of the staff relationship. While within the latter the staff members have no authority and are therefore not able to force the managers to follow their advice, functional specialists are given authority in order to assert their advice. A manager can assign his own authority over his direct subordinates to a staff expert in order to ensure that the expertise recommendations for a certain matter are followed and implemented.

All three types of relationships are indicated using lines which is shown in the figure below.

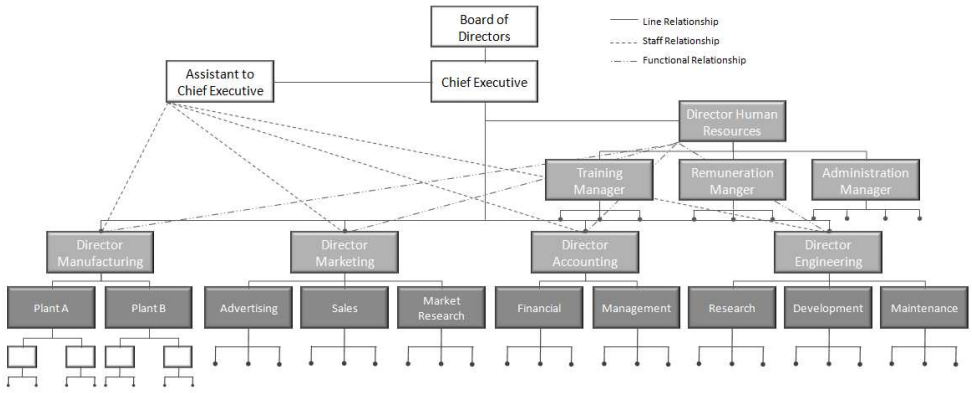

Figure 13: Types of relationships between positions of an organization chart[242]

Another structural feature of the organization is the distinction between the formal and informal organization. The former is laid down by the management which determines, documents, plans and modifies the relationships between the employees within the company. As opposed to that, the latter indicates the relationships which are not documented and occur spontaneously between individual employees for meeting their specific psychological and physical needs. Since the origins of these two types of

[242] According to Buchanan D. and Huczynski A. 2010 page 468

organizational relationships are different – management or employee – they can be in conflict with each other; this condition is shown in the following figure.

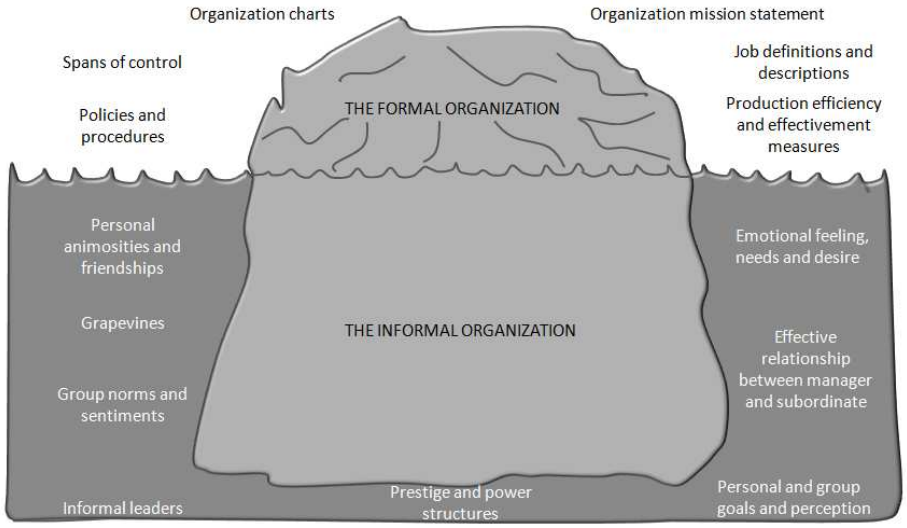

Figure 14: The formal and the informal organization[243]

The table below gives an overview of the differences of both concepts.

		Formal organization	Informal organization
A	Structure ▪ Origin ▪ Rationale ▪ Characteristics	 ▪ Planned ▪ Rational ▪ Stable	 ▪ Spontaneous ▪ Emotional ▪ Dynamic
B	Position technology	Job	Role
C	Goals	Profitability or service to society	Member satisfaction
D	Influence ▪ Base ▪ Type ▪ Flow	 ▪ Position ▪ Authority ▪ Top down	 ▪ Personality ▪ Power ▪ Bottom up
E	Control mechanism	Threat or firing or demotion	Physical or social sanction (norms)
F	Communication ▪ Channels ▪ Networks	 ▪ Formal channels ▪ Well defined, follow formal lines	 ▪ Grapevine ▪ Poorly defined, cut across regular channels

[243] According to Buchanan D. and Huczynski A. 2010 page 470

G	Charting	Organizational chart	Sociogram
H	Miscellaneous		
	▪ Individuals included	▪ All individuals in work group	▪ Only those 'acceptable'
	▪ Interpersonal relations	▪ Prescribed by job description	▪ Arise spontaneously
	▪ Leadership role	▪ Assigned by organization	▪ Result of membership
	▪ Basis for interaction	▪ Functional duties or position	▪ Personal characteristics status
	▪ Basis for attachment	▪ Loyalty	▪ cohesiveness

Table 12: Comparison of the formal and informal structure[244]

A further important attribute of the organizational structure is the differentiation of centralization and decentralization. In a centralized organization, the authority and responsibility for making decisions primarily lies within the (top) management, whereas a decentralized organization features an entrustment of the power for decision-making to subordinate managers. Though both concepts are valid, a company usually has to decide which approach to establish.

According to Morgan[245], there are six major types of organization structure which are:

- Rigid bureaucratic structure
- Bureaucratic structure with senior management team
- Bureaucratic structure with cross-functional teams
- Matrix structure
- Project (team) structure
- Loosely coupled organic structure

In a *rigid bureaucratic structure*, only one chief executive has control over the entire, pyramidal-formed organization with all principles laid down.

The second type, the *bureaucratic structure with senior management team*, features a management team which holds meetings and consists of the chief executive and the directors of the departments each of whom has authority within their department.

The *bureaucratic structure with cross-functional teams* is comprised of teams whose members come from lower organizational levels from different departments and attend meetings for making reports to their head of department and receiving instructions at the same time.

[244] According to Buchanan D. and Huczynski A. 2010 page 471

[245] Morgan, G. 1989 page 66

The *matrix structure* features a combination of a vertical and a horizontal structure, with a control from top to down as well as between the departments, thus resulting in a dual chain of command.

The *project team structure* indicates that the team members work in specific projects rather than functional departments and are free to manage themselves within the strategic framework given by the management.

In a *loosely coupled organic structure* no clear organizational structure is visible because a network of departments or even firms is established which acts around a core consisting of the organization's employees. This system is of advantage since there is no limit for the number of networking enterprises, ideas or activities.

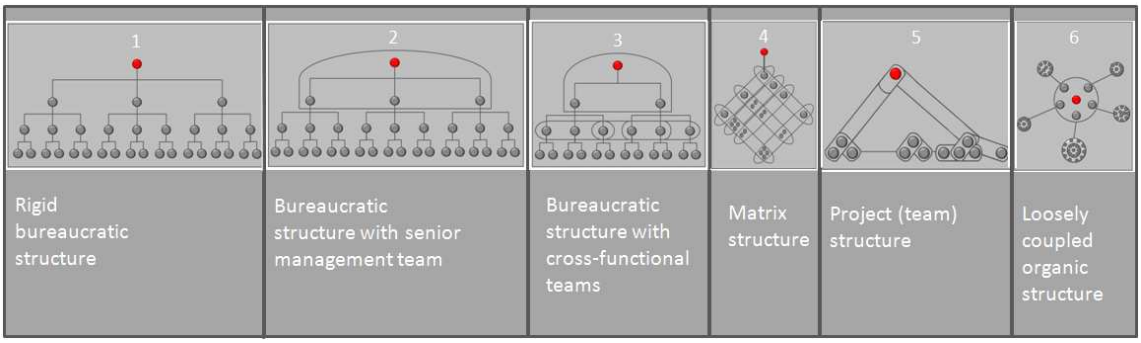

Figure 15: Types of organization structure[246]

Based on Morgan, literature distinguishes between four major organizational structures:

- Functional structure
- Divisional structure
  - Product or service-based
  - Geography-based
  - Customer-based
- Matrix structure
- Modular organization structure

In a *functional structure* activities and employees are classified from down to top with reference to commonalities of their work, profession, aims or resources used.

By contrast, in a *divisional structure* the departments are arranged on the basis of the organizational output, which is i) product or service-based, ii) geography-based or iii)

[246] Buchanan D. Huczynski A. 2010 page 496 referring to Morgan G. 1989 page 66

customer-based. In this way, each division has its own functional structure and operates separately as a single entity.

In a *product or service-based divisional structure* the individual departments are organized according to the various products or services the company offers.

In a *geography-based divisional structure* the divisions are located in different places, thus offering the product where it is required by the customer.

A *customer-based divisional structure* is chosen when different types of customers are to be served.

The *matrix structure* is an organizational design which combines both vertical and horizontal structures, resulting in a control along the chain of command, i.e. from top to down, and between different departments.

In the *modular organization structure* the company enters different collaborations with external companies, thus outsourcing the productions of various single parts. The different parts or modules are produced by external (or internal) contractors, provided by them and finally assembled by the company itself.

Irrespective of the organizational structure chosen, the differentiation pertaining to organization does not only implicate advantages, but also drawbacks which result from the risk that sub areas lack in consistency. Thus, for a complex system to achieve and maintain a dynamic balance with its environment it needs to be highly differentiated and at the same time integrated sufficiently. Therefore, integration and coordination actions need to be taken to be able to better adjust the behavior of individual subsystems to each other and also to the goals, strategies and norms of the entire system. [247]

3.2.4 Problems with the Organization Chart and Traditionally Organized Firms

The efforts of organizing firms of the last centuries and decades improved the efficiency of corporations. Along with technological innovations which changed the way how goods are produced, organization can be regarded as a success factor for optimizing the production output. However, traditional organization forms are also associated with disadvantages which are illustrated below.

[247] Lawrence, P.R., Lorsch, J.W. 1963 pages 229 ff.

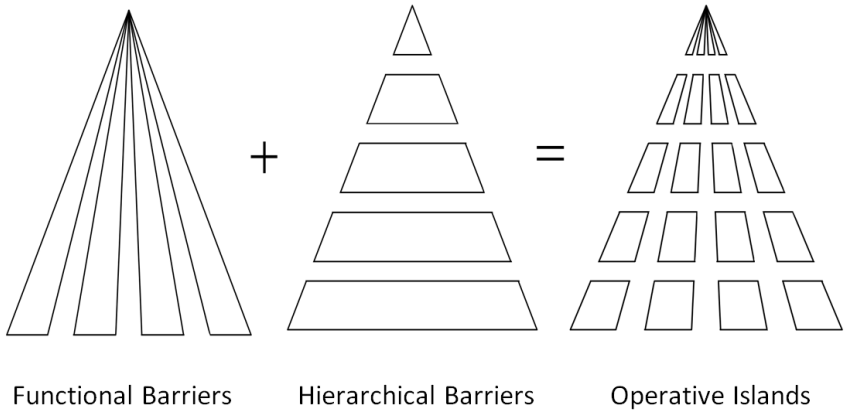

Figure 16: Operative islands[248]

In traditionally functional oriented organizations work is divided into smaller tasks. In addition to that, these tasks are functionally and hierarchically organized. The former leads to the functional perspective of the corporation. Or as Hammer and Champy state "Companies today consist of functional silos, or stovepipes, vertical structures built on narrow pieces of a process."[249] The latter, the hierarchical organization, additionally clusters the functional organization; the result of which is operative islands which occasionally also operate as such.

A problem with such organized firms is the poor representation of the natural sequence of business processes,[250] even though they are central for the firm because they are creating value. No one is in charge of the process and hardly anyone even knows the processes. Persons involved in the process tend to look inward into their department and upward towards their boss, while the outside perspective is not adequately taken into consideration.

[248] Hörrmann and Tiby 1991 page 76

[249] Hammer M., Champy J. 2006 page 31

[250] Hinterhuber 1995 page 64

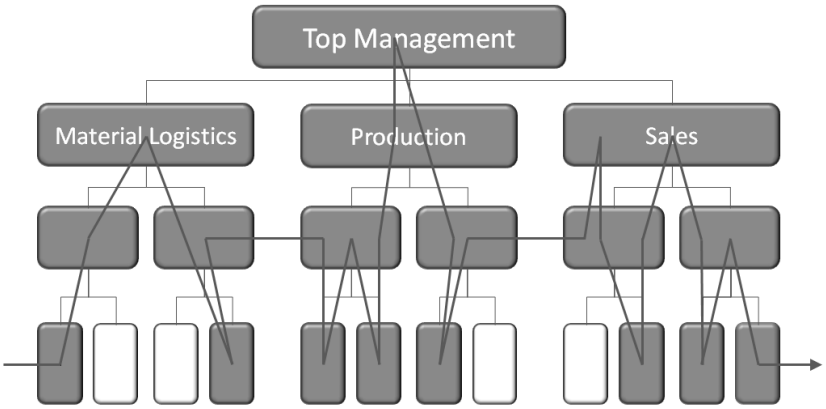

Figure 17: Process flow in structural organizations

Another problem occurring due to functionally organizing firms is the increase of interfaces for getting work done. With a growing number of interfaces coordination efforts increase; this usually also results in a loss of time and information.[251] In general, a poor communication between departments is a numerously stated point of criticism of functional organizations.[252]

Additionally, improper organizational responsibilities and alignments between the interfaces can lead to situations of irresponsibility,[253] the passing over of responsibility of one organizational unit to another as well as the creation of unneeded outputs. [254]

A poor customer orientation is another problem which occurs in traditionally, or silo oriented organizations. They are usually focused on fulfilling their internal targets, which are rarely aligned to all customer needs. They do not often think about collaborating with other organizational units or departments, and the intra-departmental harmonization and information is often missing.[255] In order to overcome these disadvantages of traditional organizations the concept of process orientation is a promising approach.

[251] Osterloh M., Wübker S. 1999 page 18

[252] Osterloh M., Wübker S. 1999 page 22, Braganza A., Korac-Kakabadse N.2000 page 47

[253] Osterloh M., Wübker S. 1999 page 18

[254] Suter A. 2004 pages 13,14

[255] Gulati R. 2007 page 93 ff. and Hammer M., Champy J. page 31

3.3 Process Orientation

This chapter introduces the basis about the concept of Process Orientation (PO) and further terminology which is used in the same context. The concept of process orientation is of interest for this thesis because it potentially delivers a valuable basis for the utilization and management of synergies. Thus, this chapter is the second scientific foundation for the design of a process oriented synergy management.

3.3.1 Business Process

The term *business process*, which is also referred to as *process*[256], is widely used in the scientific context as well as in daily life (e.g. delivery process). Processes always were and still are an integral part of every company[257] even though they were not always specifically entitled as such. However, the term process was used in different context during the last few years. In the business context there is also no common understanding about the definition of a process.[258] The most essential definitions are:

Hammer and Champy define a business process as "a collection of activities that takes one or more kinds of input and creates an output that is of value to the customer".[259] Whereas "the difference between task and process is the difference between part and whole. A task is a unit of work, a business activity normally performed by one person. A process in contrast, is a related group of tasks that together crate a result of value to a customer."[260]

Davenport and Short[261] define two important characteristics of processes that: i) a process has customers who receive a defined outcome and ii) processes usually are cross-organizational, meaning that they usually do not holistically take place in one organizational unit.

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[256] The terms process and business process are used as synonyms in this thesis.

[257] Armistead C., Rowland P. 1996 page 31

[258] Suter A. 2004 page 83

[259] Hammer M., Champy J. 2006 page 38

[260] Hammer M. 1996 page 5

[261] Davenport T.H., Short J.E. 1990 page 12

Suter[262] defines that a business process is customer oriented, value-adding and has a determined responsibility. A business process represents a modular platform containing everything that is needed to finish an order.

The definition used in this thesis is in alignment with those mentioned above:

"A process creates value to the customer by converting an input to a customer oriented output; it has an end-to-end responsibility and its activities can be cross-functional and thus independent from the organizational structure."

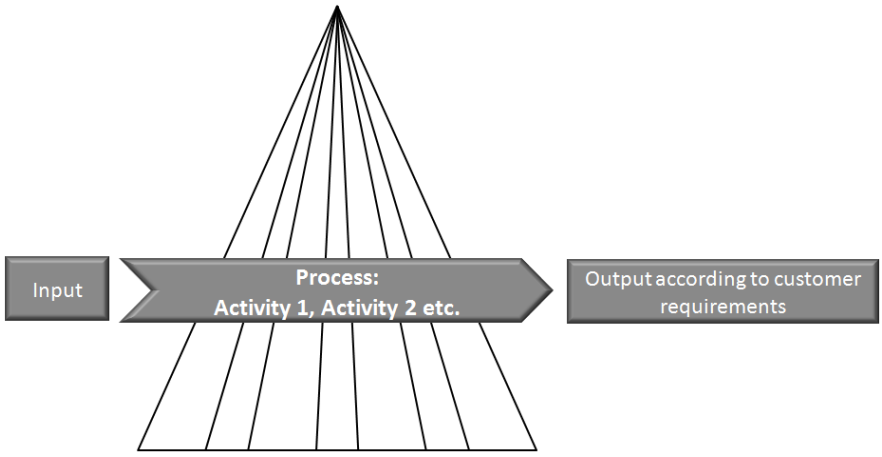

Figure 18: Process: customer oriented and end-to-end

3.3.2 Business Process Reengineering

Even though, business process reengineering (BPR) is not a focal point of this thesis, its high relatedness with process orientation requires a brief introduction of this concept. BPR was first introduced by Hammer and Champy in their book "Reengineering the Corporation", published in 1993, which is highly based on process orientation.

According to Hammer and Champy reengineering "is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed."[263] "Reengineering takes nothing for granted. It ignores what is and concentrates on what should be. […] Reengineering is about business reinvention – not business improvement, business enhancement, or business modification."[264] Additionally

[262] Suter A. 2004 page 83

[263] Hammer M., Champy J. 2006 page 35

[264] Hammer M., Champy J. 2006 page 36

Hammer underlines the value of BPR by stating that "Few executives question the idea that redesigning business processes – work that runs from end-to-end across an enterprise – can lead to dramatic enhancements in performance. This is enabling organizations to deliver greater value to customers in ways which also generate higher profits for shareholders."[265]

Other authors differentiate in BPR between i) process simplification and ii) fundamental process reengineering.[266] The first refers to incremental process improvements, which is contrary to Hammer and Champy's definition. The second definition correlates with Hammer and Champy's definition involving radical change as a main characteristic. In Hammer and Champy's definition there is a clear distinction between BPR and incremental change which is assigned to quality programs such as total quality management (TQM). Even though BPR and TQM focus on processes and the customer perspective both differ fundamentally in the starting point. TQM continually improves existent processes, while BPR replaces processes with new ones.[267] All authors have in common that they perceive BPR as a single project and not as an approach or method how to manage a company. Synergy implementation and realization projects can result in incremental as well as radical change, depending on the scope of the project. Thus, BPR findings which are of relevance for the implementation phase can accordingly be used for synergy projects.[268]

The connection of BPR with process orientation (PO) and therewith with this thesis is given by the emphasis on processes in BPR, according to Hammer and Champy it is "[process is] the most important word in our definition (of BPR)."[269] Or "The core message of this book, then, is this: It is no longer necessary or desirable for companies to organize their work around Adam Smith's division of labor. Task oriented jobs in today's world of customers, competition, and change are obsolete. Instead companies must organize work around processes."[270]

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[265] Hammer M. 2007 page 1

[266] Coulson-Thomas C. 1995 page 3 ff and Childe et al. 1994 page 28

[267] Hammer M., Champy J. 2006 page 52

[268] Such findings are introduced in chapters 2.4 and 2.6.

[269] Hammer M., Champy J. 2006 page 37

[270] Hammer M., Champy J. 2006 page 31

3.3.3 Process Orientation

The concept of *Business Process Orientation* (BPO) or *process orientation* (PO) is based on the work of Deming,[271] Porter,[272] Davenport and Short,[273] and Hammer.[274] Process oriented firms focus on processes ranging from end-to-end[275] or from customer to customer instead of only considering functional structures and focusing on the customer.[276]

Process orientation is usually used as an additional perspective for organizing firms. Hence, the structural organization is supplemented, but not substituted by process orientation. Process orientation in this understanding is the basis for business process management.

3.3.4 Business Process Management

Business process management takes process orientation to the next stage by managing processes according to the process orientation inherent principles. "Process management seeks to improve processes continuously so that the products and services meet the ever-changing expectations of the internal and external customers."[277] And "Business process management does not only incorporate the discovery, design, deployment and execution of business processes, but also interaction, control, analysis and optimization of processes."[278]

Business process management starts with the design of processes, and accordingly leads the responsibility for the designed processes over to the so-called process owner who from then on manages the processes. The essentials which need to be taken into consideration are presented in this subchapter. Due to its central importance for this thesis the process owner role is introduced in chapter 3.3.5 which sums up all essential principles of business process orientation.

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[271] Walton M. 1986

[272] Porter M. 2004

[273] Davenport T.H., Short J.E. 1990

[274] Hammer M. 2006

[275] BMW PRIME 2012 page 6

[276] Reijers 2006 page 392

[277] Hinterhuber H. 1995 page 70

[278] Smith H., Fingar P. 2002 page 89

For the first stage of BPM, the design of the processes, Hammer and Hershman, suggest the following procedure:[279]

i. Get organized
ii. Get oriented
iii. Get crazy
iv. Get real

i. The first step of *getting organized* is about mobilization and bringing together the people needed for the process design. This task should be done by a team consisting of insiders and outsiders of the process, instead of an individual. It is recommended that a team consists of seven (±2) team members. This approach gives support in finding a range of different ideas, evaluating and critiquing them to find the best solution for the process design. "Thinking different", which means focusing on the big picture while being able to talk about details, and analytical thinking are important prerequisites of the team members for achieving good results.

ii. *Getting oriented* is about understanding the actual process and how well it meets the customer needs. In this step the focus lies on the customer's relationship and their actual needs; thus the process is to be adapted around the customer.

iii. In the third step, *get crazy*, the team gets creative, thinks outside the box and argues how the seven principles of process design can be utilized optimally for designing the optimal process. For proving the success of the redesign of the process the new design should be simulated with all parties involved in the process taking part. This way, necessary changes can be implemented simultaneously.

iv. Finally, the new process design is implemented in the real world. However, depending on the complexity and the extent of the process, the implementation should include a final pilot test carried out to check in the real world if any additional process changes are needed. After the process is implemented the measurement of key process metrics remains important for deriving further optimization potentials of the process.

This procedure is of importance for this thesis, because it can additionally be applied for the identification of synergies[280] in the first turn.

For designing processes Hammer and Hershman identified seven principles on which process design should focus:[281]

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[279] Hammer M., Hershman L. 2010 page 56 ff.

Details below according to Hammer, Hershman

[280] The identification of synergies is introduced in chapter 5.3

i. *What* tasks are performed
ii. *Whether* they should be performed and under what circumstances
iii. *How precisely* they are performed
iv. *What* information they employ
v. *When* they are performed
vi. *Who* performs them
vii. *Where* they are performed

i. What tasks need to be performed for delivering the output the customer requires, is the central question of process design: It supports the question if the process includes all details for which the customer is willing to pay.

ii. The principle to ask *whether* and *under what circumstances* something needs to be done differentiates in value-adding and non-value-adding processes. Only for the value-adding processes the customer is willing to pay money for. This principle supports the company in eliminating unneeded process steps or tasks which do not add value to the process and in questioning under what circumstances which process steps need to be performed.[282]

iii. *How precisely* a process is to be performed is related to the question asked before. This question is of importance because the right level of detail can save costs: The tasks can be performed less thoroughly when this is sufficient, or, in the contrary, the specific steps can be performed more thoroughly and precisely when it is necessary.

iv. Since information is of relevance for a good process performance, the question what information has to be employed is of interest for the design of processes. Especially in times where most companies have a lot of data, the awareness of what information is needed for the process for operating well is valuable.

v. Processes consist of subprocesses, activities and tasks. The order *when* they are performed can have an impact on the overall process performance. Steps can be moved to a preceding or subsequent stage, previously sequenced activities can be performed simultaneously, and the relative order of certain activities can be changed.

vi. vii. Processes are performed in functionally organized firms by individual employees. This practice often results in mistakes by customizing processes around specific persons or departments which are additionally locally determined. For this reason it is important to ask *who* should perform the process and *where* this should happen. The first question should focus on the skills needed for the process. The second one determines where it makes sense to execute the process.

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[281] Hammer M., Hershman L. 2012 page 34 ff.

[282] Compare also the principle of process segmentation in chapter 3.3.5

In addition to the seven principles of process design, Hammer and Hershman introduce the do's and don'ts of process design which are:[283]

- Do take time to understand the process you are redesigning. One very good way to do that is to "attach" yourself to an order or to a facet of the process and follow it from beginning to end.
- Do document the existing process in a "swim lane" format, depicting a different horizontal row or vertical column for each department that has an effect on the process, so that you can see graphically how many times the process is handled off (and back) to various departments.
- Do prepare the design team and the organization for the inevitable mistakes that will occur in the redesign of a process. No one ever creates a perfect design the first time.
- Do use different design teams for each design and ensure that about two-thirds of the team consists of outsiders with no role in the process.
- Do team members know in advance that they may move from the core of the team to an advisory capacity so that they will feel free to move and you will be in a position to move them without bad feelings.
- Do communicate openly and widely throughout the organization about what the design team is doing, to head of rumors and gossip and to ensure that team members feel comfortable being away from their usual jobs and applying all their efforts to the redesign.
- Don't overanalyze the process and become immersed in analysis paralysis that delays the redesign effort and the result it needs to achieve.
- Don't design the new process in the swim lane format that you used to depict the old process. That will put the focus on silo organizations rather than on the work that needs to be done and who the right person is to do it.
- Don't skip the simulation and pilot phase of the new design because that is the best time to uncover mistakes in a safe environment.
- Don't put more than nine people on the design team, or fewer than five, to ensure that the design team doesn't become bogged down ant that it benefits from a diversity of thoughts and viewpoints.
- Don't allow the new process to look like the old process it is replacing or you will wind up making only marginal improvements that will produce disappointing results and discourage further process work.
- Don't forget to have a reentry plan for the design team members so that they won't be fearful of devoting their entire effort to the redesign rather than trying to work part-time on it as well as their old job.

[283] Hammer M., Hershman L. 2010 page 63 ff.

For the performers and infrastructure Hammer and Hershman suggest the following do's and don'ts:[284]

- Do include the input of those who will be performing the process by including some of them on the design team.
- Do create new training and development plans for the new roles in the process to alleviate fears among people whose performance measures will change.
- Do redesign the process first and then evaluate how technology can further enhance the process performance.
- Do ensure that new metrics are aligned with compensation and reward to prevent confusion among the performers.
- Don't allow the boundaries of departments and budgets to prevent you from creating the right combination of activities or from having the right people perform the tasks in the new process.
- Don't run the simulation or the pilot test of the new process without also testing the new performer roles, compensation, reporting structure, and other changes.
- Don't allow the technology to dictate the process.
- Don't evaluate performance without asking performers, the process owner, and the functional managers to provide input.

The dos and don'ts of governance and expertise in process orientation are:[285]

- Do include all process owners for core, governing, and enabling processes in the initial governance structure so that they all understand how the process being redesigned will affect their processes.
- Do establish "rules of engagement" to foster rational and unemotional discussions of difficult issues when they arise.
- Do create a training curriculum for process experts that includes instruction in change management, negotiation skills, communication skills, and problem solving.
- Don't overdesign or overengineer the governance structure in a way that makes it look like another bureaucracy instead of value-adding structure to enhance business design.
- Don't overlook other governance structures in the organization that can provide support and resources.
- Don't forget functional managers as part of the governance structure and process.

[284] Hammer M., Hershman L. 2010 page 150

[285] Hammer M., Hershman L. 2010 page 214

- Don’t create a permanent team of experts that loses touch with the day-to-day reality of operating the company.

As the general procedure for designing processes the do’s and don’ts for process design are also adaptable for the application in synergy identification. Besides the introduction of the findings mentioned above Michael Hammer developed a holistic maturity model which is able to derive a business process management maturity level dependent on which elements of BPO are already implemented in the organization. This maturity model consists of the central elements i) design, ii) performers, iii) owner, iv) infrastructure, v) metrics, vi) leadership, vii) culture, viii) expertise and ix) governance; all of which include statements on different maturity levels and contribute to the process maturity. The process maturity level model is shown on the next pages:[286]

[286] Hammer M., Hershman L. 2012 pages 289 ff.

		P-1	P-2
DESIGN	**Purpose**	The process has not been designed on an end-to-end basis. Functional managers use the legacy design primarily as a context for functional performance improvement.	The process has been redesigned from end to end in order to optimize its performance.
	Context	The process's inputs, outputs, suppliers, and customers have been identified.	The needs of the process's customers are known and agreed upon.
	Documentation	The documentation of the process is primarily functional, but it identifies the interconnections among the organizations involved in executing the process.	There is end-to-end documentation of the process design.
PERFORMERS	**Knowledge**	Performers can name the process they execute and identify the key metrics of its performance.	Performers can describe the process's overall flow; how their work affects customers, other employees in the process, and the process's performance; and the required and actual performance levels.
	Skills	Performers are skilled in problem solving and process-improvement techniques.	Performers are skilled in teamwork and self-management.
	Behavior	Performers have some allegiance to the process, but owe primarily allegiance to their function.	Performers try to follow the process design, perform it correctly, and work in ways that will enable other people who execute the process to do their work effectively.
OWNER	**Identity**	The process owner is an individual or a group informally charged with improving the process's performance.	Enterprise leadership has created an official process-owner role and has filled the position with a senior manager who has clout and credibility.
	Activities	The process owner identifies and documents he process, communicates it to all the performers, and sponsors small-scale change projects.	The process owner articulates the process's performance goals and a vision of its future; sponsors redesign and improvement efforts; plans their implementation; and ensure compliance with the process design.
	Authority	The process owner lobbies for the process but can only encourage functional managers to make changes.	The process owner can convene a process redesign team and implement the new design and has some control over the technology budget for the process.
INFRA-STRUCTURE	**Information Systems**	Fragmented legacy IT systems support the process.	An IT system constructed from functional components supports the process.
	Human Resource Systems	Functional manager reward the attainment of functional excellence and the resolution of functional problems in a process context.	The process's design drives role definitions, job descriptions, and competency profiles. Job training is based on process documentation.
METRICS	**Definition**	The process has some basic cost and quality metrics.	The process has end-to-end process metrics derived from customer requirements.
	Uses	Managers see the process's metrics to track its performance, identify root causes of faulty performance, and drive functional improvements.	Managers use the process's metrics to compare its performance to bench-marks, best-in-class performance, and customer needs and to set performance targets.

P-3	P-4	P-1	P-2	P-3	P-4
The process has been designed to fit with other enterprise processes and with the enterprise's IT systems in order to optimize the enterprise's performance.	The process has been designed to fit with customer and supplier processes in order to optimize interenterprise performance.				
The process owner and the owners of the other processes with which the process interfaces have established mutual performance expectations.	The process owner and the owners of customer and supplier processes with which the process interfaces have established mutual performance expectations.				
The process documentation describes the process's interfaces with, and expectations of, other processes and links to process to the enterprise's system and data architecture.	An electronic representation of the process design supports its performance and management and allows analysis of environmental chances and process reconfigurations.				
Performers are familiar both with fundamental business concepts and with the drivers of enterprise performance and can describe how their work affects other processes and the enterprise's performance.	Performers are familiar with the enterprise's industry and its trends and can describe how their work affects interenterprise performance.				
Performers are skilled at business decision making.	Performers are skilled at change management and change implementation.				
Performers strive to ensure that the process delivers the results needed to achieve the enterprise's goal.	Performers look for signs that the process should change, and they propose improvements to the process.				
The process comes first for the owner in terms of time allocation, mind share, and personal goals.	The process owner is a member of the enterprise's senior-most decision-making body.				
The process owner works with other process owners to integrate processes to achieve the enterprise's goals.	The process owner develops a rolling strategic plan for the process, participates in enterprise-level strategic planning, and collaborates with his or her counterparts working for customers and suppliers to sponsor interenterprise process redesign initiatives.				
The process owner controls the IT systems that support the process and any projects that change the process and has some influence over personnel assignments and evaluations as well as the process's budget.	The process owner controls the process's budget and exerts strong influence over personnel assignments and evaluations.				
An integrated IT system, designed with the process in mind and adhering to enterprise standards, supports the process.	An IT system with modular architecture that adheres to industry standards for interenterprise communication supports the process.				
Hiring, development, reward, and recognition systems emphasize the process's needs and results and balance them against the enterprise's needs.	Hiring, development, reward, and recognition systems reinforce the importance of intra- and interenterprise collaboration, personal learning, and organizational change.				
The process's metrics as well as cross-process metrics have been derived from the enterprise's strategic goals.	The process's metrics have been derived from interenterprise goals.				
Managers present the metrics to process performers for awareness and motivation. They use dashboards based on the metrics for day-to-day management of the process.	Manager regularly review and refresh the process metrics and targets and use them in strategic planning.				

		E-1	E-2
LEADERSHIP	**Awareness**	The enterprise's senior executive team recognizes the need to improve operational performance but has only a limited understanding of the power of business processes.	At least one senior executive deeply understands the business process concept, how the enterprise can use it to improve performance, and what is involved in implementing it.
	Alignment	The leadership of the process program lies in the middle management ranks.	A senior executive has taken leadership of, and responsibility for, the process program.
	Behavior	A senior executive endorses and invests in operational improvement.	A senior executive has publicly set stretch performance goals in customer terms and is prepared to commit resources, make deep changes, and remove roadblocks in order to achieve those goals.
	Style	The senior executive team has started shifting from a top-down, hierarchical style to an open, collaborative style.	The senior executive team leading the process program is passionate about the need to change and about process as the key tool for change.
CULTURE	**Teamwork**	Teamwork is project focused, occasional, and atypical.	The enterprise commonly uses cross-functional project teams for improvement efforts.
	Customer focus	There is a widespread belief that customer focus is important, but there is limited appreciation of what that means. There is also uncertainty and conflict about how to meet customer needs.	Employees realize that the purpose of their work is to deliver extraordinary customer value.
	Responsibility	Accountability for results rests with managers.	Frontline personnel begin to take ownership of results.
	Attitude toward change	There is growing acceptance in the enterprise about the need to make modest change.	Employees are prepared for significant change in how work is performed.
EXPERTISE	**People**	A small group of people has a deep appreciation for the power of processes.	A cadre of experts has skills in process redesign and implementation, project management, communications, and change management.
	Methodology	The enterprise uses one or more methodologies for solving execution programs and making incremental process improvements.	Process redesign teams have access to a basic methodology for process redesign.
GOVERNANCE	**Process model**	The enterprise has identified some business processes.	The enterprise has developed a complete enterprise process model, and the senior executive team has accepted it.
	Accountability	Functional managers are responsible for performance, project managers for improvement projects.	The process owners have accountability for individual processes, and a steering committee is responsible for the enterprise's overall progress with processes.
	Integration	One or more groups advocate and support possibly distinct operational improvement techniques.	An informal coordinating body provides needed program management while a steering committee allocates resources for process redesign projects.

E-3	E-4	E-1	E-2	E-3	E-4
The senior executive team views the enterprise in process terms and has developed a vision of the enterprise and its processes.	The senior executive team sees its own work in process terms and perceives process management not as a project but as a way of managing the business.				
There is strong alignment in the senior executive team regarding the process program. There is also a network of people throughout the enterprise helping to promote process efforts.	People throughout the enterprise exhibit enthusiasm for process management and play leadership roles in process efforts.				
Senior executives operate as a team, manage the enterprise through its processes, and are actively engaged in the process program.	The members of the senior executive team perform their own work as processes, center strategic planning on processes, and develop new business opportunities based on high-performance processes.				
The senior executive team has delegated control and authority to process owners and process performers.	The senior executive team exercises leadership through vision and influence rather than command control.				
Teamwork is the norm among process performers and is commonplace among managers.	Teamwork with customers and suppliers is commonplace.				
Employees understand that customers demand uniform excellence and a seamless experience.	Employees focus on collaborating with trading partners to meet the needs of final customers.				
Employees feel accountable for enterprise results.	Employees feel a sense of mission in serving customers and achieving ever-better performance.				
Employees are ready for major multidimensional change.	Employees recognize change as inevitable and embrace it as a regular phenomenon.				
A cadre of experts has skills in large-scale change management and enterprise transformation.	Substantial numbers of people with skills in process redesign and implementation, project management, program management, and change management are present across the enterprise. A formal process for developing and maintaining that skill base is also in place.				
The enterprise has developed and standardized a formal process for process redesign and has integrated it with a standard process for process improvement.	Process management and redesign have become core competencies and are embedded in a formal system that includes environment scanning, change planning, implementation, and process-centered innovation.				
The enterprise process model has been communicated throughout the enterprise, is used to drive project prioritization, and is linked to enterprise-level technologies and data architectures.	The enterprise has extended its process model to connect with those of customers and suppliers. It also uses the model in strategy development.				
The process owners share accountability for the enterprise's performance.	A process council operates as the senior-most management body; performers share accountability for enterprise performance and the enterprise has established steering committees with customers and suppliers to drive interenterprise process change.				
A formal program management office, headed by a chief process officer, coordinates and integrates all process projects, and a process council manages interprocess integration issues. The enterprise manages and deploys all process-improvement techniques and tools in an integrate manner.	An informal coordinating body provides needed program management while a steering committee allocates resources for process redesign projects.				

Table 13: Process and Enterprise Maturity Model

Even though the process orientation maturity model was designed to determine the maturity of process orientation, an adapted model can be used to determine the synergy maturity. When synergy management is regarded as an element of business process orientation, synergies can even be regarded as the tenth element of the maturity of processes.

After the introduction of business process management in general one specific element, business process measures, is introduced in the following subchapter.

3.3.4.1 Business Process Measures

Business process measures are an integral part of business process management and are of importance because usually key process indicators (KPI) need to be adapted after process orientation was implemented. The reason is that standard KPI in non-process oriented organizations do usually not reflect the entire end-to-end process but only fractions of it. Thus, an adaption or new design of process KPI is needed.

For a successful definition of process KPI Hammer and Hershman introduced seven deadly sins, which must be avoided when defining business process measures:[287]

- Vanity
- Provincialism
- Narcissism
- Laziness
- Pettiness
- Inanity
- Frivolity

Vanity as a failure in performance measurement refers to the method where measures are used for making the organization, or single persons, look good. In this case target measures are defined based on what the organization can accomplish at a given time in order to meet the target, instead of measuring against the customer needs. Even though the second measure would be suitable, it includes the risk that the target could not be met in the short term, thus reflecting discredit on the management.

Provincialism is the reflection of organizational boundaries in performance metrics. This approach is usually selected to reflect the manager's performance in the area he can influence directly. However, it also leads to narrowing down targets, while not reflecting the overall picture and accordingly creating suboptimal decisions and conflicts in the end-to-end process.

[287] Hammer M., Hershman L. 2010 page 68 ff.

Narcissism is the ignorance of the customer perspective for the benefit of the personal point of view which is reflected in the performance measures.

Laziness in performance measurement is the assumption that the right indicators are measured without making an adequate effort or considering all aspects thoroughly. Especially in business process management the measures have to be well considered because they are often completely different compared to the usual KPI.

Pettiness is the consideration of only a small component of what matters. This effect is a remnant of the departmental-based KPI definition which does not necessarily reflect the overall process but rather a part of it. Additionally, it refers to the need of reflecting mutual dependencies between single process measures.

Inanity describes the missing consideration of the effects of business metrics on human behavior. People usually seek to improve the metrics they are measured against. By doing so, their behavior can sometimes be contra-productive to the overall goal of the organization. Thus not only the direct effect the measure aims to have on needs is to be considered, but also side effects which might be initiated.

Frivolity describes the effect when measures are not taken seriously. Features of that behavior are, for instance, arguing about metrics, finding excuses for poor performance, or finding ways to blame others for one's own poor performance.

In addition to the seven sins of business measures Hammer and Hershman, introduced the following do's and don'ts which should be taken into consideration when defining process measures:[288]

- Do examine the behaviors that your current metrics are driving to determine if they are counter to the results you are trying to achieve.
- Do balance voice-of-the-customer and voice-of-the-business to ensure that the process meets the needs of both the customer and the enterprise.
- Do review your metrics regularly and adjust them when necessary to reflect changing conditions in the economy, your customer base, and your business outlook.
- Do create alignment between your enterprises key performance indicators and your process metrics.
- Do keep appropriate functional measures but ensure that process metrics take priority over departmental metrics.
- Don't settle for using only metrics that your IT system can capture instead of the metrics that really matter, even if you have to capture them manually.

[288] Hammer M., Hershman L. 2010 page 96

- Don't have so many metrics that you are data rich and information poor. Instead, focus only on those metrics that truly drive the voice-of-the-customer and voice-of-the-business results you seek.
- Don't allow people to keep metrics and targets that they were comfortable achieving but that are wrong measures.
- Don't align your metrics to departments. Align them to the process, and ensure that all the departments that support the process have the right metrics.

These advices on how process measures should be defined are valuable for the definition of synergy KPI. Synergy KPI also need an additional perspective in the target system, as process KPI do. In addition the definition of synergy KPI is supported by the cross-functional character of process KPI. [289] After the basics about business process management and measures were introduced, the essential principles of process orientation are presented in the following chapter.

3.3.5 Essential Principles of Business Process Orientation

This chapter deals with the essential principles of business process orientation (BPO), which are important for the general understanding of process orientation and for further elaborations made in the following chapters which are based on those principles. The most important principles of BPO are:

i. Principal-agent relationship
ii. End-to-end responsibility or process ownership
iii. Makrodesign and microdesign
iv. Cascading
v. Segmentation
vi. Modularization
vii. Horizontal integration

i. The *principal-agent relationship* regulates the interfaces between hierarchical structured processes.[290] The figure below depicts the principles of this relationship. The objective is a clear understanding on both sides, on which output needs to be delivered to the customer. The principal process x specifies the demand, including details such as constraints, volumes, delivery time, and quality. The agent, process y, decides how this outcome will be provided. For this reason all competencies and resources for the order fulfillment need to be located in process y.

[289] As chapter 4 will determine the principles of process orientation and synergy support each other.

[290] Suter A. page 20 ff.

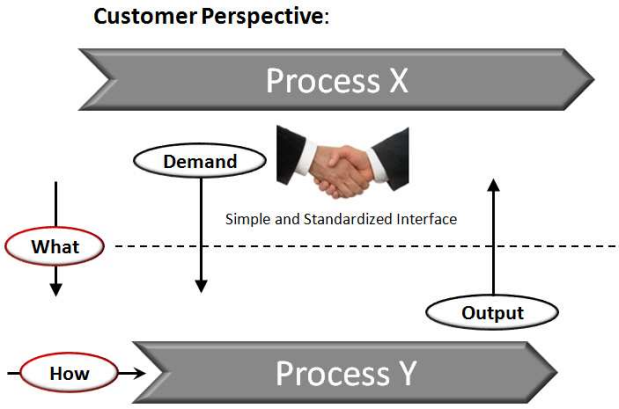

Figure 19: Customer perspective of processes

ii. *End-to-end responsibility* or process ownership means that there is one person who is accountable for the delivery of the required output of the process as well as for the process itself.[291] "In the broadest sense, the process owner does process design or redesign, handles operational planning for the process, leads improvement initiatives, and solves problems with the process […]"[292] Because of its central importance for process orientation as well as synergy management this principle is explained in detail.

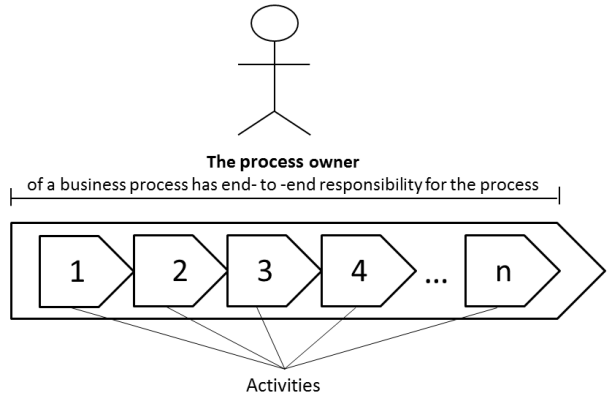

Figure 20: End-to-end responsibility[293]

According to Hammer, the process owner's responsibilities and authorities are[294]:

[291] Hammer M., Hershman L. 2010 pages 118 ff. and Suter A. 2004 page 20 ff.

[292] Hammer M., Hershman L. 2010 page 118

[293] Schantin D. 2004 pages 44 ff.

[294] Hammer M., Hershman L. 2010 page 118 ff.

- To be accountable for the design of the process, for ensuring its successful execution, and for its continuous improvement
- To design, document, publish, and develop training content, supporting tools, and/or templates for the process
- To identify and monitor metrics against which process performance can be measured
- To use metrics and audit results to evaluate compliance and continuously improve the process
- To understand relevant internal and external benchmarks and use them to identify and drive process improvements
- To ensure that all process participants understand their role and how they fit into the end-to-end design
- To identify, prioritize, and govern changes to the process
- To establish and evaluate metrics to monitor the health of the process
- To evaluate external benchmarks
- To ensure adherence of the organization to the process
- To resolve issues within the process to help ensure that the process executes as designed

In accordance with Hammer and Hershman, the process ownership dos and don'ts are:[295]

- Do have the leadership sanction, legitimize, and announce the creation of the process owner role and the authority it will have
- Do select leaders for the role of process owner who are influential in the organization, with not only a span of control but also a span of influence
- Do give the process owner full authority over the design, including choosing the design team and setting the performance targets
- Do ensure that the metrics used to evaluate the process owner's performance are aligned with the corporate key performance indicators and are balanced between the voice of the customer and voice of the business.
- Don't allow the process owner to delegate the role to subprocess owners or direct reports
- Don't assume that the process owner role has to be full-time and be reflected as a new position on the organizational chart, although that is an option
- Don't forget that the functional managers own the resources and therefore are critical to the implementation of the process owner's design and should not be neglected

[295] Hammer M., Hershman L. 2010 page 120

- Don't forget to align the functional manager's metrics with the process owner's metrics to ensure they are closely integrated for optimal performance
- Don't simply keep the same structure and call functional managers process owners

For ensuring a proper support of the process owner role Hammer suggests the following senior management's obligations:[296]

- To position process ownership as a senior role in the organization
- To fill the process owner position with a powerful and respected individual
- To provide process owners with the full support of top management
- To help the process owner adapt to a new style of managing
- To be absolutely clear about the relationships and divisions of responsibilities and authority between process owners and operating managers
- To give process owners real power and tools for wielding their authority

iii. The next essential principle of process orientation is *makrodesign* and *microdesign* which are two phases with a different level of detail in reengineering projects suggested by Suter. These two aligned phases describe the corporate design.[297] The Makrodesign maps all corporation-wide processes as well as its internal and external interfaces. The main objective is to illustrate the value stream independently from the organizational structure and, based upon that, to derive improvement activities to minimize improper interfaces, unneeded processes and non-value-adding coordination procedures. Hence, it is the makrodesign, where radical changes are made; the microdesign is responsible for incremental changes.

Microdesign is the optimization of a dedicated business process where, amongst others, the quantitative and qualitative resources are defined. Usually these projects are initiated by departments; thus a comprehensive coordination is needed for synchronizing different projects and ensuring aligned goals.[298] The set-up should optimally be done by the superordinated Makrodesign team.

iv. The next important principle of business process orientation is *cascading* which supports the organization of processes. Cascading allows for outsourcing subprocesses to other business processes, thus enabling a performance-based specialization. By doing so the principal-agent relationship comes into effect. Even though the subprocess is delegated to another party, the overall responsibility remains within the superior process

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[296] Hammer M., Hershman L. 2010 page 120

[297] Suter A. 2004 pages 25 ff.

[298] Contradictions are rarely detected on a lower level, such as the departmental level.

which controls the progress of the subprocess. The principle of cascading is shown in the figure below.

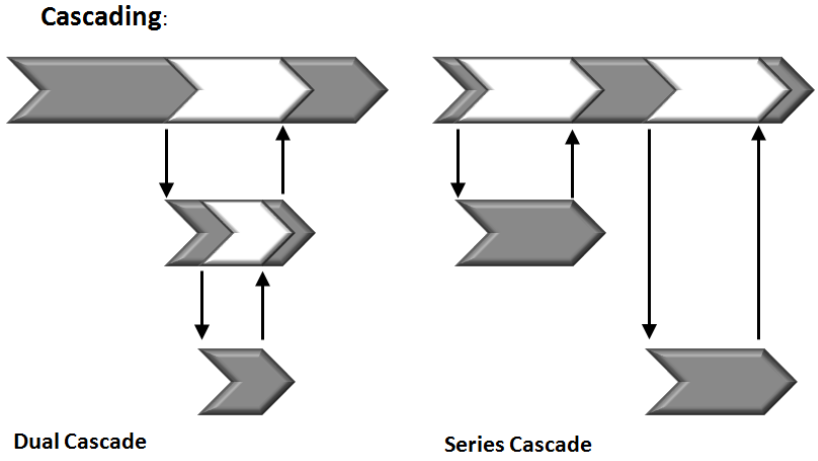

Figure 21: Cascading of processes[299]

According to Suter, the characteristics of a real process cascade are:[300]

- Simple and clear interface between principal and agent
- (Partial) autonomy of the principal cascade with an end-to-end responsibility for one's own output
- Integration of planning, controlling and realization of the business process
- Manageable entities with simple measures

Whereas characteristics of unreal process cascades are: [301]

- Difficult formulation of demand
- Unclear and inefficient interfaces between principal and agent
- Complex responsibility delegation
- Organizational separation between controlling and realization
- No autonomy and resource pool
- High degree of coordination and intervention
- Rather large and complex entities

v. *Segmentation*, as the next process orientation principle, is also an organizational principle which supports the design of process oriented companies by differentiating

[299] Suter A. 2004 page 118 ff.

[300] Suter A. 2004 page 125 ff.

[301] Suter A. 2004 page 125 ff.

business processes by the customer needs. Process segments are designed when a standard process is not able to account for all customer needs. This segment has to contain all activities of the business process and must not be designed as an unreal process cascade. The principle is shown below.

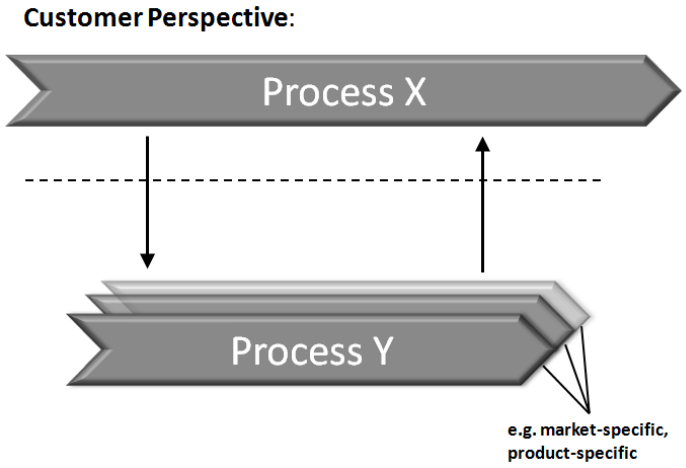

Figure 22: Segmentation of processes[302]

According to Suter, external factors of a business process which may require process segmentation are:[303]

- Market- and customer segments which account for volumes, sourcing behavior and other sales critical factors
- Product segments which account for different functional needs and consider price ranges of products
- Distribution channels
- Competition sensitivity
- Geographical reasons

Internal factors which might require process segments are:[304]

- Process complexity which has an effect on the difficulty level, the realization- and procedural complexity, routinization and automatization of the process
- Order variance which accounts for the size- and time limits of the order
- Technologies and procedures
- Production- and logistical locations

[302] Suter A. 2004 page 128 ff.

[303] Suter A. 2004 page 130

[304] Suter A. 2004 page 130

- Third party involvement

vi. Another principle which is closely connected to segmentation and cascading is *modularization*.[305] In architecture a structure is modular if a loose linkage is given between single parts of a whole component which enable the entity to follow its function. Modular architectures enhance the flexibility and support the utilization of economies of scale; still customized solutions are possible. The principle is applicable for products, allowance in kind, services and information technology. Thus product, process and resource modules are realizable. The central idea is the reutilization of the same modules for the same or for different application in various areas. The reason why process segmentation and cascading is related to modularization is that both process segments as well as cascades can be designed as modules. Benefits of modular structures are learning- curve and volume effects.[306] The principle is shown below:

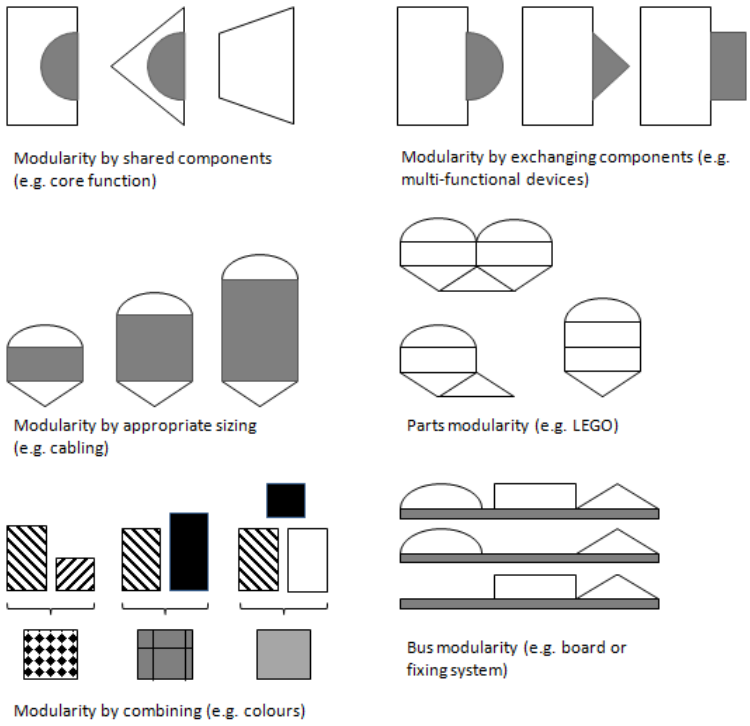

Figure 23: Types of modules[307]

[305] Suter A. 2004 pages 167 ff.

[306] Suter A. 2004 page 170

[307] Suter A. 2004 page 169

vii. *Horizontal integration* as a principle of process orientation supports the efficiency of the previously segmented and cascaded vertical processes.[308] Horizontal interfaces do not result from order interrelations, which have a vertical character, but they result from dependencies on resources or information of the horizontally separated processes. Such dependencies occur, for instance, if the knowledge about a prior process is of interest for a subsequent horizontal process, for example the information of the design phase of a product can be of value for the service, or vice versa. The principle of horizontal integration must not be confused with horizontal interrelationships defined by Michael Porter.[309] The principle is shown below:

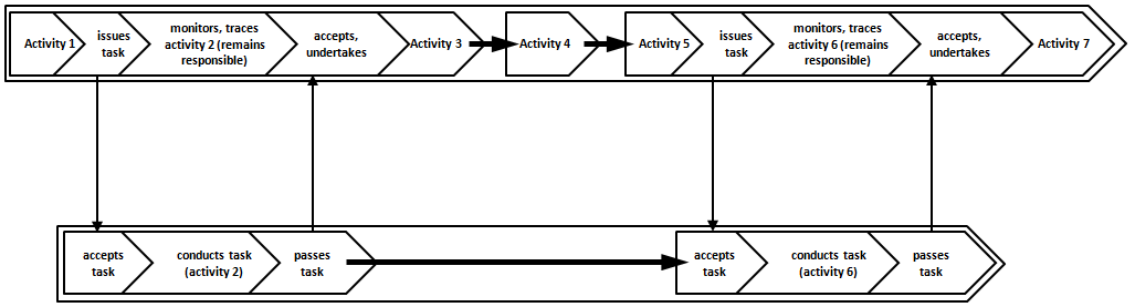

Figure 24: Horizontal integration

Resulting from these essential principles of process organization the following themes are often a result of BPM and hence of BPO: [310]

- Several jobs are combined into one
- Workers make decisions
- The steps in the process are performed in a natural order
- Processes have multiple versions
- Work is performed where it makes the most sense
- Checks and controls are reduced
- Reconciliation is minimized
- A case manager provides a single point of contact
- Hybrid centralized-decentralized operations are prevalent

Because interfaces and the handoffs of jobs from one department to another cause problems, the optimized solution is often a combination of several jobs within one job or one team. This approach enables a better end-to-end responsibility, minimizes coordination and administration efforts and needs less supervision.

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[308] Suter A. 2004 page 132 ff.

[309] Compare chapter 2.3.2

[310] Hammer M., Champy J. 2006 page 54 ff

Since reengineering compresses processes horizontally and employees become a part of the real work, the vertical hierarchy is also compressed. This goes hand in hand with an increased responsibility of the employees. The employee has a broader perspective which results in making autonomous decisions as a part of the work, instead of having supervising hierarchies which gather the information from different departments for making decisions.

Due to a broader process understanding and compressed responsibilities the steps in the process are performed in a natural order. Further advantages are that rework is reduced and processes can be run simultaneously.

Since BPR focuses on the customer and one-size-fits-all processes do often not meet the exact requirements of each customer, multiple versions are often a result of BPR projects. These process versions do not negatively influence the efficiency of the organization; quite the contrary, they optimize the work by making a difference in how much effort is needed for a specific process.

As traditionally organized firms do not account for processes, but specialties or functions in their organizational structure, work is not necessarily performed where it makes the most sense, but where the work is a functional part of. By changing the focus on processes work is often performed in different units than before: in those where it makes the most sense.[311]

Another benefit of process orientation is that non-value-adding work such as checking and control is reduced based on the increased responsibility and the end-to-end perspective.

Accompanied with the reduction of interfaces another form of non-value-adding performance is reduced: the minimization of reconciliation.

The existence of someone who Hammer and Champy refer to as the “case manager” supports reengineering by having a buffer between the process and the customer. The case manager takes over the role to understand the process as well as the customer needs in detail. In this way the company is able to optimize both the process and the satisfaction of the customer needs.

[311] Hammer M., Champy J. 2006 page 59, make an example where all pens of a company were ordered by the purchasing department. When an employee needed a pen he had to contact the purchasing department and the department ordered the pen for the employee. The process was changed in a way that the purchasing department negotiates the prices and accordingly lists the approved vendors. Each employee is able to order his or her own pen directly at the vendor.

According to Hammer and Champy firms that have reengineered their processes tend to make use of the advantages of centralization and decentralization in the same process. Process orientation makes use of central information systems which are available for each and every employee in decentralized regional businesses units which have their own responsibilities.

In summary, chapter 3.3 in general and this subchapter in particular have provided the essentials of process orientation which will be needed further on to elaborate if process orientation is a suitable approach to support the utilization of synergies. The following chapter starts with this elaboration by presenting the links between process orientation and synergies.

4 Links between Process Orientation and Synergies

4.1 Introduction and General Consideration

The previous chapters have introduced the concepts of synergies and process orientation. In this chapter the links between both concepts are discussed to derive if the concepts support each other and where they share commonalities.

The hypothesis which is of relevance for this chapter and accordingly for scientific problem four is defined as follows:

The principles of process orientation support the use of synergies; processes are regarded from end-to-end without referring to organizational boundaries which can negatively influence the use of synergies.

In order to derive the links between the concepts of process orientation and synergies, this chapter makes use of the main characteristics of both concepts and explains their mutual effects on each other. First, the effects of the basic principles of process orientation are examined regarding their effect on the synergetic effect in subchapter 4.2. The result is given in an overview which shows if these principles have a i) positive, ii) neutral or iii) negative effect on the exploitation of synergies (in general). Secondly, the effects of process orientation on the key influential factors on the utilization of synergies are examined in subchapter 4.3. This chapter gives an overview on how a specific influential factor is manipulated by process orientation i) positively, ii) neutrally or iii) negatively. After this comparison of the central characteristics of the respective concept on the other concept, shared commonalities between process orientation and the concept of synergy are elaborated in subchapter 4.4. The findings of this chapter are based on the experience gained in the case studies which are accordingly supplemented by examples from the field.

4.2 How the Main Principles of Process Orientation Affect Synergies

The question - how the main principles of process orientation affect synergies - is of interest for deriving the first potential links between both concepts. It gives an outlook how PO can support or hinder the utilization of synergies. This understanding is of interest for classifying the role of PO in SM; it is examined whether it is possible to use PO as a supportive approach to make use of synergies and which constraints need to be taken into consideration if it should be possible.

The results suggested in this subchapter show a tendency how the effect of the main principles of process orientation is on the utilization of synergies. The reason is that there is not only one, but different synergies, or synergy categories, as Chapter 5.3.4 will highlight. Due to the different characteristic of synergies the effect of PO can also be different depending on what kind of synergy one is referring to. The supportive effect of the PO principles on synergies is summed up at the end of this chapter by rating the effects as i) very positive (++), ii) positive (+), iii) neutral (O), iv) negative (-), v) very negative (--).

The main principles of Process Orientation are:[312]

i. The principal – agent relationship
ii. End – to – end responsibility or process ownership
iii. Makrodesign and microdesign
iv. Cascading
v. Segmentation
vi. Modularization
vii. Horizontal integration

Before the effects of the PO principles on the utilization of synergies are introduced in detail, the following table gives a summarizing overview about the results:

PO Principle	Effect on the utilization of Synergies	Tendency
i.Principal-Agent Relationship	O	+

[312] See Chapter 3.3.5

ii.End-To-End Responsibility or Process Ownership	++	++
iii.Makrodesign and Microdesign	+	+
iv.Cascading	O	+/-
v.Segmentation	O	+/-
vi.Modularization	++	++
vii.Horizontal Integration	+	+/-

Table 14: Effects of the main principles of process orientation on the utilization of synergies

i. The *principal – agent principle* regulates the interface between different processes, in particular the principal process which is the customer of the agent process. In general the effect of this PO principle is neutral on the utilization of synergies. However, depending which particular situation is regarded this principle can also have a positive tendency on the utilization of synergies. The positive tendency can be caused by the principal inherent idea that the principal agent only specifies what he demands and not how the output has to be generated. This fact influences the agent process positively because he decides on his own how he will deliver the needed output and therewith which synergetic effects he can use for the creation of the output.

This positive impact of the principal-agent principle is not far-fetched. During the case studies the researcher observed situations where the customer process did not only specify what he demanded from the agent process, but also how it should be done. Examples can, for instance, be found in typical reporting processes where the customer process does not only define which information it needs, but also how this information needs to be gathered and edited. This minimal intervention to the agent process authority results in individualized, and non standardized, approaches where the agent process could make use of operational synergies if he would be allowed for deciding for an own standard.

ii. The second PO principle the *end-to-end responsibility* or *process ownership* defines one person who is responsible for the entire process. Therewith the process is regarded as an entity and is not cut into pieces which are usually the result from the organizational structure of a company. This principle has in general a very positive effect on the utilization of synergies. The reason is that the role-inherent overall perspective and the end-to-end responsibility motivate the process owner to search for synergies in the entire process without the restricted perspective which is caused by the organizational structure.

In this context process orientation has the advantage of having coordinated process metrics and targets, even for cross-functional processes where the tasks are carried out in different organizational units. This holistic perspective supports the elimination of contradictory targets and measures which can be found in traditionally organized firms.[313] This attribute is of interest for the exploitation of synergies because contradictory targets and non-aligned measures can impede the cooperation between organizational units. With these qualities process orientation positively works against one of Porter's impediments in the implementation of synergies; the "*Biased Incentive Systems"*.[314]

During the case studies the researcher found multiple situations where potential process synergies were not used, because the organizational structure limited the persons in charge to take up the overall process perspective. Even worth, if this perspective was created, some persons did not think about implementing a synergy optimized solution simply because this overall process solution would not be in their functional responsibility.

One example from the case of the Maintenance Triangle in the United Kingdom explains the value of the end-to-end responsibility or process ownership very well; the subprocess MANAGE SPARE PARTS. After the idea of the end-to-end responsibility and process ownership was created within the team who was in charge to optimize the overall process MAINTAIN PRODUCTION the perspective on the prior function, spare parts storage, changed completely.

Before the project started each main department, in some cases even departments, had some dedicated places where the spare parts for the specific, organizational structure defined, production areas were stored. The functionally responsible persons did not think about the idea how the overall spare parts management could be improved, but optimized their area of responsibility by applying lean production principles.

After the idea of an end-to-end responsibility for the MANAGE SPARE PARTS process was set, the optimization ideas reached another level. The functionally responsible persons started to think about a common storage for parts which need not to be stored in direct closeness to the production lines, they started discussions how personnel could be used optimally in this storage, and they started discussions about which systems and tools are used in the different stores. Ideas came up to collectively ask for external storage potentials at the suppliers where they previously independently purchased their spare parts, cost saving ideas came up by purchasing higher volumes of

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[313] Suter A. 2004 page 18 ff.

[314] Compare chapter 2.6

spare parts due to bundled orders, plus standardization ideas arose after the unneeded variety of spare parts between the different functional areas became transparent. All these and additional ideas in this subprocess only emerged because the process was regarded from end to end, without the organizational structure restrictions for the first time.

Not only this example but multiple observations during the case studies proved that the principle of an end-to-end responsibility plus the role of the process owner can support the definition and utilization of synergies to a great extent.

Based on the process owner's responsibilities and authorities[315] the process owner role has additional advantages for the utilization of synergies:

- The process owner is accountable for the design of the process, for ensuring its successful execution, and for its continuous improvement. Therewith the process owner is to be made responsible for the definition and utilization of synergies and their successful execution.
- The process owner designs documents, publishes, and develops training content, supporting tools, and/or templates for the process. Consequently, the process owner is able to design supporting tools for the use of synergies and share his general synergy ideas with the process staff.
- The process owner identifies and monitors metrics against which process performance can be measured. Therewith the process owner is in a position to define measures which favor the utilization of synergies and measure the results of the identified synergies.
- The process owner uses metrics and audit results to evaluate compliance and continuously improve the process. With this responsibility the process owner is also able to evaluate and continuously improve the utilization of synergies.
- The process owner identifies, prioritizes, and governs changes to the process. Therewith he is able to identify new synergies and implement the needed changes.
- The process owner ensures adherence of the organization to the process. Therewith he is able to counteract if synergies are not used as defined.
- The process owner and the operating manager know the process and its upstream and downstream effects. Therewith they are able to detect synergies which are possible in cooperation with upstream and downstream processes.
- The process owner ensures that all process participants understand their role and how they fit into the end-to-end design. Therewith the process enables the process participants to derive further synergy potentials by giving them the needed transparency for being able to detect additional synergies.

[315] See Chapter 3.3.5 and Hammer M., Hershman L. 2010 page 118

Derived from the evidence of the case studies it was not the end-to-end responsibility but the end-to-end or overall perspective which was decisive to generate all improvement ideas. Still, the end-to-end responsibility and the role of the process owner are important for the implementation phase of the ideas.

iii. The principle of *makrodesign and microdesign* describe how processes are to be designed; starting with a general overall perspective in the makrodesign phase and then continuing with the detailed perspective in the microdesign phase. The makrodesign phase is where radical changes are made; the microdesign phase is responsible for incremental changes. This principle or approach has a positive influence on the way of proceeding when defining synergies. It describes exactly the needs which are subject to the approach needed to define synergies: from top to bottom and from the general to the detailed perspective.

This finding was also observed by the researcher in the case studies. When synergy implementation ideas were addressed bottom up or details were developed before knowing the big picture, problems occurred when the reference to other processes or synergies was made in a later phase.[316]

During the painted body case study in Munich the optimization of the maintenance was also addressed as it was in the Maintenance Triangle case study in the United Kingdom. The major difference was the level from which the two maintenance optimization projects were started. In Munich the project was initiated by the painted body main department, while in the United Kingdom the project was initiated by the Managing Director. Even though the starting point of both projects was basically the same and included the same basic objectives, the results of both differed. Points which were addressed top down in the Maintenance Triangle in the United Kingdom were all aligned between all main departments ensuring that no subunit will produce results which do not meet the overall targets. After generating an overall picture consistent sub teams with subprojects were defined which all were aware of the bigger picture for the implementation phase. The teams that dealt with the microdesign projects worked in cross-main-departmental teams.

In contrast to that the natural boundary for the maintenance project within the painted body case study was given by the painted body main department. Even though the basic ideas what should be improved were generally the same in the United Kingdom as well as Munich the ideas how it should be improved differed since the painted body organization did not leave their organizational boundaries. Retrospectively, with the

[316] Synergy ideas can and should be directed bottom-up but the implementation needs to be defined top-down in order to ensure integrity of all synergies in total.

experience from the Maintenance Triangle project from the UK, some of the work packages of the painted body organization would have produced results which would not fit into a bigger picture of a potential plant Munich Maintenance Project. In the best case the results would have to be adapted to a bigger picture solution, whereas in the worst case they would have been worthless for the bigger picture solution.

One example which shows that effect is the previously mentioned optimization of the MANAGE SPARE PARTS process in the United Kingdom. The painted body organization also regarded the optimization ideas of the spare parts management process but with different results. Since they did not include the other main departments into their perspective, the optimization ideas had rather the extent of a continuous improvement workshop. Whereas the ideas from the UK in some cases radically changed the way the process was handled. In the painted body organization the demand of the other main departments for specific parts was not regarded. Hence the idea of saving money by bundling the demands of all main departments located in Munich did not arise on a bigger scale. Thus ideas of standardizing specific equipment between the main departments to make use of economies of scale was not regarded, simply because the equipment in the main department was standardized; even though it was not standardized from the plant Munich perspective.

Given these examples and additional experience from all three case studies the principle of makrodesign followed by microdesign is an important approach to ensure the correct definition of synergies right from the beginning.

iv. The next PO principle to be examined on its effects on synergy utilization is *cascading*. Cascading supports the organization of processes by defining the next lower level of a process. Following this principle, subprocesses are created which again have a process owner; the overall responsibility still remains with the overall process owner. This principle has a neutral effect on the utilization of processes. Depending on how the cascades of the processes are organized the effect can also be negative or positive. However, if the characteristics of a real process cascade are pursued, the negative effect of process cascading is unlikely. Positive effects of process cascades primarily occur due to the enabling potential of cascades regarding the utilization of synergies. However, well defined process cascades are an important factor for supporting another PO principle, the process modularization.

v. The principle of business process *segmentation* organizes a standard process by defining variations of the process due to different customer needs. With process cascading the principle of segmentation has a neutral effect on using synergies.[317]

[317] On the one side process segments can support that the different segments still make use of synergies which exist between the different segments. On the other side segments can lead to separation and accordingly individualized solutions.

Negative tendencies can again occur if the principle is not followed according to the rules.[318] However, the principle of process segmentation has the tendency to create a more positive effect on the utilization of synergies than process cascades do. The reason is that process segments are primarily created to satisfy the customer needs in a higher degree than the standard process would do. This better fulfillment of the customer needs often comes along with a stronger binding with the customer; this is often an upstream or superordinate process. That stronger binding again allows the segmented process to actively search for synergies with the upstream or superior processes; this is often not possible with a standard process.

The effect where proper process segmentation would have supported the utilization of synergies with the upstream and superordinate processes was observed in the Maintenance Triangle case study in the United Kingdom. The central planning departments in Munich generally plan which companies deliver which production equipment to the specific plants. By doing so they also influence the maintenance team in the UK because they decide for which equipment has to be maintained in the future. Usually, the teams are organized according to the production area where the equipment will be needed and according to the plant they are planning for; the result of which is a type of matrix organization. This kind of organization has, without a doubt, advantages when it comes to making use different kinds of synergies. It also partially shows the principle of process segmentation because the main process is internally organized in different segments which are dealing with the geographically specific needs of the plants.

In one case the execution of the cascading principle was not followed in a way which supported the utilization of synergies from the operational UK perspective. The central planning departments did not take the local needs into account and decided for the standard equipment which is used almost worldwide for this application in one specific area of production. The result was on the one side an equipment synergy for the BMW group but on the other side that the maintenance of this equipment has since then been difficult for this production area because the supplier of the equipment has no local branch in the Oxford area. This leads to unsatisfying reaction times if the equipment breaks, plus no other production area has this equipment installed. From the UK perspective the local needs were not sufficiently taken into consideration which leads to a situation where synergies with i) the other departments and ii) local suppliers are not able to be used.

[318] Described in chapter 3.3.5 This could for instance lead to separation of process segments, which negatively influences the utilization of synergies.

Even though this case does not indicate if the local optimum for the UK production would also be the overall optimal solution for the BMW AG, it indicates that process segmentation can support the utilization of synergies by taking into account market, or product specific considerations.

vi. A principle which is closely connected with process cascading and segmentation is *modularization*. Process modularization describes the idea of designing specific processes as reusable modules for the same as well as different market services. Regarding the effects of modularization on the utilization of synergies their impact is very positive.

The reason for this very positive correlation of process modularization on the utilization of synergies is that modules can be reused for different applications; hence a multitude of customers can make use of the same service instead of performing the same process independently. This leads to learning curve and volume effects and additional synergy effects. Basically, it exactly applies to the main idea of synergies to create a higher overall value by combining resources.

For being able to make use of the positive synergetic effects of process modularization the design of the processes – how they are cascaded and segmented – is of central importance. Evidence from the case studies has shown that this principle is generally present, but not fully understood by all process partners within the process network to tap the full potential of module processes.

Process modules which were generally well used during the case studies are to be found in the HR environment. Whether it is in the human resource management processes or the human resource services[319] they all made use of some process modules. The modules differed in their modes of action and the level where they were applied. Some modules were used all over the world, whereas some modules were location specific but still used in the according local organization.

The following example gives an idea on how modules are used in the case study environment: In a case where an employee wants to change his job position he refers to the local superordinate process PROVIDE HUMAN RESOURCE SERVICES. For being able to deliver the desired output the process would access the standard module PROVIDE EARNING SETTLEMENTS to get an overview how much money the employee is earning, in which salary group the employee is and so on. Afterwards, the subordinate process would address the next standard module PROVIDE INTERNAL EMPLOYMENT AD to see which positions are vacant for being able to provide the employee with the customer specific information. Thus the local process is able to make

[319] Which deal amongst others with earning settlements.

use of two process modules which make the overall process more efficient. This principle is shown below:

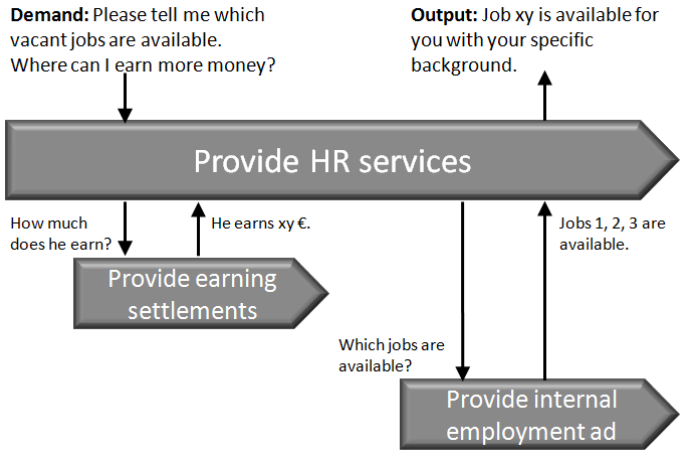

Figure 25: Example utilization of process modules

Even though the evidence from the case studies has shown that the general principle of process modularization is applied in production environments, its application could still be enhanced to make use of more synergies. However, the difficulties which hinder the design of additional modular processes are:

- the needed transparency about the entire process landscape
- detailed knowledge about the requirements the processes need to fulfill
- knowledge about the effects on up and downstream as well as superordinate processes

vi. The next process orientation principle of *horizontal integration*, which describes the integration of upstream or downstream processes, has in general a positive influence on the utilization of synergies. However, if not holistically considered, horizontal integration can lead to dissynergies. Positive effects of horizontal integration on the utilization occur if down or upstream processes contain valuable resources, whether tangible or intangible, for the process under consideration. Thus it supports the definition and implementation of cross-functional synergies; the organizational structure does not necessarily need to be changed for enabling synergies which are based on horizontal integration.

An example from the field describes the value of horizontal integration on the utilization of synergies: the partial integration of the manufacturing staff into the maintenance process. Prior to this integration the manufacturing staff was only responsible for manual operations like placing parts into the machine. After the integration the same workers are also responsible for minor maintenance relevant processes and exchange their knowledge with the maintenance experts. This situation results in additional synergies for both the production and the maintenance process.

The findings of this subchapter have shown that process orientation has a general positive effect on the utilization of synergies. Even though not all PO principles support the utilization in the same extent, the value of process orientation for the utilization of synergies is evident. Particular emphasis shall be placed on the very positive effects of the end-to-end responsibility as well as modularization which both actively support the utilization of synergies if they are probably defined. After this subchapter has given a general overview of the process orientation principles on the utilization of synergies, the following subchapter goes into detail by showing the effects of process orientation on the main influential factors on synergy utilization.

4.3 The Effects of Process Orientation on the Key Influential Factors of Synergy Utilization

The previous chapter has shown that PO has an overall positive effect to support the utilization of synergies. This chapter specifies the leading questions how PO affects the utilization of synergies by showing the effects of process orientation on the explicit key influential factors of utilizing synergies. These were defined as the essential factors for a successful utilization of synergies.

This chapter follows a similar approach as the previous one by showing which effect the PO principles have on the key influential success factors of synergy utilization. This is done by opposing the PO principles to the key influential factors and deriving if the effect is i) very positive (++), ii) positive (+), iii) neutral (O), iv) negative (-), v) very negative (--). The results are supported by findings from the field. An overall overview of the effects of the principles of PO on the key influential factors is given at the end of this chapter.

The rating is based on the essential principles of process orientation[320] which were used in the previous chapter as well as the key influential factors which were introduced in chapter 2.4. The key influential factors are:

Direct influential factors

i. Organizational structure (formal and informal, organizational belonging)

ii. Range of cost center

iii. Range of responsibility

[320] See Chapter 3.3.5

iv. Management behavior incl. top management support

v. Trust in synergy partner

vi. Interpersonal factors

vii. Standards

viii. Technological specifications

ix. Transparency

Indirect influential factors are:

a. Corporate culture

b. National culture

c. Size of enterprise

d. Economic situation

A summary of the PO principles on the key influential factors of using synergies is given in the following table:

PO Principle / Influential Factor	Organizational structure	Range of cost center	Range of responsibility	Management behavior incl. top	Trust in synergy partner	Interpersonal factors	Standards	Technological specifications	Transparency	Corporate culture	National culture	Size of enterprise	Economic situation
Principal-Agent Relation-ship	o	o	o	o	o	o	o	o	+	o	o	o	o
End-To-End Responsi-bility or Process Ownership	++	+	++	o	o	o	+	+	++	(+)	o	o	o
Makro-design and Micro-design	o	o	o	o	o	o	o	o	+	o	o	o	o
Cascading	+	o	+	o	o	o	o	o	+	o	o	o	o
Segmen-tation	+	o	+	o	o	o	o	o	+	o	o	o	o
Modulari-zation	++	o	o	o	o	o	++	+	+	o	o	o	o
Horizontal Integration	++	o	+	o	o	o	o	+/-	+	o	o	o	o

Table 15: Effects of process orientation on the key influential factors of using synergies

The *organizational structure* was defined as one of the main influential factors on the utilization of synergies; it acts as a framework for synergy utilization by describing a tendency how functional units interact with each other. Depending on which constellation is chosen, the resulting synergies tend to be i) rather functional in case of a centralized functional organizational structure or ii) rather cross-functional in case of a decentralized structure. Optimization opportunities for synergy utilization were derived by implementing actions which oppose the general tendency of the explicit organizational structure.

Since PO does not consider the organizational structure, but the way how the process is performed, it has a natural tendency to act cross-functional irrespective of the actual organizational structure. Thus, negative tendencies of the structural organization on the utilization of synergies are supported by showing an additional way to organize the business processes which allows for the identification of additional synergies.

The supportive principles of PO on the organizational structure as key influential element are i) the end-to-end responsibility or process ownership, ii) modularization and iii) horizontal integration. Minor positive effects are to be expected from i) cascading and ii) segmentation. A neutral effect is expected from the i) principal agent relationship and ii) makrodesign and microdesign.

A very positive influence of the end-to-end responsibility is expected because it reduces the negative effects of both centralization and decentralization;[321] in case of a centralized organizational structure PO overcomes the cross-functional boarders, while in case of a decentralized organizational structure it overcomes the functional boarders.[322] When a process owner for the process ‘ensure overall product quality’ is defined, it does basically not matter if the organizational structure is divided in different quality departments, whether centralized or decentralized; the process owner is responsible that the organizational units work together where needed to achieve the process targets.[323]

Process modules are standardized process units which also have a very positive effect on the organizational structure as a synergy influential factor. The beneficial effect of modularization arises when different organizational units are able to use the same process modules. The supportive effect of modularization on the organizational

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[321] And thus it supports to enable the right balance between decentralization and integration in accordance to Lawrence, P.R., Lorsch, J.W. 1963 pages 229 ff.

[322] This is only applicable if the defined process has a cross-functional or divisional dimension.

[323] In this case the definition of the right process scope and targets is centrally important for achieving the desired effect.

structure results from the ability to partially break functional as well as business unit boarders by means of defined process modules. Accordingly, process modules can be used independently from the organizational structure supporting the use of synergies. If, for instance, the process 'employee assessment' is defined as a process module all organizational units are able to make use of this module regardless in which organizational unit bordering processes take place.

Horizontal integration acts supportive on the organizational structure if the organizational structure designed processual cuts between sequenced process steps; for instance, if information or resources of previous or following processes are vital for a positive process output. The supportive effect of horizontal integration does not necessarily include changing the structural organization but can also be made possible by additional organizational supportive factors[324] such as transfer of knowledge in centers of competence (COC's). When information from the sales department about the customer needs is integrated into the 'design product' process, horizontal integration supports the utilization of synergies despite the organizational boarders between the sales and development departments.

The supportive effect of the principles of cascading and segmentation on the organizational structure as key influential factor is generally positive. Both can indicate structural organizational constellations which support the utilization of synergies. However, the positive effect is rather restricted to the advisory function of these principles for improving the utilization of synergies in an organizational structure. It basically does not overcome the drawbacks of an existent organizational structure itself by identifying options along with organizational changes as the previously discussed PO principles did.

The principal agent relationship and makrodesign and microdesign as PO principles have a neutral effect on the organizational structure as key influential factor for utilizing synergies. Certainly, both can support the design of the organizational structure: the makrodesign and microdesign principle by showing a logic sequence approach how to design processes, and the principle agent relationship by defining the roles between the organizational units. However, in general both do not affect the organizational constellations in a way which would improve the utilization of synergies.

The Range of cost centers as a key influential factor only affect the utilization of synergies if their configuration hinders the cooperation between organizational units. Such constellations can occur when one of the cooperation partners profits from the

[324] Compare chapter 2.4.2

overall positive synergy effect, whereas the other partner has additional expenses resulting from the synergy effect.

Based on this, the effects of the PO principles on this key influential factor are limited to an advisory function; they define how the cost centers should be designed and are thus generally rather neutral. The cost centers could, for instance, be designed based on principal-agent relationships, cascades, segments or modules. The decision to design cost centers based on the PO principles would not lead to an additional value.

Only the end-to-end responsibility can affect cost centers in a positive way. It can i) generate an additional cost center layer and ii) overcome potential contradictions between standard cost centers by assigning a process owner who will per se decide for the overall most cost-efficient solution.[325] The first positive effect is rather an advisory function which could create a superordinated "process cost center" regulating the configuration of the subordinate departmental cost centers. The latter would have a broader view on the processes compared to the strict organizational unit cost centers. However, the main problem of cost centers would still remain, even with this configuration: the negative influence when a synergy effect favors two cost centers in a different way. In this case, one process cost center could benefit from the synergy effect, whereas the other would have additional expenses associated with the synergy.

The second positive effect is based on the end-to-end responsibility the process owner's success is measured by. It supports to solve potential contradictions on the traditional cost center level by assigning the decision responsibility to the process owner. This supports to solve contradictions which are caused by synergy effects on a different level, the process level, which could not have been solved on the standard cost center configuration. However, the end-to-end responsibility cannot reflect all potential synergies which might be negatively affected by cost centers. If a department A buys a machine which could be used by another department B, the decision if this synergy will be used is not influenced by the end-to-end responsibility as long as the departments have no process interfaces.

The *range of responsibility* as a key influential factor includes i) the functional dimension, ii) the personnel dimension and iii) the time dimension which are also linked to a great extent to the organizational structure. The main problem of this influential factor is that persons tend to use synergies in their own area of responsibility and do often not contemplate synergies with other partners.

Due to the strong link of the range of responsibility to the organizational structure the effects of PO on this factor are comparable with the effects on the organizational

[325] In this case new contradictions can occur between different process owners.

structure. However, since the range of responsibility is not only determined by the organizational structure additional effects occur.

The strongest supportive effect of PO on the range of responsibility is given by the end-to-end responsibility. This includes the effects the end-to-end responsibility has on the organizational structure, which were explained before, but also which effects it can have on other factors which determine the range of responsibility. More specifically, the end-to-end responsibility can make the process owner responsible for a longer time span and for parts of other functional dimensions even though his process takes place in another structural organizational unit.[326] This extinction of the range of responsibility is made possible by process KPI which include the "voice of the customer" and the "voice of the business".[327] These KPI are able to change the behavior of the manager in a way which favors the utilization of synergies.

If, for instance, the process owner of the process 'plan production equipment' is also made responsible for the life time costs of the equipment, such as maintenance, service, and refurbishment by means of a process KPI, his functional and time dimensions of the range of responsibility are changed. He will try to reduce the invest costs in his organizational unit as well as the life time costs in the other organizational units which operate with his planned equipment in the future.

Cascading and segmentation have positive effects on the range of responsibility by giving advice how the range of responsibility could be configured. With their link to all other existent process layers they ensure the consistency of target measurement approaches, and therewith the range of responsibility, which are present in the process organization.

Horizontal integration also supports the range of responsibility as a key influential factor on synergy utilization. Its contribution is to give advice which horizontal processes should be combined with each other. This advice can result in structural organizational changes or the implementation of process KPI which extent the range of responsibility as explained above.

The next key influential factor for the utilization of synergies which is affected by some of the key principles of process orientation is *standardization*. Standards include product, process and equipment standards. Their existence is sometimes a requirement to allow the synergy partners to use specific synergies. Standards are positively

[326] Which would not be per se responsible for these additional dimensions.

[327] Compare chapter 3.3.5

influenced by the PO principle of the end-to-end responsibility and exceedingly positively by the principle of modularization.

The end-to-end responsibility influences standards positively where the process owner is directly affected by their need; thus, standards are implemented wherever the process owner sees their value. Standards which do not have an effect on the process might be neglected. The second fact implies that not all necessary standards are implemented; the first fact implies that a coordination for specific standards is needed which affect the output of different process owners.[328]

The effect of *modularization* as a PO principle on standardization is even more important. In fact, process modules are standardized fragments of processes or entire processes which allow for the reutilization of this module for different needs. With process standardization, which is needed for process modules, one associates the standardization of the module interfaces to other processes which make use of the specific process module, the standardization of products or services to enable economies of scale within the process module, as well as the standardization of equipment which is needed for the process as well as the standardization of the equipment of the interface processes if needed.

Technological specifications as a synergy utilization factor are generally positively affected by the PO principles. Technological specifications describe the variations between organizational units which are rooted in technologically based specification. They influence the utilization of synergies negatively i) when the specifications are used as excuses not to implement cross-technological synergies as well as ii) by defining dissynergies between cross-technological organizational units which do not take technological specifications into consideration.

Both effects, the implementation of cross-technological synergies as well as the prevention of cross-technological dissynergies, are supported by the existence of end-to-end responsibilities. In the first case the existence of a cross-technological process owner, for example a ‘maintain production equipment’ process owner who is in charge of optimizing the overall process, which can take place in different technological organizational units, enables the company to find synergies in addition to existent technological specifications. On the other side, the concurrent existence of a ‘optimize technology x’ process owner ensures that the technology specific needs are taken into consideration by defining the right approach with the ‘maintain production equipment’ process owner.

[328] Such as a standard for knowledge exchange which is needed in different processes which might have no direct link with each other.

Even though the positive effect of a process owner on the utilization of synergies in case of technological specifications is existent, its support is not to be rated as very positive, but only positive. The main problem of technological specifications still remains: the need to find a consensus between the functional and cross-functional needs. However, in any case the cross-functional perspective is enabled; a result which does not automatically emerge in traditionally organized companies.

The next positive effect on technological specifications is given by the PO principle of modularization. Modularization allows for the utilization of the same standardized modules and is independent from organizational as well as technological specifications, thus also allowing for cross-technological synergies. In practice two different organizational units which are based on different technological specifications could still use common process modules or submodules, thus allowing for making use of different synergies.

Besides the positive effects of PO on the technological specifications as influential factor on using synergies drawbacks which might create dissynergies, especially in this case, need to be taken into consideration. Horizontal integration needs, in this case, specific considerations since on the one hand it can create synergies between cross-technological units regarding specific characteristics such as throughput time, but on the other hand it can create dissynergies because the previously independent horizontal processes underlie technological differences.

Regarding *transparency* as an identified influential factor on the utilization of synergies, which includes the knowledge about what is done by the other organizational units in what extent and by whom, the principles of process orientation have a general positive influence. The main reason is that i) process orientation itself requires a deep knowledge about the same information which are partially required for the utilization and definition of synergies; processes cannot be defined if this information is missing and ii) that process orientation provides a wide transparency about all processes including details such as process owner or process KPI.

The central supportive effect of PO on the transparency needed for using synergies is based on the role of the process owner who plays an active role in the process landscape. He has to know the upstream and downstream processes, he has to inform all process participants how they fit into the end-to-end processes and which role they play, thus creating transparency.

The other PO principles do not directly create transparency; they enable the organization to create a proper process landscape which results in a process transparency. In detail, the principal agent relationship defines exactly who delivers what to whom. This information is not always known in traditionally organized firms and allows the parties involved, whether customer or supplier, to derive additional synergies based on this interrelation. Makrodesign and microdesign describe different

levels of processes and enable a consistent transparency among all levels. Cascades show vertical process interdependencies, while segments show parallel existent processes which were designed for satisfying specified needs. Modules show which process elements can be reused in the process landscape. Horizontal integration combines processes with a time-based relationship.

The effect of PO on i) the management behavior including top management support, ii) the trust in the synergy partner, iii) interpersonal factors, iv) the corporate culture, v) the national culture, vi) the size of the company and vii) the economic situation as key influential factors on the utilization of synergies is neutral. During the case studies no specific effects of process orientation on these factors were observed, and even literature revue did not prove the opposite. However, minor effects of PO on the influential factors mentioned above are still possible. For instance, if PO is implemented in the entire cooperation this can lead to a more cooperative corporate culture, thus supporting the utilization of synergies.

This subchapter provided an overview of the effects of PO on the key influential factors on using synergies which has proven a generally positive influence. Even though most effects were detected as being neutral, the end-to-end responsibility, which is associated with process orientation, has once more proven its value in the synergy context; this time positively influencing the key influential factors. Additionally, the general positive influence of PO on the transparency, which was detected as one of the key influential factors, is of importance. Thus, process oriented firms tend to indirectly influence the utilization of synergies in a positive way because PO per se provides a better transparency which in turn favors the utilization of synergies. After this subchapter has provided the next positive effect of PO on synergies, the following chapter discusses major shared commonalities between PO and synergies.

4.4 Shared Commonalities between Process Orientation and Synergies

After the effects of Process Orientation on synergies were presented in subchapter 4.2and the specific influence of PO on the key influential factors on synergy utilization was discussed in subchapter 4.3, this subchapter derives general commonalities between process orientation and synergy management. These commonalities are derived from the comparison of the theoretical content about process orientation[329] and synergies[330]

[329] Chapter 3

[330] Chapter 2

as well as evidence from the case studies where the researcher dealt with both concepts in practice.

The general commonalities between PO and synergy management are:

- Holistic character
- Revolutionary approach
- Top down procedure
- Design procedure and do's and don'ts
- Change management needs
- Supportive KPI and target system

Both, process orientation (PO) as well as synergy management (SM) represent a *holistic approach* which requires a high transparency of the object of investigation. Whether processes are defined from end-to-end or synergies are searched between different organizational units, the known organizational boarders need to be kept and a changing perspective needs to be taken into consideration. Thinking out of the organizational structure box is crucial for both; in the first case, it is important to be able to understand where the process starts and where it ends, while in the second case one must consider if the combination of resources can produce a higher value. This holistic approach involves a multitude of persons to generate the needed transparency about the process and understand where true synergies are hidden. In general, PO as well as SM, are dependent on the same requirements which are accompanied with this holistic perspective. Thus, both concepts are able to support each other: the transparency generated by PO can be used for SM and vice versa.

Both PO and SM usually involve a *revolutionary approach* rather than continuous improvement. The reason for this is the previously mentioned holistic character which does not allow for changing small pieces in single organizational units. It is because a change in one organizational unit usually also changes the mode of operation in the other organizational unit. For this reason both, PO as well as SM, ideally require a revolutionary change which involves all organizational units to decide for the ideal i) process design or ii) synergy constellation. Certainly some processes, especially subprocesses, can be improved in smaller continuous improvement projects and some synergies can be implemented in the same way, but the full benefits only emerge if a revolutionary approach is chosen. Only this procedure allows for a consistent process and synergy constellation. Especially the implementation of synergies comes along with destroying other existent synergies or even creating dissynergies when the effects on other organizational units are neglected and effects are only regarded in smaller isolated organizational units. Only when a process organization or synergy management is implemented, continuous improvement of both is suitable.

The next key success parameter PO and SM have in common is the need for a *top down procedure*. This requirement comes along with the holistic and revolutionary characteristics of both approaches. A top down approach is needed for both to enable a

consistency in the network between different participants potentially from different organizational units which would not be possible when following a bottom up procedure. If processes are defined on a low organizational level, their consistency between each other and the higher process levels cannot be guaranteed. If synergies are defined on low organizational levels, one cannot guarantee that more beneficial synergies exist on higher levels or that dissynergies with other organizational units are avoided. This is why processes and synergies again can principally be identified bottom up, still the full benefits only occur if a top down procedure for the implementation is followed.

Besides the top down procedure PO and SM can rely on the same basic *design procedures*. The reason is that the definition of processes as well as synergies requires i) a broad variety of participants, ii) out of the organizational box thinking including a new perspective and iii) transparency about what is being done where and by whom in the organization. For this reason procedures for process design such as the ones suggested by Hammer[331] can also be adapted to the identification and definition of synergies.

Due to the revolutionary character of PO and SM both require a proper *change management* on which they are highly dependent to enable the desired results. Since both PO and SM ideally involve a multitude of members following a top down approach, the change management approach can be the same for both.[332]

The final commonality between PO and SM is that they can make use of the same *KPI and target system* or at least create separate ones which support each other. This is because i) the end-to-end process KPI already involves the synergy idea to a great extent, ii) both KPI and target systems need to change the actual perspective on how success is measured in the organization and iii) the KPI and target system of PO and SM can be based on the same considerations[333] when it is designed.

End-to-end KPI already involves the synergy idea to a great extent because synergies often result from the cooperation of different organizational units performing the same processes. In PO organizations this synergy effect is rewarded in the KPI and target system independent from the structural organizational units involved. This is in contrast to structurally organized KPI and target systems where synergy effects would not be immediately rewarded for both sides. Problems can only occur if synergies are used between different processes which are not logically connected with each other.[334]

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[331] Compare chapter 3.3.4

[332] Compare chapter 2.6

[333] Compare chapter 3.3.4.1

[334] This is why synergies need to be managed in addition to processes.

The general perspective how success is measured in process oriented organizations and how synergy effects can be reflected in the target system usually requires an additional perspective to the functionally-based target systems of organizations. This cross-functional perspective supports both the synergy as well as the process target system. However, sometimes the functional and process perspectives are still not sufficient to represent all potential synergies and the according KPI. If this tertiary perspective is need, it still can be based on the same considerations as the PO target system.

Based on i) the positive effects the essential principles of process orientation have on the utilization of synergies, ii) the positive tendency of the essential principles of process orientation on the synergy key influential factors as well as iii) the commonalities between process orientation and synergy management presented in this chapter an overall positive fit between process orientation and synergy management has become evident.

Based on these findings, the synergy management model which is designed in the subsequent chapter will take advantage of process orientation where it is suitable to support the synergy concept.

5 Process Oriented Synergy Management in Production Environments

5.1 Introduction and General Consideration

As Michael Porter already stated in the 1980's "the failure of synergy stemmed from the inability of companies to understand and implement it, not because of some basic flaw in the concept".[335] Biberacher[336] and Rodermann[337] also point out that the realization of synergies is the most challenging part and requires a clear understanding of the synergy concept as well as the implementation of a synergy management for successfully using synergies. As the previous chapters provided the basis to understand the concept of synergy, the important concept of process orientation, as well as links between both this chapter derives a concept how to manage synergies in production environments.

The findings of this chapter are based on the previous chapters, literature research on synergy management as well as evidence from the case studies. Subchapter 5.2 presents the Process Oriented Synergy Model, the following subchapters describe the single elements of this model: the synergy identification in chapter 5.3, the synergy analysis and validation in chapter 5.4, the synergy implementation in chapter 5.5, the synergy controlling in chapter 5.6.

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[335] Porter M. 2004 page 318

[336] Biberacher J. 2003 page 95

[337] Rodermann M. 1999 page 173

5.2 The Process Oriented Synergy Model

The Process Oriented Synergy Model (PrOSyM) describes the main components which are needed to enable a process oriented synergy management. The circle accounts for supporting all key influential factors[338] in a way that synergies can be utilized successfully. The manage component is responsible for this fit.

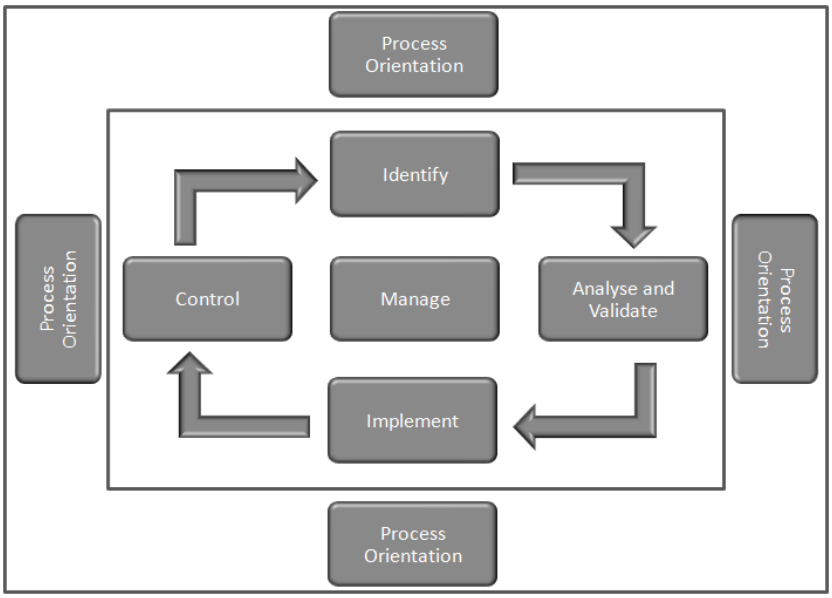

Figure 26: Process Oriented Synergy Model

The centre of the model is the *manage* component which decides which of the other four components i) identify, ii) analyze and validate, iii) implement and iv) control should be used in what order. The general order starts with the identification step. However, it is in the responsibility of the synergy manager to decide for a suitable order. The manage component is influenced by the external surroundings as well as internal decisions of the organization and needs to ensure a fit of the synergy configuration to general strategic decisions. This thesis does not evaluate whether the manage component is performed by a specific synergy management department, handled as an additional task of existent line managers or regarded as a duty of a process owner.

The *identify* component is usually the first step of the synergy management circle in which existent and potential synergies are identified. The potential synergies explicitly are ideas about a future stage which need to be analyzed before they are implemented.

[338] See chapter 2.4

The *analyze and validate* component should follow the identification step, thus being step two. It supports the synergy management by indicating if the aimed positive effect of the synergy is effectively present in the broader organizational context or if the identified synergy potential results in dissynergies. If a mismatch is detected after the validation, the potential synergies are denied and are adapted in the identification component if required.

After the synergies are identified and validated to be suitable, the i*mplement* component converts the synergy potentials into practice in a third step. In this phase all influential factors need to be taken into consideration, plus the potential adoptions on the key influential factors which might need to be made to ensure that the synergy effect is put into action. Depending on the extent of the change initiated by the synergy, a proper change management[339] needs to be installed at latest in this phase.

The *control* component as step four ensures by means of KPI the effectiveness of the anticipated synergy benefits. At the same time it validates the maturity of the synergy management level within the organization.

The outer frame of the model indicates that synergy management following this model is based on process orientation.

5.3 Component One: Synergy Identification

5.3.1 General Considerations

As the design of processes plays a central role in business process management, the identification, or definition, of synergies plays the central role in the synergy management model. It supports to understand which synergies are already used in the organization and which synergy potentials are present. Thus the identification component of the PrOSyM delivers the needed transparency which was detected to be one of the key influential factors to utilize synergies and enables the management of synergies.

For the identification of synergy potentials, and accordingly new synergy configuration in the corporation, an alignment on the procedures used for designing business processes is recommended.[340] Both, the design of processes as well as the identification of synergy potentials, require thinking out of the box; thus the procedures used for

[339] Compare chapter 2.6

[340] Compare chapter 3.3.4 and chapter 4.4

designing processes can be adapted to the identification of synergies. However, besides basic procedures the identification of synergies additionally requires a systematics how synergies are characterized which is developed in this subchapter.

Chapter 2 in general and subchapter 2.3 in particular presented different approaches how synergies are characterized in the economic environment. The findings were based on literature research supplemented by experiences from the case study and action research. The characterization approaches resulted from regarding the object of research from different perspectives, based on a top view interpretation of synergetic interrelation such as in mergers and acquisitions which were primarily regarded in inter-cooperative contexts. This is too vague for the purpose of this dissertation to identify and characterize synergies in production environments.

As there are different perspectives how synergies are categorized and additionally different ways how the sources of synergy effects are defined, the basis for the identification of synergies also follows different approaches. For the identification of synergies Ansoff suggests the synergy matrix[341], while Michael Porter's approach is the value chain[342] with which his defined interrelations can be detected. In this context Michael Porters value chain approach is to be emphasized as a valuable source of discussing synergetic interrelations because it holistically describes the entire organization on a high level.

According to Biberacher[343] further analytical concepts for identifying synergies are the concept of strategic fields by Sautter,[344] portfolio models,[345] spinnweb concepts,[346] strengths-weaknesses profiles[347] and profile comparisons.[348] In general, all concepts follow the same main idea. At first they determine an organizational area where synergies should be identified, which is followed by an analysis based on the earlier chosen synergy concept which is usually based on specified synergy effects.

In spite of their value for the overall understanding of synergies in the economic context the approaches described in chapter 2 are only partially applicable for i) synergy

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[341] Ansoff I.H. 1965 page 88 ff. and chapter 2.3.1

[342] Porter M. 2004 page 327 and chapter 2.3.2

[343] Biberacher J. 2003 page 101

[344] Sautter M. 1989 page 232 ff.

[345] Reißner S. 1992 page 130 and Clarke C. 1987 page 14 ff.

[346] Clarke C. 1987 page 16 ff

[347] Rockholtz C. 1999 page 156 ff.

[348] Reißner S. 1992 page 130 and Sautter M. 1989 page 212

identification and characterization as the first step and ii) synergy management in production environments as the result.[349] For the specific case of synergy management in production environments a more detailed perspective is needed which concurrently allows for the involvement of a broad personnel base. Therefore the insights given in chapter 2, specifically about synergy categorization, describe a valuable basis for further specialization for the application in production and need to be adapted and detailed in the following.

The objective of this chapter is to develop an approach which fills this gap and allows companies to systematically identify and characterize synergies and synergy potentials from the production perspective.[350] Based on the previously described characteristics of synergies and the needed suitability for the production environment the requirements toward the systematic synergy identification and characterization approach are:

1. Industrial independency
2. Cross-functionality
3. Hierarchical integrity

1. *Industrial independency* accounts for the need of the synergy identification to be systematically applicable in different production-based environments independent from branch specific characterizations.[351] Since synergies can also be present between production sites of companies belonging to different industrial branches this prerequisite also allows for the identification of inter-organizational synergies.

2. *Cross-functionality* is primarily of importance to account for the need of identifying synergies which are existent between different horizontal organizational or functional units within the organization. This prerequisite is impeded by the variety of organizational or functional units including different processes. Even though organizational charts try to structure an organization into more or less reasonable units, they do not, and are not designed for, account for optimal synergy allocation. For this reason a relative independence of the organizational chart which reduces organizational silo thinking must be enabled by the synergy identification framework.

3. *Hierarchical integrity* accounts for the second, vertical orientation of the organizational chart which needs to be reduced for effective synergy identification. This

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[349] Synergy characterization is thereby the identification and descriptive process, whereas synergy management additionally includes a synergy evaluation and realization phase. Compare also J. Biberacher 2003 page 97

[350] Which is only one high level element of Michael Porters value chain. Porter M. 2010 page 421 and chapter 2.3.2

[351] Even though the case study insights result from the automotive industry, the end results of this thesis account for general applicability.

requirement is of importance because synergetic effects are also possible in the combination of resources of different organizational levels and should therefore be detectable within the approach to be developed.

The requirements mentioned above are primarily derived from organizational characteristics which result in inadequate exposure with synergy-related issues by the organizational chart. For reducing the impact of additional negative effects such as those resulting from the key influential factors[352] and for accounting for the needs resulting from the challenges of synergy management and change management already in the identification phase[353] the following requirements need to be considered:

1. Simplicity
2. Guidance character
3. Consideration of existent and potential synergies
4. Consideration of positive and negative synergies
5. Relative personal independence
6. Derive ability of fields of action

1. *Simplicity* is a key requirement for the synergy identification and characterization phase. Only a simple approach allows for the involvement of a large number of participants from different hierarchical levels who are needed to holistically identify synergies in the organization. Synergies do not only exist on high hierarchical levels, and synergy potentials detected by top management are not necessarily true synergies on the working level at the end. Without simplicity the synergy identification process already risks a strictly limited perspective on synergies with a limited detection of all synergy potentials. The involvement of a broad basis of employees in the synergy identification phase additionally supports the prevention of resistances against the planned synergies and allows for combining the synergy identification phase with change management activities.[354]

2. A *guidance character* of the synergy identification and characterization process is needed to ensure a systematic search for synergies instead of a chaotic brain storming of different functional and organizational levels for identifying which synergies exist. However, the guidance should not dedicate or manipulate the result on which synergies are detected but allow the persons involved an open generation of synergy ideas. The results of different persons should still be comparable with each other and overall results in a holistic synergy map.

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[352] Compare chapter 2.4

[353] Compare chapter 2.6

[354] Compare chapter 2.6 and chapter 3.3.4 on the do's and dont's on process design

3. The *consideration of existent and potential synergies* as a requirement for the synergy identification approach is of importance i) for generating a holistic synergy map which is able to portray all synergy constellations, ii) for deriving new synergy potentials based on existent ones, iii) for indicating potential misfits between different synergies and iv) for establishing a certain sensitivity about the synergy concept in the organization.

4. Implying the concept of *positive and negative synergies* in the identification phase is of importance for enabling an effective synergy management where positive synergies are enhanced and negative synergies are reduced.

5. Achieving a *relative personal independence* in the synergy identification model is useful because synergies are partially differently perceived by different persons as well as organizational units. Especially the fact that synergies can have a beneficiary effect on one synergy partner and simultaneously a negative one on the other could tend to a one sided view on synergies. Relative personal independence can be achieved through developing a transparency which allows for comparability between the processes which enables certain cross-reference ability.

6. Finally the synergy identification approach should be *able to derive action plans* from the identified synergies.

Both, the observations made at the beginning of this chapter which say that existent synergy identification approaches are not suitable to holistically identify synergies in production environments on a broad basis, and the requirements which were defined for a suitable synergy identification model for the application in production environments determine that a new suitable approach needs to be designed. The following subchapter derives the initial point for the identification of synergies.

5.3.2 Processes as Initial Point for Synergy Identification

After the requirements for the synergy identification procedure were defined in the previous subchapter, this subchapter discusses the potential to make use of processes as initial point for the identification of synergies. This question is derived from the general positive tendencies PO has on the concept of synergies which was established in chapter 3. The hypothesis is:

Because PO supports the utilization of synergies it could also act as a valuable initial point for synergy identification and definition.

The main idea is to define processes and then identify corresponding synergies for the specific process. In this context it is elaborated i) if processes in general and process orientation in particular as basis for synergy identification comply with the requirements defined in the previous subchapter towards a synergy identification approach, ii) which effect the process orientation principles have on the identification phase when processes

are the basis for synergy identification and iii) which further theoretical interrelations exist to establish a consistent link from processes to synergy identification.

For elaborating the first question – do processes comply with the requirements defined in the previous chapter if they are defined as basis for synergy identification – the fulfillment of those requirements is examined and rated as i) very positive (++), ii) positive (+), iii) neutral (O), iv) negative (-), v) very negative (--). The requirements are:

- Industrial independency
- Cross-functionality
- Hierarchical integrity
- Simplicity
- Guidance character
- Consideration of existent and potential synergies
- Consideration of positive and negative synergies
- Relative personal independence
- Derive ability of fields of action

The requirement of an *industrial independency* is absolutely fulfilled by defining processes as starting point for synergy identification. Processes are present in every organization irrespective of the economic sector and do not account for branch specific characterizations.

Cross-functionality is also entirely fulfilled when deciding for processes as basis for synergy identification because it is an integral part of the PO concept and the nature of processes.[355] Even though the first attempts to define a process out of one organizational unit might not automatically define the process across functional units, process orientation perfectly allows for a cross-functional perspective.

Processes support the requirement of structural organizational *hierarchical integrity* because processes act not only cross-functional, but also cross-hierarchical. Even though processes are again designed in a hierarchical process structure, with processes and subprocesses illustrated on different process cascades, one specific process level can involve parties from different hierarchical levels of the organizational chart.

Deciding for processes as starting point for the identification of synergies absolutely fulfills the requirement of *simplicity*. Regardless of the hierarchical level or educational background of the person who applies this principle, he or she knows which processes take place in the according organizational unit. Thus, no additional training is needed

[355] Compare chapter 3.3.5

for enabling the employee to define which processes take place in his or her organizational unit.

Processes actually do not directly contain a *guiding character* to identify synergies. However, if the principles of PO are known, indirect guidance is given where synergies might be expected.

Processes as initial point do not fulfill the requirement of considering neither i) *existent and potential synergies* nor ii) positive and negative synergies.

Regarding the requirement to enable a *personal independence* in the synergy identification process the approach to choose processes as initial point indirectly supports this requirement. Due to its simplicity this approach allows to involve a multitude of persons into the synergy identification approach; thus, it is partially ensured that the synergies identified do not only describe the opinion of one expert but different persons.

Processes and process orientation indirectly allow for a *derivability* of action plans from the synergy identification process. If a process is, for instance, carried out in other organizational units, it might indicate that synergy potentials between these organizational units might be present. Additionally, processes with a high number of unneeded interfaces might indicate that the integration of up or downstream processes might lead to synergies.

The results of the fulfillment of the requirements towards a synergy identification approach of processes as initial point for synergy identification are summed up in the table below.

Requirement for synergy identification	Fulfillment of requirement
Industrial independency	++
Cross-functionality	++
Hierarchical integrity	0
Simplicity	++
Guidance character	+
Consideration of existent and potential synergies	0
Consideration of positive and negative synergies	0
Relative personal independence	+
Derivability of fields of action	+

Table 16: Fulfillment of requirements for synergy identification procedure based on processes

The second main question – which effect do the PO principles have on the identification phase when processes are the basis for synergy identification – partially refers to chapter 4. This chapter identified i) how the principles of PO affect the utilization of synergies, ii) how they affect the synergy key influential factors and iii) which general

commonalities exist between the two concepts of PO and SM. Hence, in this chapter it was observed that PO generally has a positive supportive character for the concept of synergies and the utilization of those. However, this finding has a wide-ranging character and does not specifically consider if the principles of process orientation effect the identification phase when processes are the basis for synergy identification.

This is why the effects of PO on the identification phase of synergies based on processes need to be considered in particular. For this reason the effects are rated as i) very positive (++), ii) positive (+), iii) neutral (O), iv) negative (-), v) very negative (--), which is done by opposing the essential principles of process orientation with their effect on the synergy identification phase.

By taking a process as initial point for synergy identification the *principal-agent relationship* does have a neutral effect on the synergy identification process. This is because this principle only regulates the interface between different processes which basically does not influence the identification of synergies.

The principle of the *end-to-end responsibility* has a very positive effect on the identification of synergies when processes are the basis for synergy identification. The reason is that this principle is able to indicate synergies between processes which are separated due to structural organizational interfaces. Often synergies are not used between similar processes only because structural organizational boarders separate the natural process into pieces including wrongly designed ranges of responsibility.[356] The principle of the end-to-end responsibility supports to question if the regarded process is effectively designed end-to-end and in the second step if organizational boarders separate the process in a way that the utilization of synergies is hindered. In case of structural organizational misfits in accordance to the end-to-end responsibility synergy potentials can be derived.

If synergies would be, for instance, searched in the paint shop quality department to improve the paint quality of the vehicles delivered to the customer, the end-to-end principle would, in this case, broaden the perspective by including at least the press shop, body in white and assembly into the consideration simply because they all together affect the quality of the paint delivered to the customer. A potential result might be that quality inspection and rework would be reduced in the body in white and paint shop department because the root cause for imperfect paint finish would lie in the assembly department.

[356] Which in turn are key influential factors for synergy identification.

If processes are taken as basis for the synergy identification the *makrodesign and microdesign PO* principle is able to support the identification process by indicating the proper procedure: from the general to the detailed, from top to bottom. In practice this principle also supports to question if additional superordinate or subordinate synergies exist.

If, for instance, purchasing synergies are searched on the working level of the maintenance department, the principle would indicate to search for the synergies at first on the higher organizational levels and afterwards on the lower levels. This might result in the purchase orders for robots being bundled across all plants, instead of only one plant.

Cascading has no effect on the identification of synergies based on processes. The reason is that process cascades only indicate how the vertical connection between processes should be designed, which does not indicate any potentials to derive synergies.

Modularization has a positive effect on the synergy identification phase if processes are used as basis because it is able to indicate synergies which might be present between process modules. Thus, it supports to question if there are similar processes as the one under investigation, which might serve different customers but still allow for synergies.

If, for instance, a paint shop equipment planning department is searching for synergies, the principle of modularization would suggest searching for synergies within planning departments of the press shop, the body in white as well as the assembly. A potential result might be that the same planning software would be installed across the departments.

Horizontal integration is supportive for the synergy identification process because it can indicate synergies which are present between horizontally separated processes which are depending on the same resources. Thus, it supports to question if up or downstream processes make use of resources which can create synergies.

If, for instance, the body in white equipment planning department is searching for synergies, the principle of horizontal integration would suggest deriving synergies with up or downstream processes. A downstream process is, for instance, the equipment maintenance process, which has to maintain the previously planned equipment in the equipment use phase. A potential outcome might be that the knowledge about the maintenance costs would be used by the planning department to plan a more cost efficient equipment regarding the investment as well as costs of use.

A summary of the effects of the PO principles on the identification phase is given in the table below.

Process Orientation Principle	Effect on the identification phase of synergies
Principal-agent relationship	0
End-to-end responsibility or process ownership	++
Makrodesign and microdesign	+
Cascading	0
Segmentation	+
Modularization	+
Horizontal integration	+

Table 17: Effects of the process orientation principles on the identification phase of synergies

Even though the PO principles have a generally positive influence on the identification and definition of synergies, their effect is not sufficient for enabling a systematic synergy identification approach. However, the hypothesis of this subchapter is proven: processes and process orientation are a valuable basis for the synergy identification procedure. This is why processes are defined as initial point for the synergy identification approach. As Michael Porter made use of the value chains of different organizations to identify synergetic interrelations,[357] the approach elaborated in this thesis for production environments is based on processes as initial points for synergy characterization. Processes initialize the synergy identification and definition procedure, but do not characterize or categorize synergies themselves.

A categorization of process-based synergies is needed to give the person who is in charge of finding synergies advice where synergies are to be found. Without a synergy categorization the procedure of searching for synergies does not meet the requirement of a guiding character, thus making the systematic identification of synergies impossible. For this reason the categorization of synergies based on processes needs to be defined for enabling a systematic procedure which fulfils the requirements towards a synergy identification process in subchapter 5.3.1. The synergy categorization now requires the strict sticking by processes, since they are the basis for the identification process. Hence, the process as such also has to be the basis for the synergy categorization. However, process orientation does not indicate any valuable source for how process-based synergies can be categorized. For this reason a new synergy categorization method needs to be developed which is based on processes.

[357] Porter M. 2010 pages 409ff.

5.3.3 The Two Perspectives on Synergies in Production Environments

After processes were defined as basis for the synergy identification systematics in the previous subchapter, this subchapter defines which process-based synergies have a non-systematic character and thus need to be excluded from the scope of this thesis.

A valuable source to determine non-systematic characteristics of synergies based on processes is enabled by the resource-based view (RBV)[358], which defines what is needed in the "process black box" to generate customer value:[359]

1. Capabilities
2. Resources

Capabilities are non-transferrable and firm-specific, implicit resources such as skills and knowledge about how to carry out a particular activity. [360] *Resources*[361] are "the assets that a firm employs in its efforts to generate economic value"[362]; they are further subdivided into:

1.1.Intangible
1.2.Tangible
1.3.Human

Intangible resources include knowledge, relationships with customers or trade secrets. *Tangible resources* include, amongst others, equipment, plants or raw material, while *human resources* include individual skills, knowledge and abilities of the specific employee.

Regarding capabilities and intangible resources from the synergy perspective based on processes the result is mainly the exchange of knowledge as synergy source, which can be used systematically. Tangible resources can also be transferred into a synergy

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[358] Barney J. 1991 page 639 ff. compare also Shane S. 2009 pages 258 ff.

[359] The creation of value for the customer is the logical link between process orientation and RBV.

[360] According to the RBV capabilities create competitive advantage if they are rare, valuable, inimitable, durable and non-substitutable. Shane S. 2009, page 264

[361] According to RBV the transformation of resources into products is only a sustainable competitive advantage (SCV) if the process is valuable, rare, non-substitutable, difficult to imitate and durable. S.Shane 2009, page 259

[362] Shane S. 2009 page 265. Referring the RBV-resource definition to Hammer's definition of a process, the resources are part of the inputs which are creating customer value through activities (and capabilities). Chaterjee S. and Wernefelt B. 1991 page 34 ff. differentiate between i) financial resources, ii) material resources and iii) immaterial resources. The former are part of the tangible resources in this thesis.

systematics since tangible resources, such as equipment, can be used commonly by different processes. However, pertaining the latter, human resources, from a synergy perspective the fact that each individual employee would be the source of the process synergy would be the result. In contrary to the shared use of tangible resources, the pooling of employees requires the specific knowledge of the individual employee's skills, knowledge and abilities; a fact which complicates the systematic search for synergies in production environments. Therefore, two general perspectives on synergies which account for this difference in production environments are implemented: the i) process perspective and ii) personnel perspective.

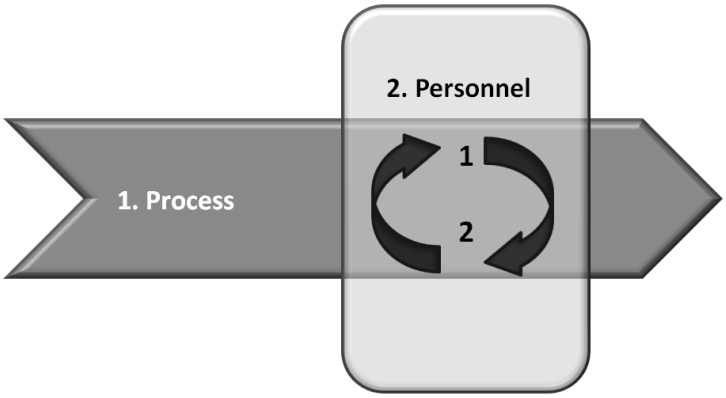

Figure 27: Synergy perspectives

The *personnel perspective* includes, among others, employee specific skills and generally all other implicit characteristics of the specific employee which are not directly detectable in the synergy identification process. These characteristics lead to personnel immanent synergies which result from the single employee's qualification and other personal tacit factors. The synergetic effect is thereby an outcome of the employee's background, knowledge and experience. Example: An experienced engineer with business administrational education can potentially operate in different processes, which require engineering as well as economical knowledge. The synergetic effect is here the simultaneous assignment of one employee for multiple processes which results in headcount savings as well as potential multi-additional knowledge effects which would have not occurred in assigning the job to an engineer and a business economist.

For the consideration of personnel immanent synergies in the production environment, the systematics needs to be different to other resources needed for the specific process and is rather to be assigned to the human resources management. The personnel perspective, which includes personnel immanent synergies, is excluded from the synergy identification in this thesis.

The *process perspective* describes process immanent synergies which result from process characteristics which are further detailed in this thesis. They are based on the configuration of the utilization of capabilities, tangible and intangible resources.

Even though the personnel perspective is excluded in further consideration, one must bear in mind that both perspectives mutually affect each other. If personnel changes are made in the process, the skills of the new personnel might have an effect on the process. If process changes are made, they can affect the required skills of the personnel.

After personnel immanent synergies are excluded from the scope of this thesis the synergy categories based on processes including capabilities, tangible and intangible resources are defined in the following subchapter.

5.3.4 Synergy Categories

Up to here, proof was given that processes are a valuable basis for the synergy identification procedure and that personnel immanent synergies need to be excluded from the synergy identification procedure in the previous chapter. The synergy categorization for the production environment is presented in this subchapter. These categories were developed by the researcher during his involvement in the three case studies[363] at the BMW group. The initial categories used in the first weeks of the first case study, which were partially based on the theoretical findings presented in chapter 2.3, were further developed during the three case studies up to the final level presented in the following. The improvement of the categories was an iterative process based on the feedback from the case study participants, the effectiveness of the categories as well as the comparison of the findings with theoretical approaches presented in chapter 2.3.

The main reason why the categories presented in chapter 2.3 needed to be further developed by the researcher for the application in production environments was their non compliance to the requirements introduced in chapter 5.3.1, most important these synergy categories were too complex in order that a broad user base consisting of all hierarchical levels could apply them for identifying synergies.

The synergy categories for the identification of synergies in production environments are the following:

1. Operational synergy
2. Knowledge synergy
3. Sourcing synergy
4. Resource synergy
5. Strategic synergy

1. *Operational synergies* are present if the combined accomplishment of a process or of activities itself creates a larger value than the independent solution. Synergetic effects of

[363] Case studies see chapter 6

operational synergies are, amongst others, cost savings, mainly due to optimized staffing, output quality improvements or reduced throughput time.[364] Operational synergies are primarily enabled through structural organizational or process changes, where the mode of "doing the process" is changed. Generic options for enabling operational synergies are:

i. the centralization/decentralization of the same processes in different areas
ii. the integration/segregation of an up or downstream process or
iii. the integration/segregation of a non-directly related process

Example

Process: Maintain Robots Synergy Category: Operational Synergy

The process 'maintain robots' is carried out independently in different organizational areas of a production plant consisting of a press shop, body shop and paint shop. It includes the activities, or subprocesses: plan maintenance, refurbish robots, and order equipment. The purchasing of the equipment needed for this process takes place in an upstream central purchasing department which operates independently for each organizational area. The application of the generic options of the operational synergy to the example is as follows:

i. The 'maintain robots' process is carried out commonly for all organizational units. Due to an optimized human resource allocation for the common solution a reduction of the combined process staffing and additional throughput time reductions are possible without decrease of process quality.
ii. The 'maintain robots' process is supported by the 'purchase equipment' process of a different organizational unit. By combining both processes a reduction of the combined staff is possible because the maintenance staff is able to do the orders on their own without decreasing the quality of the two processes. The optimized interface additionally improves the quality and throughput time of the purchasing process.
iii. A 'control production' process is present in a different organizational unit which is responsible for controlling the production equipment data as well as major KPI such as throughput time. By combining this process with the 'maintain robots' process the quality of both processes is improved without changing the number of employees.

2. *Knowledge Synergies* are present if the combination or sharing of knowledge creates a larger value than the isolated solution. Synergy effects related to knowledge synergies

[364] Compare also 2.3.3 for the sources of operative synergies.

are learning curve effects, elimination of duplication, as well as innovation. Knowledge synergies can be exploited by means of various synergy enablers, primarily those belonging to the group of data storage/exchange, such as knowledge management software systems, but also formal and informal organizational solutions, such as meetings. Even though organizational structure changes, such as centralization, support knowledge synergies, they are not needed to exploit this kind of synergy. Generic options for enabling knowledge synergies are:

i. sharing of process specific knowledge
ii. combination of process-specific knowledge
iii. minimization of reinventing the same ideas at different locations
iv. coordination where needed knowledge has to be developed

Example

Process: Maintain Robots Synergy Category: Knowledge Synergy

The process ‘maintain robots’ is carried out independently in different organizational areas of a production plant consisting of a press shop, body shop and paint shop. It includes the activities, or sub processes: plan maintenance, refurbish robots, and order equipment. The purchasing of the equipment needed for this process takes place in an upstream central purchasing department which operates independently for each organizational area. The application of the generic options of the knowledge synergy to the example is as follows:

i. The way how robots are maintained in the body shop is shared with the other organizational units by means of work instructions.
ii. The failure performance data collected in the single organizational areas is centrally collected and provided to all areas. With this approach the quantity of initial data is increased and the statistical significance results in a higher prediction accuracy of specific robot failure modes.
iii. By exchanging approaches for how often robots need to be maintained costly analyses can be reduced to a minimum and the results can be used by all.
iv. For specific applications expert knowledge is too expensive. For robot applications the knowledge how to use gluing end effectors can be useful, but is not needed in each and every organizational area. In that case it is sufficient to have work instructions in one place and make use of it for every organizational area if needed.

3. *Sourcing synergies* are present when the combined effect of sourcing resources is higher than the single solution. These synergies result from an optimized negotiation power for purchasing of goods, credits, tax benefits and subsidies as a result of economies of scale. They include positive effects such as the reduction of purchasing and stock costs, improve the availability of the products, improve quality of the purchased goods and increase the flexibility. Synergy effects of sourcing synergies are

primarily found in economies of scale and deployment of power. The generic option for enabling sourcing synergies is:

i. The centralization of the demand[365]

Process: Maintain Robots Synergy Category: Sourcing Synergy

The process 'maintain robots' is carried out independently in different organizational areas of a production plant consisting of a press shop, body shop and paint shop. It includes the activities, or sub processes: plan maintenance, refurbish robots, and order equipment. The purchasing of the equipment needed for this process takes place in an upstream central purchasing department which operates independently for each organizational area. The application of the generic option of the sourcing synergy to the example is as follows:

i. The robots are bought centrally for all organizational units and plants.

4. *Resource Synergies* exist when the common use of i) intangible, ii) tangible and iii) human resources which were previously used independently creates a greater value than the independent solution. Primary synergy sources for resource synergies are economies of scale and scope, transactional cost benefits and quality improvements. The generic options for enabling resource synergies are:

i. The physical sharing the same resources.
ii. The extension of the use of resources in other processes.
iii. The shared use of technologically sophisticated solutions, which would be too costly for exclusive use.

Example:

Process: Maintain Robots Synergy Category: Equipment Synergy

The process 'maintain robots' is carried out independently in different organizational areas of a production plant consisting of a press shop, body shop and paint shop. It includes the activities, or sub processes: plan maintenance, refurbish robots, and order equipment. The purchasing of the equipment needed for this process takes place in an upstream central purchasing department which operates independently for each organizational area. The application of the generic options of the resource synergy to the example is as follows:

[365] Note that the centralization of the sourcing demand does not necessarily require a structural organizational centralization.

i. The same software for equipment data analysis is used for all functional areas. As a result, license costs are reduced and costly customized solutions are replaced.
ii. The body shop was equipped with new toolkits; the old toolkits are further used in the body shop.
iii. One thermal camera is shared between all organizational units for preventative maintenance; it needs to detect high temperatures in equipment bearings which might lead to downtimes. The single purchase for one organizational unit is too expensive and thus no option.

5. *Strategic Synergies* are a result of a commonly defined plan of action and determine how the goals of the process are achieved together; this creates a greater overall value than the independent solution. In contrast to the other synergy categories strategic synergies do not refer to the current processes, including all three process elements, but rather to the potential future configuration of them. Thus, strategic synergies are not immediately affecting the process, but they enable new patterns how all process elements are configured in the future by means of cooperation. Since strategic synergies have a wide ranging scope, there are no specific generic options how they are enabled.

Process: Maintain Robots Synergy Category: Strategic Synergy

The process ‘maintain robots’ is carried out independently in different organizational areas of a production plant consisting of a press shop, body shop and paint shop. It includes the activities, or sub processes: plan maintenance, refurbish robots, and order equipment. The purchasing of the equipment needed for this process takes place in an upstream central purchasing department which operates independently for each organizational area. The application of the generic options of the strategic synergy to the example is as follows:

i. How future preventative maintenance is carried out for the major equipment and which KPI’s are used in the maintenance process, is decided by all organizational units. Highly specific operations, such as thermal camera checks, are performed centrally for all organizational units, even though the organizational units stay independent regarding the rest of the operations carried out in the main process ‘maintain robots’.

The synergy categories are not mutually exclusive, but they can influence each other. The implementation of an operational synergy, for instance, often goes hand in hand with the utilization of knowledge, but also sourcing and resource synergies. A parallel or simultaneous utilization of multiple categories is possible. The strategic synergy, as

an exception, has no direct synergy source but enables the utilization of the other synergy categories in the future.

The definition of the five synergy categories is beneficial for the synergy identification systematics in production environments compared to other approaches. [366] It provides guidance to the person in charge of identifying synergies by predefining all potential synergies from the process perspective. Thus, he or she does not need to consider i) which general options are available and ii) how to ensure that all potential sources for synergies are regarded. In contrast to other synergy categories introduced in chapter 2.3, the defined synergy categories are simple enough to allow for a broad user base for synergy identification.

After this subchapter has defined the core element of the synergy identification systematics, the synergy categories, the following subchapter defines further elements which are needed to identify process-based synergies in production environments.

5.3.5 Synergy Levels

Only defining synergy categories which are based on processes is not sufficient for a synergy identification systematics in production environments. Synergy categories are able to guide the person in charge of identifying synergies in terms of the general options which are present for utilizing synergies, but they do not indicate where these synergies are located.

Identifying where the synergy is located is of importance because the synergy categories can be present at the same organizational level where the process takes place, but they can also be available on a higher or lower process or structural organizational level. For instance, if an operational synergy is located on a process level x, one cannot rule out that the same processes knowledge synergies are located on a higher process or structural organizational level. Thus, it is vital to have an indicator showing where the specific synergy is located in the structural organizational context or process organization.

For this need it is beneficial to make use of the general hierarchical organizational structure or the process organizational structure to allocate the synergy categories. The former is reasonable because it exists in every organization.[367] The latter allocation of the synergy category to the process organizational structure is possible, but only recommended if a consistent and holistic process map which clearly indicates all

[366] Compare chapter 5.3.1

[367] Compare Figure 11 in chapter 3.2.2

process levels already exists. This is due to the fact that processes are usually not holistically mapped in all organizations, and if a process map exists, many employees are not familiar with it. Both i) the presence of a visualized process organization and ii) the familiarity within the organization are required when the process organizational structure is used for locating synergy categories in the organization.

Resulting from the fact that the hierarchical structural organization is present in all organizations and the majority of employees are familiar with it, it will be used for locating the process based synergy categories in production environments. In case a firm is making use of a matrix structure, it needs to be reflected accordingly on a proper hierarchical level. Because synergies are also feasible between different companies, the structural hierarchy is extended by this perspective. Since only the hierarchical levels are needed for the allocation of synergies, these levels will be referred to as synergy levels. A synergy level can, and should, be adapted to the existent organizational structure to facilitate the communication within the company during the synergy characterization process. In the specific case of the BMW Group the synergy levels are:

1. Group
2. Department
3. Main department
4. Plant
5. Technology
6. Product line
7. BMW group
8. Supplier
9. Automotive industry
10. Industry

The synergy levels one to seven represent the company's hierarchical organizational structure, while synergy levels eight to ten extend the perspective to organizational structures outside the company. All synergy levels describe where the synergy effect, resulting from the synergy category, takes place. In contrast to Biberacher[368] the synergy level is not used for the derivation of different synergy categories, but only for the allocation of the specific synergy category.

The localization of the synergy category is needed for further understanding the nature and the scope of the synergy category. Using operative synergies on the group level (1) is a different factual connection from the synergy perspective than exploiting the same synergy category on the plant level (4). The first one would represent that the operation

[368] see chapter 2.3 and Biberacher J. 2003 page 64

is done commonly for the group; the latter would indicate that the process is carried out commonly for the entire plant.

The attribution of different synergy levels to the corresponding synergy categories of one specific process is not a contradiction. It is a logical outcome of the process and the different characteristics of the synergy categories. When, for instance, a process is optimally carried out on the group level from the operational synergy perspective, the knowledge synergies can still be located optimally at the main departmental level, the sourcing synergies and strategic synergies at the BMW group level and the resource synergies on the departmental level. This principle is shown in the following figure.

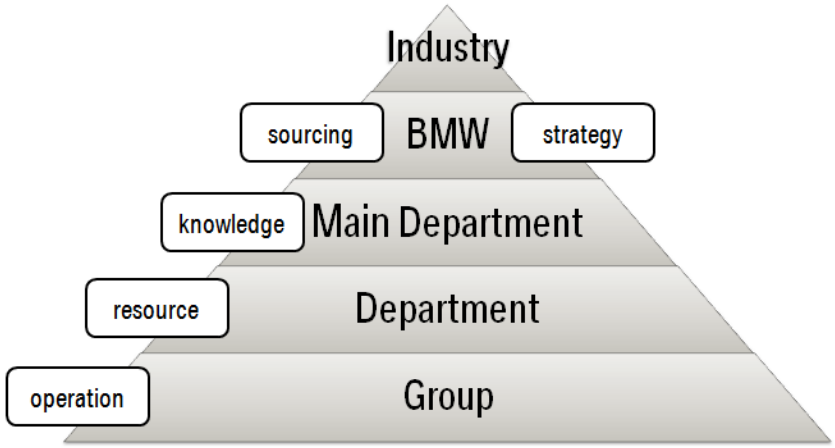

Figure 28: Independent allocation of synergy categories to synergy levels[369]

The result of the potential to allocate the five synergy categories of one specific process to different synergy levels is dissociation from the idea that the synergies need to be used in the same organizational area where the activity takes place. This is why the dissociation of the synergy categories by means of the synergy levels is advantageous for the synergy identification procedure because it suggests the person in charge of identifying synergies, that the allocation of the different synergy categories is independent from the actual activity. This way the person is motivated to think out of the box and question where the synergy categories need to be allocated ideally.

After the synergy levels were established as the second characteristic to identify process-based synergies in production environments, the systematics how synergies are identified by means of both, the synergy category and the synergy level is explained in the following subchapter.

[369] The amount of synergy levels is reduced in comparison to the BMW synergy levels listed before.

5.3.5.1 The Two-Dimensional Framework for Synergy Identification: Combination of the Synergy Category and the Synergy Level

Combining the synergy category with the synergy level from the process perspective allows for holistically and systematically map synergies in business organizations. Setting the single processes as initial points ensures the integrity of recording all organizational actions. Questioning which synergy category is used for the specific process, by regarding all five categories, supports that not only obvious synergies are regarded. Assigning the synergy level to the process-synergy category supports the question if the synergy is exploited on the right level.

With this systematics organizational units are able to map their actually exploited synergies and simultaneously identify future synergy potentials. Thus, synergies and synergy potentials are identified with the same systematic. The explicit differentiation into positive and negative synergies is also possible by explicitly asking for positive and negative synergies, but not necessary with this procedure. Thus, the existence of negative synergies can be i) allocated by means of the systematics in the first step and subsequently ii) eliminated by allocating the synergy category to a proper synergy level.

The key questions resulting from the combination of the synergy category with the synergy level from the process perspective are:

1. Which synergy category is used for the process?
2. On which synergy level is the specific synergy category used?
3. On which synergy level should the specific synergy category be used?
4. Which additional synergy categories can be used for the process?
5. On which synergy level should the additional synergy category be used?

Questions one and two refer to the status quo of the process and the use of synergies for the specific process. From the process perspective it is possible to assign multiple synergy categories on different synergy levels to one process. As already mentioned, different synergy levels which are assigned to the specific synergy categories of one process are no contradiction but a desirable effect of this approach.

Since the allocation of synergy categories is usually not elaborated in organizations but rather a side effect of the organizational structure, question three supports to question if the synergy category is allocated on the proper synergy level. A potential result of asking this question is shown in the figure below.

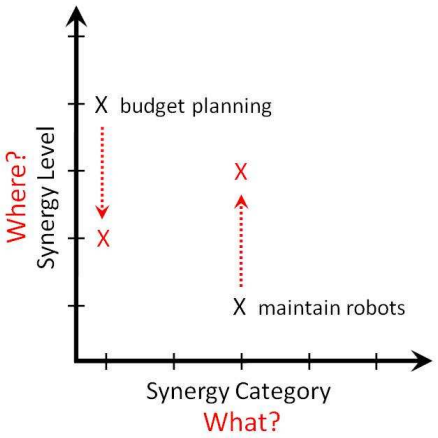

Figure 29: Example of synergy level adaption

Figure 29 exemplarily shows the synergy level adaption of the two independent processes 'budget planning' and 'maintain robots'. In the first case the operational synergy is best suitably exploited when the 'budget planning' process takes place on a lower synergy level and is not centralized on a high synergy level. An example for this case is a company performing the yearly budget planning process centrally in the headquarters for all production sites. Due to the distance to the production sites and the involved lag of information the process outcome is of poor quality and without value for the company[370]. The adaption from the synergy point of view is in this case to place the budget planning process on a lower level, for instance the main departmental level, to improve the quality of the process outcome.[371]

The second case for purchasing synergies of the 'maintain robots' process can be optimized by buying the spare parts on a higher synergy level. Again, the decision needs to be based on an appreciation of synergetic values for the process. Note that if the purchasing part of the 'maintain robots' process is placed on a higher level it does not automatically mean that the subprocess 'purchase robot spare parts' must necessarily take place in a different organizational unit! The process can still stay in the same department, but due to changed process instructions (price negotiation on high level, purchasing process on low level) the exploitation of the synergy is still possible.

Questions four and five refer to additional potential synergies which need to be defined by the synergy category and the according synergy level. They follow the same

[370] At the same time, this is a good example for negative synergies through the centralization for saving headcount.

[371] Note: in this simple case potential extra expenses for placing the operation on a lower synergy level need to be calculated against the beneficial synergetic effect.

characterization logic as the first questions but deal with synergy potentials, rather than already existent synergy effects.

The systematics is shown below.

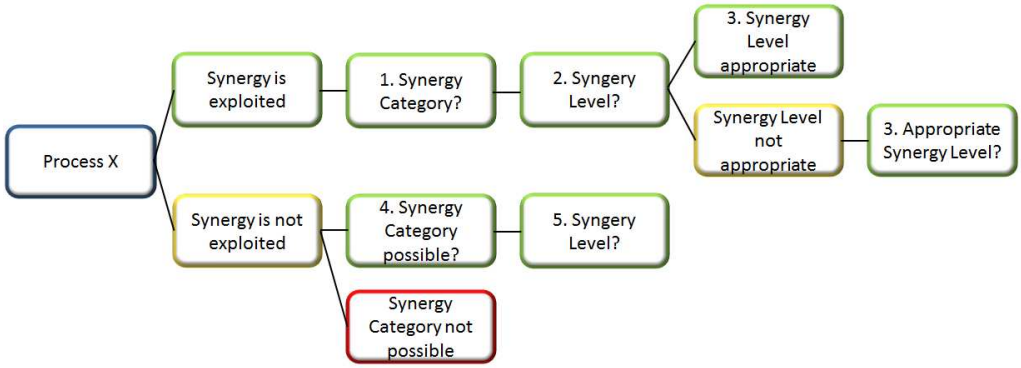

Figure 30: Synergy category – level logic

For detaching the synergy categorization from i) primarily apparent synergy categories and ii) existent organizational charts and boarders it is advantageous to follow *this two-dimensional systematics to identify synergies* by combining synergy categories with synergy levels.

In the first step every process is reviewed on its existent use of the five synergy categories, following the upper path in Figure 30. Following this path leads to the question if the synergy categories are located on the right synergy level, or if it needs to be adapted on a different level.

The second main path on the lower part of the figure derives new synergy potentials by questioning if additional synergy categories can be utilized for the specific process. In case it is possible to make use of additional synergy categories, the appropriate synergy level is pinpointed and the according synergy potential is identified.

Even though new synergy potentials are mainly identified in the second main path, the definition of existent synergies is recommended. The combination of both paths enables the user to derive new synergy potentials based on existent synergies.

In general, the two-dimensional systematics satisfies all requirements to identify synergies in production environments:[372] The *industrial independency* is given because i) the identification systematics is based on processes which are present in all industries, ii) the synergy categories are generally valid and iii) the synergy levels are adaptable to every organization.

[372] Requirements compare chapter 5.3.1

Cross-functionality as a requirement is satisfied by i) relying the identification systematics on processes which are, by definition, cross-functional with an end-to-end character as well as ii) adding the synergy levels which support the cross-functional character on a specific hierarchical level.

Hierarchical integrity is given by i) deciding for processes as initial point for the identification systematics processes take place on all hierarchical levels, ii) deciding for general valid synergy categories which are independent from the hierarchical level and iii) the definition of synergy levels which enable the hierarchical independent allocation of the synergy categories.

The requirement of a *simple* procedure is satisfied because of i) the definition of processes as initial point; everyone knows which processes are present in his/her organizational unit, ii) the definition of few categories which are easily understandable, iii) the definition of synergy levels which are aligned to the specific organizations hierarchical structure and iv) the overall procedure which only requires defining the process, the according synergy categories with the correspondent synergy level.

A *guidance character* is primarily given by i) the defined synergy categories but also by ii) the instruction to first define the process and identify the according synergy categories and levels.

The *consideration of existent and potential synergies* is included in the five key questions of the synergy category-level logic. *Positive and negative synergies are considered* i) by the possibility to indicate them and ii) by the question where a specific synergy category should be allocated to eliminate negative synergies.

Relative personal independence of the synergy identification process is made possible through two factors: On the one hand it is the simplicity of the procedure allowing for addressing a broader audience for identifying synergies, thus reducing the influence of individual persons on the exploitation of synergies. On the other hand, the comparability which is granted as the identification process is based on processes, which allows for a cross-comparability of synergy utilization of similar processes in different organizational units.

The requirement for being able *to derive fields of action* based on the synergy identification systematics is given by answering the third, fourth and fifth key questions resulting from the combination of the synergy category with the synergy level. The answers indicate what needs to be done for guaranteeing the utilization of the desired synergy. However, this is only a first indication and no direct action plan. The derivation of an action plan would additionally require that it is known how the synergy can be translated into practice. The answer how synergy potential can be translated into practice is generally answered by means of the appropriate synergy enabler. The synergy enablers are derived in the following chapter and simultaneously constitute the extended third synergy dimension.

5.3.6 Synergy Enabler

An additional third dimension to the two-dimensional procedure for identifying synergies presented in the previous subchapter is given by the synergy enabler. Synergy enablers describe how the synergy category is transferred into practice in the organizational environment. They are not mandatory in the identification systematics, but an option which describes the process-based synergy utilization in more detail.

This third dimension is of interest because it indicates which general options are available to operationalize synergies. Thus, it supports the organizational awareness that synergies can often also be used without the need for centralization or structural organizational changes. The synergy enablers defined in this thesis are based on the theoretical input in particular from chapter 2.4.2, where organizational support factors for the utilization of synergies were presented, chapter 2.6 where the challenges of synergy utilization and implementation were introduced, as well as evidence from the case studies.

The synergy enablers are clustered into primary, secondary and tertiary synergy enablers. *Primary synergy enablers* are directly responsible for making the synergy possible and they are required. *Secondary synergy enablers* are needed to support the primary synergy enablers to facilitate the synergy and they are a prerequirement. Without the existence of the secondary synergy enablers the full potential of the synergy can often not be used. *Tertiary synergy enablers* indirectly support both, the primary and secondary synergy enablers and they are not required for enabling the synergy effect but act supportive. The synergy enablers defined in this thesis are the following:

Primary synergy enabler	Secondary synergy enabler	Tertiary synergy enabler
1.1. Organizational Structure 1.1.1. Centralization or decentralization of organizational units 1.1.2. Partial and temporary centralization or decentralization of organizational units 1.1.3. Integration of up or downstream organizational units 1.1.4. Integration of non-related organizational units 1.1.5. Matrix organization 1.1.6. Process orientation incl. process ownership 1.1.7. Horizontal structures	2.1. Standards 2.2. Ownership 2.3. Horizontal systems 2.3.1. Horizontal procedures 2.3.2. Horizontal incentives 2.4. Horizontal human resource practices 2.5. Horizontal conflict resolution processes	3.1. Interrelation /synergy champions 3.2. Top management support 3.3. Transparency 3.4. Synergy systematics 3.5. Change management support 3.6. Implementation plan
1.2. Operational Structure 1.2.1. Process regulation; who does what 1.2.2. Resource regulations; who uses what, when and where		

1.2.3. Process instructions 1.2.4. Integration of activities and resources 1.2.5. Supplementation/access/power 1.2.6. Transfer of activities and resources 1.2.7. Balance of activities and resources 1.2.8. Meetings 1.2.9. Committees 1.2.10. Forums 1.2.11. Task forces 1.2.12. Projects 1.2.13. Job rotation 1.2.14. Trainings 1.2.15. Data pools and IT systems		

Table 18: Synergy enabler

Because the synergy enablers are either self-explanatory or were already explained in the previous chapters,[373] a detailed introduction is omitted in this subchapter.

The primary synergy enablers are further divided into the organizational structure and the operational structure synergy enablers. This differentiation is made because the former synergy enablers require an adaption of the formal organizational structure; the latter only require an adaption of the mode of operation, or the informal organizational structure, within the organization. Since the operational structure is easier to adapt, it is recommended to first question if an adaption of the mode of operation is sufficient for using a synergy before organizational structure changes are decided.

Regarding the secondary synergy enablers, it is important to question if one of them is mandatory for the implementation of a desired synergy. Especially standards are often required before a synergy can be utilized. Still, in some cases it should be questioned if required organizational changes should be implemented before the secondary synergy enabler is available. This approach can in some cases support a faster implementation of the secondary synergy enabler due to the pressure of the new organization.

Even though the tertiary synergy enablers are not mandatory, for the synergy effect itself, their need for the implementation of a specific synergy should still be scrutinized. Especially radical changes can require specific tertiary synergy enabler to be used for the implementation phase. Making use of these enablers can often be easy and effective for the implementation phase.

[373] Details see chapter 2.4.2 and chapter 2.6

With the definition of the synergy enabler, in addition to the synergy category and level, the requirement of a derivability of action plans resulting from the process identification procedure is supported. As a result from the according synergy enabler, the person in charge is able to derive what is needed to operationalize the synergy.

After the third optional dimension of the synergy identification systematics was introduced, a summary of all three dimensions and their role for the synergy identification procedure is given in the following subchapter.

5.3.7 The Three-Dimensional Framework for Synergy Characterization in Production Environments

The previous subchapters introduced the key elements for identifying synergies in production environments which resulted in the two dimensional framework for synergy identification as well as the synergy enablers. The combination of the two dimensional framework for synergy identification with the synergy enablers is the three dimensional framework for synergy characterization in production environments. It characterizes i) what synergy categories exist on ii) what synergy level and iii) which synergy enablers are needed to transfer the synergy or synergy potential into practice.

This framework is based on processes as initial point for the synergy identification process. The systematic steps which have to be followed in the synergy identification phase are:

1. Define all processes of the area of interest
2. Define which synergy category is used for the process
3. Define on which synergy level the synergy category is used
4. Define on which synergy level the synergy category should be used
5. Define which additional synergies can be used for the process
6. Define on which level the additional categories should be used
7. Identify which synergy enablers are mandatory, and which are supportive for each synergy defined

In the first step, the person in charge of identifying synergies in an area of interest needs to define all processes which take place in this area. It is recommended to start listing all processes at the beginning for questioning if the level of detail is appropriate. As a rule of thumb, five to ten processes per organizational area are an appropriate value. If a consistent and holistic process map already exists, this step can be omitted.

After all processes were defined, steps one to seven allocate the synergy characteristics for each process in the three-dimensional synergy framework shown in the figure below. The result is an identification and characterization of existent and potential synergies of the specific processes.

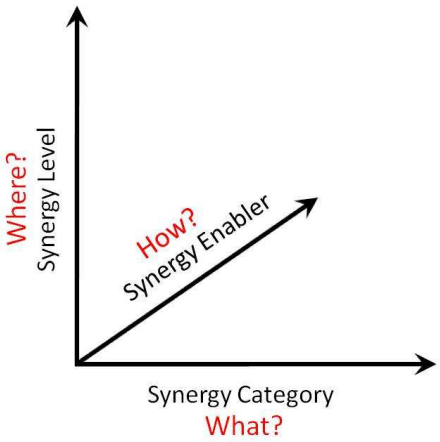

Figure 31: Three dimensions of synergy characterization

The basic idea of this framework is to identify existent and potential synergies by means of the combination of the five synergy categories with the synergy level[374] and subsequently to further characterize the specific synergy, or synergy potential, by means of the synergy enabler. The two dimensions, synergy category and synergy level, are mandatory. The former defines what kind of synergy one is dealing with, whereas the latter defines where this synergy is located. The third dimension, the synergy enabler, is optional. This third dimension does not support the synergy identification process but the synergy characterization, which is supportive for the synergy validation and implementation phases as well as derivation of action plans.[375]

Based on the experience from the case studies it is recommended to document all results in a spreadsheet for supporting the following steps of synergy analysis and synergy implementation. An exemplary format is shown on the next side.[376]

[374] Compare chapter 5.3.5.1

[375] Compare chapter 5.4 and 5.5

[376] During the BMW Painted Body Munich case study the processes of this organizational unit were gathered and the synergy characterization logic applied. Details about the case study see chapter 6.3.1.

Process	Synergy category used	Synergy level used	Potential synergy category	Ideal synergy level	Synergy enablers used	Additional synergy enablers required	Summary
Assembly 1	1 (operation synergy)	1 (group level)	1 (operation synergy)	2 (department level)	1.1.1 (centralization)	1.1.1 (centralization) 2.1 (standards) 3.2 (top management support)	Centralizing assembly 1 and 2
	2 (knowledge synergy)	2 (department level)			1.2.9 (committees)		
Purchasing of equipment	1 (operation synergy)	3 (main department level)			1.1.1 (centralization) 1.2.9 (committees)		
			1 (operation synergy)	4 (plant level)		1.1.1 (centralization) 2.1 (standards)	Centralizing purchasing of equipment on the plant level
	2 (knowledge synergy)	3 (main department level)	2	7	1.2.8 (meetings) 1.2.15 (data pools)	1.2.9 (committees)	Implement regular meetings between purchasing departments on the BMW group level
			5 (strategic synergy)	7 (BMW Group)		1.2.12 (project)	Define BMW group wide strategy for purchasing of equipment

Table 19: Example of synergy identification

The advantage of this systematic is that the data from different organizational units can be gathered allowing for i) the definition of cross-organizational approaches and ii) the comparison with other organizational units concerning which synergies they use in what way. The latter is also of interest for minimizing the influences of personal opinions on how synergies can and cannot be used; this way it can create a synergy utilization footprint. If a production plant A has a completely different synergy utilization footprint than a production plant B, it can be questioned why certain synergies are only used by one plant and not by the other. This comparison can be used as an indicator for all comparable organizational units.

The systematics for identifying synergies, which was developed in the previous subchapters, is the backbone for the synergy identification component of the PrOSyM. Yet, the procedure which needs to be followed within this component for the purpose of identifying synergies has not been explicitly defined so far. Nevertheless, the procedure for process design in BPM by Hammer and Hershman introduced in chapter 3.3.2 gives

the basis for the procedure of synergy identification. As indicated in this chapter, this general procedure including getting i) organized, ii) oriented, iii) crazy[377] and iv) real as well as the do's and don'ts[378] of process design in BPM is directly applicable for the synergy identification procedure. Thus the procedure by Hammer and Hershman should be employed together with the synergy systematics for the identification of synergies in production environments.

After the synergy identification and characterization systematics and the according procedure was developed as the key element of the Process Oriented Synergy Model in this chapter, the second step of the model is introduced in the following chapter.

5.4 Component Two: Synergy Analysis and Validation

The synergy identification process underlies certain subjectivity because of the nature of synergies as well as the persons involved in the process. In order to minimize the subjectivity and involve the effects on other processes and organizational units of the identified synergies, the PrOSyM model suggests the analysis phase subsequent to the identification phase. This phase defines which of the synergy potentials are desirable for the company in a broader organizational context and if the single synergy potentials match well when they are combined. However, due to the findings from chapter 2.5 which indicate that the quantification of synergies is not always transferable into clear measures, certain subjectivity in the assessment process of the synergy analysis will always remain.

What is needed in the analysis phase is an approach which is able to describe and assess the effects of the identified synergy on the organization and indicate which costs and risks are involved when deciding for the specific synergy. An additional requirement is the fit of the analysis phase to the previously defined synergy identification phase and specifically the synergy systematics as well as the adherence to the general requirements[379] of this thesis.

A valuable source for this need is Michal Porter's cost driver concept.[380] The cost driver concept holistically identifies which structural factors influence the cost behavior of the

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[377] Hammer M., Hershman L. 2010 page 56 ff.

[378] Hammer M., Hershman L. 2010 page 63 ff., 150, and 214

[379] Compare chapter 1

[380] Porter M. 2004 page 70 ff. Biberacher makes use of Porters cost driver concept to support the identification of synergies based on the cost saving potentials. Biberacher J. 2003 page 106 ff.

company's value chain activities; this is referred to by Porter as cost drivers. Several cost drivers can be combined to explain the total costs for the value chain activity. Since synergies can have an effect on different structural factors, the concept is suitable for analyzing the impact on different cost-affecting drivers. It does not only allow for analyzing the obvious synergy effects of the synergy under investigation but to diagnose if additional cost drivers are affected in a positive or negative way by the defined synergy. The analysis is suitable for every synergy category with the correspondent synergy level.

When analyzing the effect of the synergy on the cost driver, two perspectives need to be regarded:

- How does the specific synergy positively influence the cost driver?
- Which negative effects does the specified synergy have on the cost driver?

This fact is of importance because a synergy can have a positive influence on cost driver A but simultaneously a negative influence on cost driver B. In total, this can lead to a negative cost influence regarding the overall cost effect if B > A. Thus, all positive and negative effects of the analyzed synergy need to be weighed against each other for deciding if the resulting effect is desired. Since not all cost drivers can be measured by means of quantitative data, the assessment needs to involve both, quantitative as well as qualitative data.[381] In view of the fact that the importance of all cost drivers is case-dependent, a weighting approach is recommended prior to the synergy analysis process.

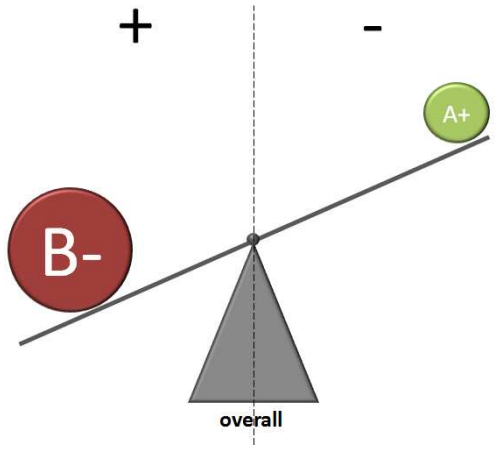

Figure 32: Synergy balance

[381] Compare chapter 2.5

The main focus of the analysis phase is the understanding concerning the influence of the synergies on all cost drivers to derive a tendency if the synergy should be implemented or omitted. Cost drivers identified by Porter are:

1. Economies or diseconomies of scale
2. Learning and spillovers
3. Pattern and capacity utilization
4. Linkages
5. Interrelationships
6. Integration
7. Timing
8. Discretionary policies independent of other drivers
9. Location
10. Institutional factors

1. *Economies or diseconomies of scale*[382] arise from the potential to perform activities more efficiently at larger volumes.[383] Increasing complexity and costs of coordination can cause negative effects and thus diseconomies of scale. Additionally, the scale sensitivity of activities and synergies has to be taken into consideration as it may vary from case to case. Scale economies in plants are affected by the number of variants as well as the length of runs chosen. As economies of scale are not all alike, the relevant measure of scale always needs to be taken into account. Some activities are influenced by the global or worldwide scale, for some the national, regional, local, plant or project scale might be the relevant measure to reduce costs.

2. *Learning and spillovers*[384] can positively influence the cost structure based on learning which increases the efficiency of the organization. It does not only include the classic learning curve effect but also cost savings based on the transfer of ideas such as improved product design, plant layout or scheduling. Cost advantages from spillovers only result from proprietary learning. Since mechanisms for learning differ and spillover effects need to be taken into consideration, the appropriate measures also differ from case to case.

[382] Porter M. 2004 page 70 ff.

[383] Details compare chapter 2.3

[384] Porter M. 2004 page 73 ff.

3. *Pattern of capacity utilization*[385] are of particular importance with activities with high fixed costs. These cause penalties for underutilization and save costs with a maximized utilization.

4. *Linkages*[386] as a cost driver are present if the activity affects the performance of other activities. Linkages include i) linkages within the value chain and ii) vertical linkages including suppliers. When activities are linked or decoupled, it can reduce or increase the total cost of the operations.

5. *Interrelations*[387] describe the sharing of activities with other units and have an effect on the cost structure since it potentially supports to achieve scale, go down the learning curve faster or improve the patterns of capacity utilization.

6. *Integration*[388] describes the addition of vertical activities to the process. They can affect the cost structure if activities of the external value chain are added to the internal value chain or internal processes are outsourced. Integration can reduce the costs of using the market, such as procurement and transportation, avoid the no nomination of suppliers with a high bargaining power, lead to economies of joint operations. At the same time, it can create inflexibility, insource activities which are more cost-efficient when performed externally, or raise exit barriers.

7. *Timing*[389] is primarily a cost driver in situations where first-mover or late-mover advantages are present but also applicable for other situation. It can also support companies which deal in cycle-related environments.

8. *Discretionary policies independent of other drivers*[390] describe policy choices of a company which tend to have an effect on the costs, such as:[391] i) product configuration, performance and features, ii) mix and variety of products offered, iii) level of service provided, iv) spending rate on marketing and technology development activities, v) delivery time, vi) buyers served (e.g. fewer, more efficient dealers versus many small ones), vii) process technology chosen, independent or scale, timing, viii) the specifications of raw material or other purchased inputs used, ix) wages paid and amenities provided to employees, relative to prevailing norms, x) other human resource

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[385] Porter M. 2004 page 74 ff.

[386] Porter M. 2004 page 75 ff.

[387] Porter M. 2004 page 78 ff. details see chapter 2.3.2

[388] Porter M. 2004 page 79 see chapter 2.4.2 and 5.3.6

[389] Porter M. 2004 page 79 ff.

[390] Porter M. 2004 page 80 ff.

[391] In accordance to Porter M. 2004 page 81

policies including hiring, training, and employee motivation and xi) procedures for scheduling production, maintenance, the sales force and other activities.

9. *Location*[392] as a cost driver refers to the value chain activity as well as related value chain activities. The geographic location influences the cost structure due to costs of labor, management, scientific personnel, raw materials, energy and other factors. Other factors which have to be considered are logistics, infrastructure, climate, cultural norms and tastes.

10. *Institutional factors*[393] as cost driver include government regulations, tax holidays, financial incentives, unionization, tariffs and levies, or local content rules.

Another valuable theoretical source which supports the analysis and validation phase and logically matches with the cost driver concept, is Michal Porters definition of cost groups which are created by combined activities; they are the:[394]

1. Costs of coordination
2. Costs of compromise
3. Costs of inflexibility

These costs groups describe which negative effects the utilization of synergies can generally have on the organization. In the same turn, these groups are of general relevance for all cost drivers since they can be applied case-dependently for each cost driver.[395] Thus, the cost groups are to be seen as an integral part of the cost drivers. One always needs to question if the cost group is of relevance for the specific cost driver synergy combination. The according assessment and validation logic of the synergy itself is to question which effect the synergy has on the according cost driver.

The cost drivers are used in the following to assess the value of the synergy by means of the synergy cost driver matrix. The matrix assesses the influence of the synergy on all cost drivers by assigning values of the specific synergy on the single cost driver; negative effects are rated between -10 till -1, neutral effects are rated with a 0 and positive effects are rated with a 1-10. The higher the value, the better is the effect of the synergy on the cost driver. Because the importance of each cost driver might differ from

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[392] Porter M. 2004 page 82 ff.

[393] Porter M. 2004 page 83

[394] Compare chapter 2.5.1

[395] Each of Porters cost driver again includes cost elements which lead to the total cost of the cost driver. The costs of cooperation are three of the many possible cost elements of each cost driver.

one organization to the other, a weighting factor is introduced to reflect this fact. Important cost drivers are rated with high values.

This approach offers the opportunity to reflect the actual importance of each cost driver on the company's cost structure and the strategic fit and to implement future strategic orientation in the synergetic assessment by weighting the cost drivers according to the future needs. The synergy cost driver matrix is shown in the following table.

Synergy under Analysis / Cost Driver	Weighting Factor (WF)	Synergy A	Synergy B	Synergy …
Economies of Scale	1-10	Rating x WF	Rating x WF	Rating x WF
Learning	1-10	Rating x WF	Rating x WF	Rating x WF
Capacity Utilization	1-10	Rating x WF	Rating x WF	Rating x WF
Linkages	1-10	Rating x WF	Rating x WF	Rating x WF
Interrelationships	1-10	Rating x WF	Rating x WF	Rating x WF
Integration	1-10	Rating x WF	Rating x WF	Rating x WF
Timing	1-10	Rating x WF	Rating x WF	Rating x WF
Discretionary Policies	1-10	Rating x WF	Rating x WF	Rating x WF
Location	1-10	Rating x WF	Rating x WF	Rating x WF
Institutional Factors	1-10	Rating x WF	Rating x WF	Rating x WF
Sum ∑	-			

Table 20: Synergy cost driver matrix

In cases when the sum of the effects is negative, the implementation of the synergy is not recommended. Values around zero should be assessed in detail making use of the synergy quantification methods presented in chapter 2.5 and other approaches which are able to identify the value of the specific synergy.[396] High positive values indicate the benefit of the synergy on the cost structure of the company and are recommended for implementation.

The Maintenance Triangle UK case study gives two examples for the principle of the synergy cost driver matrix. First, one needs to highlight the idea of a central store for standard spare parts for all departments located in Oxford, instead of having decentralized stores in all main departments which are not connected to one another. Second, it is validated that there is the synergy potential to centrally perform maintenance for all departments, compared to the status quo where each main

[396] Biberacher J. 2003 pages 123 - 174

department has its maintenance teams which are partially connected to production activities.[397]

Synergy under Analysis / Cost Driver	Weighting Factor (WF)	Central spare parts storage	Central preventative maintenance
Economies of Scale	8	8 x 8	3 x 8
Learning	4	6 x 4	3 x 4
Capacity Utilization	6	2 x 6	2 x 6
Linkages	9	-3 x 9	-7 x 9
Interrelationships	4	3 x 4	-5 x 4
Integration	6	1 x 6	-6 x 6
Timing	4	0 x 4	1 x 4
Discretionary Policies	1	0 x 1	0 x 1
Location	1	1 x 1	0 x 1
Institutional Factors	1	0 x 1	0 x 1
Sum ∑	-	80	-67

Table 21: Example: Synergy cost driver matrix

The first synergy potential of central spare parts storage shows a positive result and indicates that it affects the cost drivers in a positive way. Especially the economies of scale support this idea: i) spare parts can be purchased centrally and ii) since all departments make use of the same spare parts, a smaller total amount of spare parts at the location Oxford is needed compared to the actual situation in which each department stored its spare parts separately. The positive impact of learning effects is based on savings resulting from learning curve effects as well as an optimized utilization time of equipment.

This matrix is of high advantage since the cost-sensitive assessment, which requires a deeper financial as well as strategic understanding, is practically detached from the first synergy identification and definition process. This enables the organization to involve a multitude of persons in the first synergy identification process who have a broader experience in the processes, but perhaps not in the strategic and financial understatement to assess the real value of their synergy ideas. In the second step the financial and strategic experts are able to assess the actual value of the synergy ideas based on the cost drivers which are influenced by the synergy.

[397] In Body in White the machine operators also perform minor maintenance activities and maintenance staff partially supports the operators in their activities.

With this approach the organization can also ensure that the synergies have an overall positive effect and simultaneously implement counter measures for the cost drivers which were negatively influenced by the synergy.

In summary, this approach for assessing synergies has a holistic character since it includes all cost drivers which influence the financial situation of a company. The benefit is that the synergies are not only assessed towards their primary effect[398] but also against the influence on all other cost drivers.

After the desired synergies are defined, the final step of the analysis and validation phase is to confirm if they fit together. This step is of importance because synergies can influence each other. Since the synergy identification phase can involve different persons from different organizational areas it has to be ensured that the single synergies do not influence each other negatively. This synergy fit is derived by means of the following matrix:

	Synergy 1	Synergy 2	Synergy 3	Synergy 4	Synergy 5
Synergy 1		fit / misfit	fit / misfit	fit / misfit	fit / misfit
Synergy 2			fit / misfit	fit / misfit	fit / misfit
Synergy 3				fit / misfit	fit / misfit
Synergy 4					fit / misfit
Synergy 5					

Table 22: Synergy fit matrix

The matrix opposes the synergies and determines whether the simultaneous use of both synergies is possible (fit) or not (misfit). In case of a misfit the synergies have to be analyzed for a potential adaption leading to a fit situation. When the result is still a misfit, it needs to be determined which of the two synergies should be implemented.

An example from the Painted Body case study indicates the principle of this matrix on the next page:

[398] Making use of operating synergies by centralizing the HR department has the primary effect to save costs due to economies of scale but also the potential secondary effects on the cost drivers learning, capacity utilization, linkages, or discretionary policies.

	Integrated maintenance	Central QM	Adapted Quality gates	Central maintenance	Equipment experts
Integrated maintenance		fit	fit	misfit	fit
Central QM			fit	fit	fit
Adapted quality gates				fit	fit
Central maintenance					fit
Equipment experts					

Table 23: Example: Synergy fit matrix

Table 23: Example: Synergy fit matrix shows that the five synergy potentials listed can be utilized simultaneously in addition to the synergy potentials of an integrated maintenance and the central maintenance. The integrated maintenance is based on the idea that maintenance personnel is specialized in a smaller field of operation and also partially operates this equipment, whereas the central maintenance is based on the idea of one maintenance team for the entire plant with generalists who should not operate machines, but only maintain them.

After the synergies were identified in the first step of the Process Oriented Synergy Model (PrOSyM) and the analysis and validation procedure allowed for identifying the beneficial synergy potentials, the following chapter introduces what needs to be taken into consideration during the implementation phase of the PrOSyM.

5.5 Component Three: Synergy Implementation

Once it is known which synergy potentials exist and that their utilization is desired, the implementation phase has to transfer synergy potentials into synergies. This implementation highly depends on the kind of synergies to be introduced since the efforts considerably vary between different synergy scenarios. This chapter will introduce the main factors which need to be taken into consideration in the synergy implementation phase.

The most important fact influencing the difficulty level of the implementation scenario is the synergy enabler since it describes how a synergy potential is transferred into practice. Depending on which primary synergy enabler is needed, which secondary synergy enabler is required to support the primary synergy enabler and which tertiary synergy enablers are recommended, a more or less complicated synergy scenario

occurs. Additional influential factors on the degree of difficulty to implement synergies are i) the synergy category, ii) the difference of the actual synergy level in comparison to the optimal synergy level and iii) the time needed for the implementation. Since the perception of how severe the impact of each influential implementation factor is case dependent, a scoring model with a weighting factor is an appropriate approach for determining the overall degree of difficulty to implement specific synergy potentials.

The degree of difficulty can be determined by means of the scoring model shown below. The values assess the severity of each influential factor: a show stopper is rated with 10, high difficulties are rated with 9, medium difficulties are rated with 3, and low difficulties are rated with 1. Since the influential factors can have a positive and a negative influence on the implementation of the synergy, the sign of the number is positive (+) in case the influential factor has a negative influence on the implementation. If the influence on the implementation scenario is positive the sign of the number is negative (-). The weighting factors determine the relevance of each single influential factor: very important is rated from 7 to 9, important with 5 to 7, minor important with 2 to 5 unimportant with 1. The scoring model is shown below.

Synergy to be implemented	Synergy category			Synergy enabler			Difference synergy level		Time required		Σ
	Number	Weighting factor	Value	Number	Weighting factor	Value	Weighting factor	Value	Weighting factor	Value	
Synergy 1	1-5	1-9	+/- 1,3,9, 10	1.1 – 3.3	1-9	+/- 1,3,9, 10	1-9	+/- 1,3,9, 10	1-10	1,3,9	V1
	1-5	1-9	+/- 1,3,9, 10	1.1 – 3.3	1-9	+/- 1,3,9, 10	1-9	+/- 1,3,9, 10	1-10	1,3,9	V2
Synergy 1 ∑											= V1+ V2
Synergy 2	1-5	1-9	+/- 1,3,9, 10	1.1 – 3.3	1-9	+/- 1,3,9, 10	1-9	+/- 1,3,9, 10	1-10	1,3,9	V3
Total ∑											= V1+ V2+ V3

Table 24: Implementation degree of difficulty model

The results of this matrix indicate the degree of expected resistance for i) each synergy category enabler combination; for example V1, V2, V3,[399] ii) for the entire synergy, where the single sums of each synergy category enabler combination are added; for example =V1+V2 and iii) for all synergies, which might be part of a project; for example =V1+V2+V3. The value indicates the difficulty of the implementation phase

[399] V = ∑ (Synergy category weighting factor x Synergy category value) + ∑ (Synergy enabler weighting factor x Synergy enabler value) + ∑ (Difference synergy level weighting factor x difference synergy level value)

Whereas: Difference synergy value = |actual synergy level – new synergy level|

expected for these three combinations. The higher the ratio value[400], the higher is the resistance expected for the implementation phase.[401]

The entity number identifies which synergy category and which synergy enabler is regarded. The difference of the synergy levels is only applicable if the same synergy was used in the past on a different synergy level; if not applicable the value is zero.

It is of importance that all entities for one synergy which should be implemented are assessed as a unity because the entities might influence each other. This fact is primarily of significance if entities are changed or added. Even though the synergy category, the difference between the actual and ideal synergy level and the time required to implement the synergy can often be regarded as relative constant values for a specified synergy potential,[402] the synergy enablers can still be adapted to the needs. Additionally, synergy enablers can i) influence and ii) complement each other in a way which changes the total degree of difficulty to implement the synergy potential. The following example explains this connection:

A car manufacturer assembles cars and has a press shop, body shop, paint shop and assembly main department. Each main department consists of departments, the departments consist of groups. The maintenance of robots is carried out in each group of the main departments, the robots are not standardized. The synergy potential is the centralization of the robot maintenance for all main departments. The top management, in this case the plant managing director and the main departmental directors, are not informed, thus no top management support is expected. Translated to the implementation degree of difficulty model the result is as follows:

Synergy to be implemented	Synergy category			Synergy enabler			Difference synergy level		Time required		Σ
	Number	Weighting factor	Value	Number	Weighting factor	Value	Weighting factor	Value	Weighting factor	Value	
Central robot maintenance	1	9	9	1.1	9	9	7	3	3	3	192
				2.1	9	9	9	1	7	9	225
Synergy 1 ∑											417
Total ∑											417

Table 25: Example synergy implementation without top management support

Now the same starting position is changed by convincing the top management of the need of implementing this synergy. All top managers commit to the synergy idea and

[400] Total ∑ / amount of entities

[401] An example for this model is given on the following page.

[402] Likewise the synergy is adapted.

hence support the implementation phase and all necessary steps involved. The other preconditions stay similar. The matrix changes as follows:

Synergy to be implemented	Synergy category			Synergy enabler			Difference synergy level		Time required		Σ
	Number	Weighting factor	Value	Number	Weighting factor	Value	Weighting factor	Value	Weighting factor	Value	
Central robot maintenance	1	9	9	1.1	9	3	7	1	3	3	100
				2.1	9	1	9	1	7	1	34
				3.3	2	-9					-18
Synergy 1 ∑											116
Total ∑											116

Table 26: Example synergy implementation with top management support

The result of the example above shows that the support of top management has a positive influence on the entire implementation process of the desired synergy. This positive is visible in the matrix by means of i) the negative value – 18 and ii) the changed values for most of the other entities. In this specific example the value for the centralization was changed, because the decision to centralize the departments is supported from the top management; thus no additional severe resistance is expected. The same argumentation is true for the value of the difference between the synergy levels; since the top management wants the change, only minor resistance is expected. The value for the standardization of equipment was adapted because the top management support also facilitates the purchasing of standardized equipment for the new centralized robot maintenance department. Because the standardized equipment can be purchased immediately based on the top management support, the value of the time required is adapted.

After this example has shown the principle of the model, general considerations about the model are introduced. The added value of the implementation degree of difficulty model is that depending on the value resulting from the single entities or sums, this value can be used to i) decide if the synergy potential should be implemented or not, ii) decide if the synergy category needs to be adapted to simplify the implementation of the synergy and iii) indicate that additional supportive factors or synergy enablers are required to simplify the implementation phase.

The procedure for implementation should always be to

1. Identify absolute show stoppers regarding the single entities
2. Identify how the sum of each synergy potential can be optimized
3. Identify how the sum of all synergies can be optimized
4. Define which synergies should be implemented
5. Define an implementation scenario
6. Implement the synergy

In the first step, show stoppers, i.e. entities with the value ten, are identified. If show stoppers exist, it needs to be questioned if the implementation of this entity is required, or if the synergy can be used without it. If it is not required, the entity is eliminated

from the list; if needed, a substitution element is implemented.[403] In case it is required one can i) proceed with step two, if a potential exists to optimize the show stopper or ii) proceed with step four, if no potential exists to optimize the show stopper.

Step two identifies which potential of optimization is available to reduce the sum of each synergy potential. This is done first by questioning if the contribution of single entities, such as the synergy enabler, could be optimized and subsequently by questioning if the unity of all entities allows for optimization. This step supports to ensure that all supportive synergy enablers were taken into consideration and that the proper synergy category on the right level was defined for enabling the beneficiary effects for the organization. Asking this question is of importance because desired synergy effects can also be enabled partially with fewer efforts based on the adaption of synergy categories or levels. If, for instance, the synergy category is changed from an operational synergy to a knowledge synergy, simply because the main desired effect results from knowledge transfer and not from the combination of activities, the implementation phase is considerably facilitated. Instead of requiring centralization as synergy enabler, regular meetings can be installed to enable the desired effect. In the same way additional synergy enablers, in particular a tertiary synergy enabler, can be supportive for minimizing the implementation efforts in this step.[404]

The same logic is followed in step three with the difference that the entity of all synergies is regarded. Regarding the entity in addition to the single synergies which should be implemented is of importance because, depending on the number of synergies and the effected organizational area, they all can i) influence each other, such as the single entities of the single synergies do and ii) be bundled to one implementation project. In the second case additional tertiary synergy enablers, in particular a combined change management, can support the implementation phase tremendously.

The decision about the extent of change management efforts should be based on the level of difficulty determined by means of the implementation degree of difficulty model, and the extent of the implementation on the organization. Essential facts about change management are introduced in chapter 2.6 and need to be taken into consideration in the implementation phase. Which of the facts are used to support the implementation phase, is to be decided case-dependent. However, the persons in charge

[403] Note that the elimination of one entity, such as a tertiary synergy enabler, can affect the other values in the scoring matrix.

[404] In case the synergy potentials were identified independently, by different persons, and the synergies were adapted in the previous steps of the synergy implementation phase, the fit between all synergies needs to be ensured. The fit between the single synergies is part of the synergy analysis and assessment. Compare chapter 5.4

of implementing the synergies should be aware of the change management facts as well as the challenges involved.

Based on the previous steps, the definition about which synergies should be implemented is made. This step does not reconsider if the synergy itself is desirable – this was already assessed and validated in the previous step – but if the desired synergies are able to be implemented or not. If show stoppers exist which cannot be eliminated or the degree of difficulty is still too high, even though approaches for optimization were taken into consideration during the previous two steps, the implementation should be avoided because the risks to fail are high. For all other synergies the implementation can take place.

In the following step five a detailed implementation scenario is defined. This scenario considers the previous steps – in particular what change management efforts are required – and defines how and when the synergies are implemented and who is responsible for the implementation process.

Depending on the extent of the synergies to be implemented and thus the amount of organizational units involved, a parallel approach is recommended for complex projects to enable the fastest possible implementation. Aligned work packages with clear responsibilities, known interdependencies between the work packages and deadlines are a strict requirement for a successful implementation phase. For being able to satisfy these requirements, a top down definition procedure which involves all parties concerned is compulsory. The implementation phase should make use of project management tools which satisfy the requirements mentioned above.

Even though the definition of the single work packages is case-dependent, the synergy enablers can support this procedure. Complex synergy implementation projects tend to have prerequirements which are reflected as specific primary, secondary or tertiary synergy enablers. Especially the exchange of knowledge about specific topics between organizational units and the definition of common standards are common prerequirements in complex synergy projects. Thus, the table of synergy enablers on page 191 can be used as an indicator for the definition of work packages.

Regarding the responsibilities for the work packages of the projects, it is recommended to assign persons belonging to a management level who have the competences to decide for changes in the affected area. Subprojects can be defined and delegated to lower management levels, but not the responsibility. Ideally, these persons have experience with the content work package, while at the same time they have no need to manipulate the results in their personal favor.[405]

[405] For instance, if a potential result of the synergy would support reaching the personal target measures.

Along with known project management tools the following interrelationship matrix can indicate the essential inputs and outputs between the single work packages and can be filled quickly. Thus, it can be used even in workshops to derive the first necessary steps without producing double or unneeded work.

	WP1	WP2		WP3		WP3	
WP1		Input from	Output to	Input from	Output to	Input from	Output to
WP2				Input from	Output to	Input from	Output to
WP3						Input from	Output to
WP4							

Table 27: Work package interrelation matrix

Also, this matrix is dependent on naming the exact inputs and outputs including essential details, a target date and responsibilities. However, this matrix is only a supportive tool and all entries should be transferred into a project management tool.

After the work packages and responsible persons are defined, the synergies need to be transferred into practice in step six. It is recommended to track the progress of the project on a regular basis on the appropriate hierarchical level. This way ensures a quick response time if problems occur in the implementation phase.

After the synergies were implemented, the synergy controlling makes sure that the synergies make the required contribution to the organization. The following chapter deals with the synergy controlling.

5.6 Component Four: Synergy Controlling

Once the synergies are implemented, it is important to examine if the desired synergy effects actually benefit the company in the desired extent. Thus, a synergy specific target management and controlling need to be implemented. This role is taken on by the synergy controlling which is the fifth component of the Process Oriented Synergy Model. Whether this component has an institutional character or is carried out by other persons is case dependent.

Because a detailed and generally applicable concept for synergy controlling[406] was already developed by Biberacher, the design of a new synergy controlling concept is omitted in this thesis. Biberacher's controlling concept can be fully integrated into each

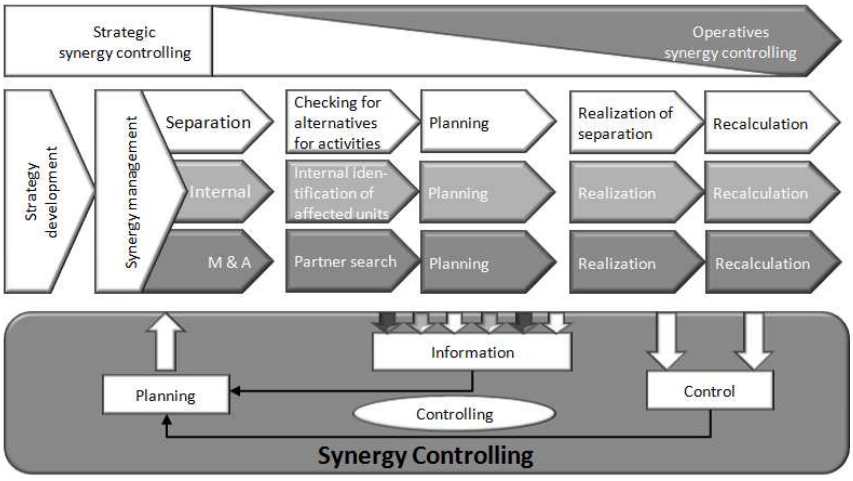
[406] Biberacher J. 2003 pages 343 - 527

organization and builds upon known business measures which are also combinable with the Process Oriented Synergy Management model. Thus Biberacher's synergy controlling concept is to be used as the basis for this thesis. However, since Biberacher did not combine the concepts of synergy management and process orientation, as this thesis does, specific consideration about this combination for the controlling need are introduced in this chapter.

In the following the most essential aspects of Biberacher's synergy controlling concept are introduced, followed by the derivation of specific relevance for the process orientation perspective of this thesis.

After the i) derivation of requirements towards synergy controlling[407] Biberacher differs between ii) strategic[408] and iii) operative synergy controlling[409] and iv) discusses the organizational implementation of synergy controlling.[410]

In summary, the *requirements of a synergy controlling* is the combination of informative, planning, controlling and monitoring functions using strategic and operative means for all activities concerned with realizing synergies. These forms of synergy controlling are shown in the following figure.



[407] Biberacher J. 2003 page 343 - 389

[408] Biberacher J. 2003 page 391 - 424

[409] Biberacher J. 2003 page 427 - 522

[410] Biberacher J. 2003 page 524 - 527

Figure 33: Forms of synergy controlling[411]

Strategic synergy controlling is responsible for i) supporting the planning of strategic synergy management, ii) creating and maintaining of the systems for the strategic planning and controlling of synergies, iii) supporting and coordinating the conversion of strategic synergy planning into operative synergy planning and iv) establishing and performing the strategic control of a synergy oriented strategy. The following instruments for ongoing strategic planning in synergy controlling are determined by Biberacher:

Target formulation	Analysis	Forecast	Strategy conception	Evaluation and selection
Target system ▪ Means-purpose relation ▪ Linkage of synergies with the target system via driver trees **Process for solving target conflicts** ▪ Target weighting, lexicographical order ▪ Adhering to demand levels of one target with an increase of another ▪ Minimization of derivations of targets	▪ Environment analysis ▪ Resource analysis ▪ Analysis of further intra-corporate factors ▪ Synergy oriented portfolio analysis ▪ Synergy identification heuristics ▪ Gap analysis considering synergy	**Quantitative processes** ▪ Regression analysis ▪ Simulation ▪ Trend analysis **Qualitative processes** ▪ Scenario technology ▪ Morphological analysis ▪ Relevance tree method	**Overall corporate strategy** ▪ Market/ competence portfolio ▪ Segmentation matrix ▪ Synergy-value matrix **Business unit strategy** ▪ Synergy identification heuristics ▪ Analysis of the benefit/ value added potential ▪ Synergy-based generic competitive strategies **Functional area strategy** ▪ Purchasing market portfolio ▪ Technology portfolio	**Quantitative processes** ▪ Comparison of costs ▪ Comparison of profit margin ▪ Investment calculation methods ▪ Simulation methods ▪ Cost-benefit analysis ▪ Value analysis **Qualitative processes** ▪ Scoring models ▪ Profiles ▪ Check lists **Methods for strategic positioning** ▪ Portfolio technologies ▪ Strategic balance **Methods for assessing the risk** ▪ Sensitivity analysis ▪ Method of the critical values ▪ Break-even analysis

[411] According to Biberacher J. 2003 page 390

Table 28: Instruments for ongoing strategic planning in synergy controlling[412]

Operative synergy controlling consists of top down controlling and bottom-up controlling. The first category includes the planning of the synergy effects, basic approaches for the controlling of synergy effects, such as discounted cash flow, economic value added and cash value added, and controlling the synergy effect. The second category comprises tasks for the controlling of measures in synergy controlling, such as action planning, budgeting, progress control and budget control, the objects of the controlling of measures, such as R&D controlling, purchasing controlling, production controlling and management controlling, and the implementation of a synergy score card, which is shown below.

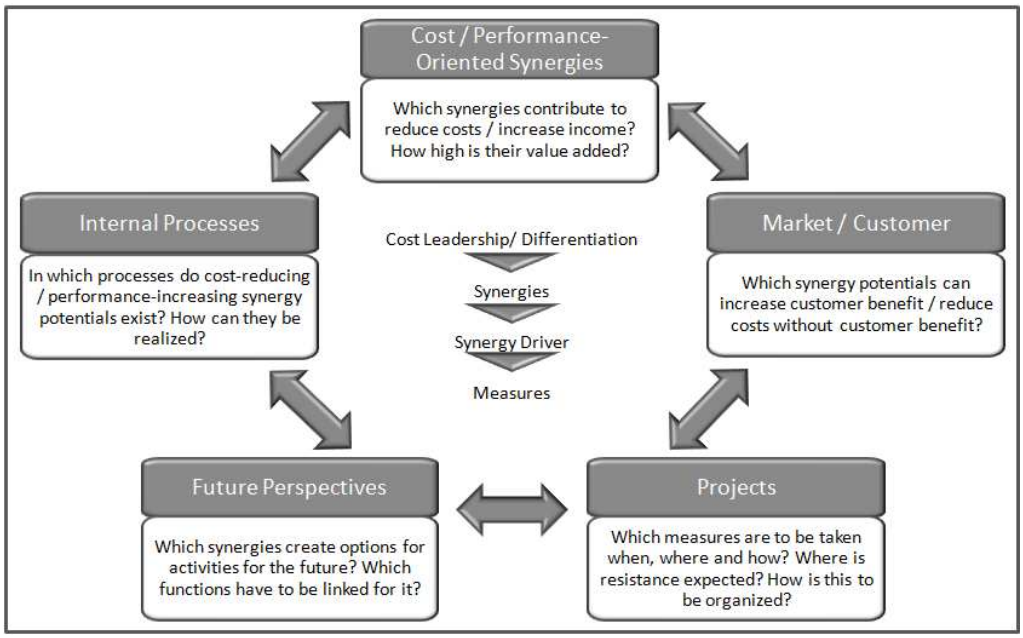


Figure 34: Perspectives of the synergy control card[413]

According to Biberacher, the KPI's for production controlling are:

Scope	Key figures
Synergy effect on production costs	▪ Personnel costs in the production [activity variance] ▪ Material costs (additionally, e.g. costs for rejects) [volume variance] ▪ Energy costs ▪ Process costs ▪ Fixed costs variance
Synergy effect on production volume	▪ Ø volume produced per time unit ▪ Ø capacity utilization ▪ Ø lot size

[412] Biberacher J. 2003 page 400

[413] Biberacher J. 2003 page 506

Synergy effect on productivity	▪ Productivity ▪ Material productivity ▪ Labor productivity
Synergy effect on production quality	▪ Error rate (parts per million) ▪ Number of customer complaints ▪ Downtimes due to disturbances ▪ Relative quality (compared to competitors)
Synergy effect on production flexibility	▪ Set-up costs ▪ Set-up times ▪ Number of versions produced
Synergy effect on production time	▪ Downtimes ▪ Throughput times

Table 29: Production controlling KPI[414]

Additionally, Biberacher introduces the synergy oriented control through incentive systems. His perspective on a hierarchical synergy incentive system is shown in the following figure.

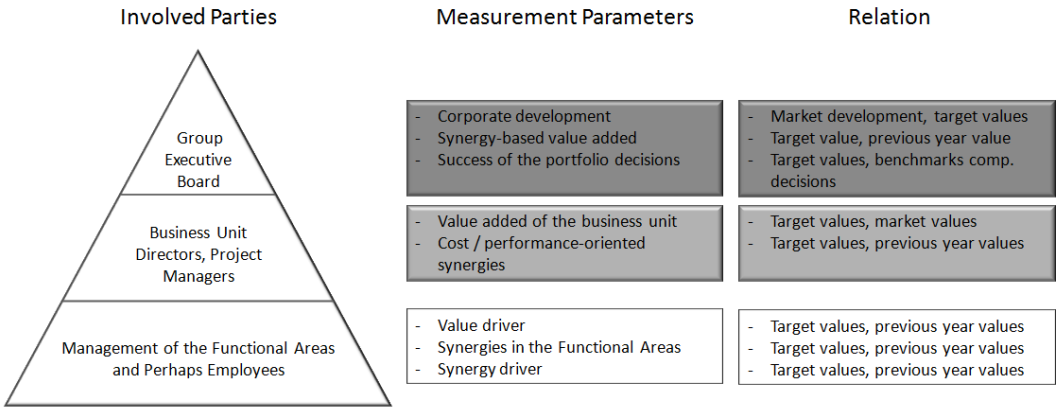


Figure 35: Hierarchical incentive systems for synergies[415]

Because of its central importance two approaches which can be used for synergy controlling means are presented in a separate subchapter.

5.6.1 The Synergy Maturity Model

This chapter introduces the main characteristics which need to be taken into consideration for synergy measures, or synergy KPI, and additionally introduces the

[414] Biberacher J. 2003 page 493

[415] Biberacher J. 2003 page 518

synergy maturity model. As indicated in chapter 3.3.4.1 the same principles by Hammer and Hershman[416] which are valid for business process measures can be applied for the definition of synergy measures. The reason is that both concepts support each other and the principles, specifically for business process measures, are generally valid for both concepts. Thus, these principles are to be used for the identification of synergy measures.

Besides basing synergy measures on the findings introduced by Hammer and Hershman synergy specific contents need to be taken into consideration. Based on the fact that synergies can stem from a wide variety of synergy sources, it is required that the specific, aimed synergy effect is always reflected in the measure. Thus, it is recommended to derive a synergy category specific set which is used for the same synergy category in different applications. Operational synergies, for instance, which are based on the combination of previously independent activities, usually should result in savings of human resources, optimized throughput times, reduction of double work and optimization of quality. Thus, the synergy measures should be able to reflect these facts and determine if a positive correlation is detectable resulting from the synergies.

In addition, synergy measures need to reflect the idea of the synergy balance[417] which implies that the utilization of specific synergies can hinder, or weaken the simultaneous utilization of other synergies. The resulting signal from the synergy balance needs to be reflected in synergy measures. Thus, not only the aimed synergy effects need to be measured, but also side effects which are accompanied by this synergy effect need to be regarded by means of counter measures. If, for instance, organizational units are centralized to enable a specific operational synergy effect, counter measures need to be installed which reflect the lost synergies which were present in the decentralized solution.

The combination of a synergy measure and a counter measure ensure on the one side that the aimed synergy effect factually results in the intended benefits and additionally that these benefits exceed potential synergy losses which were caused by the implementation of this synergy.

Besides using synergy measures, it is recommended to make use of a maturity model for being able to detect how the organization adapted the systematic synergy concept. A valuable source for such a synergy maturity model (SMM) is given by Michael Hammers process and enterprise maturity model (PEMM).[418] However, since this

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[416] chapter 3.3.4.1 and Hammer M., Hershman L. 2010 page 68 ff. and 96

[417] Compare Figure 32: Synergy balance

[418] Compare chapter 3.3.4 and Hammer M., Hershman L. 2012 pages 289 ff.

maturity model was not developed to assess synergies, an adaption of the maturity model for synergy needs is necessary. In the following the SMM developed by the researcher is presented. It is based on the PEMM, but includes synergy relevant content against which the synergy maturity of the organization is assessed.

		S-1	S-2
DESIGN	**Purpose**	Existent and potential synergies are not identified yet. Functional managers do only use the synergy concept by coincidence for functional performance improvements.	Existent and potential synergies have been identified within the organization in order to optimize performance.
	Documentation	The documentation of synergies is primarily functional, but it identifies the interconnection among the organizations involved in synergies.	There is documentation in terms of a synergy map including existing synergies and synergy potentials with their according synergy categories and level.
PERFORMERS	**Knowledge**	Performers can name the process they execute and identify the key metrics of its performance.	Performers can describe the process's overall flow including synergies which are used according to the synergy systematics.
	Skills	Performers are skilled in problem solving and process-improvement techniques.	Performers are skilled in teamwork, the synergy systematics and self-management.
	Behavior	Performers have some allegiance to the process and the synergies involved, but owe primary allegiance to their functions.	Performers try to follow the process and synergy design, even though it is different to the prior functional perspective and includes the cooperation with former unrelated colleagues.
SYNERGY MANAGER	**Identity**	The synergy manager is an individual or a group informally charged with identifying and enhancing the utilization of synergies.	Enterprise leadership has created an official synergy manager role and has filled the position with a senior manager who has clout and credibility.
	Activities	The synergy manager identifies and documents the synergies, communicates it to all the performers, and sponsors small scale change projects.	The synergy manager articulates the synergy performance goals and a vision of the future; sponsors redesign and improvement efforts; plans their implementation; and ensures compliance with the synergy design.
	Authority	The synergy manager lobbies for the synergy but can only encourage functional managers to make changes.	The synergy manager can convene a synergy identification team and implement the new design and has some control over the technology budget for the synergies.
INFRA-STRUCTURE	**Human resource systems**	Functional managers reward the attainment of functional excellence and the resolution of functional problems in a synergy context.	The synergy design influences role definitions, job descriptions, and competency profiles. Job training is based on process and synergy documentation.
METRICS	**Definition**	Synergies have some basic cost and quality measures.	Synergies have metrics derived from the explicit synergy category and the effect they are aiming for.
	Uses	Managers see the synergy metrics to track its performance, identify root causes of faulty performance, and drive functional improvements.	Managers use the synergy metrics to compare its performance to benchmarks, best-in-class performance, and customer needs and to set performance targets.

S-3	S-4	S-1	S-2	S-3	S-4
Existent and potential synergies are analyzed and validated, a fit between all synergies is established, action plans are derived, synergy performance measures are defined to control synergies within the organization.	Existent and potential synergies are identified, analyzed and validated, a fit between all synergies is established, action plans are derived, synergy performance measures are defined to control synergies within the organization as well as with external partners.				
The synergy maps of all organizational units are matched with each other, comparable organizational units follow the same synergy map, deviations shall be justified.	An electronic representation of the synergy map supports the synergy management including performance measures which allow for analysis and synergy reconfigurations.				
Performers are familiar with both fundamental business concepts and with the drivers of enterprise performance. They can describe how their work affects other processes as well as synergies and what role they play for the enterprise's performance.	Performers are familiar with the enterprise's industry and its trends and can describe how their work affects interenterprise synergies and performance.				
Performers are skilled in business decision making and able to identify synergies and synergy potentials.	Performers are skilled at change management, change implementation and synergy management.				
Performers strive to ensure that the process delivers the results needed to achieve the enterprise's goals.	Performers look for signs that the process and the synergies used should change, and they propose improvements to the process and synergy utilization.				
The synergy comes first for the manager in terms of time allocation, mind share, and personal goals.	The synergy manager is member of the enterprise's senior-most decision-making body.				
The synergy manager works together with other synergy managers to integrate synergies to achieve the enterprise's goals.	The synergy manager develops a rolling strategic plan for the process, participates in enterprise-level strategic planning, and collaborates with his or her counterparts working for customers and suppliers to sponsor interenterprise synergy management activities.				
The synergy manager controls the IT systems that support the utilization of the synergies and any projects that change the utilization of synergies and has some influence over personnel assignments and evaluations as well as the synergy budget.	The synergy manager control's the synergy budget and exerts strong influence over personnel assignments and evaluations.				
Hiring, development, reward, and recognition systems emphasize the synergy needs and results and balance them against the enterprise's needs.	Hiring, development, reward, and recognition systems reinforce the importance of intra- and interenterprise collaboration, personal learning, and organizational change.				
The synergy metrics have been derived from the enterprise's strategic goals.	The synergy metrics have been derived from interenterprise goals.				
Managers present the metrics to synergy performers for awareness and motivation. They use dashboards based on the metrics for day-to-day management of the process and synergy.	Managers regularly review and refresh the process metrics and targets and use them in the strategic planning.				

		ES-1	ES-2
LEADERSHIP	**Awareness**	The enterprise's senior executive team recognizes the value of using synergies but has only a limited understanding how to manage those.	At least one senior executive deeply understand the synergy concept including the synergy systematics, understand how the enterprise can use it to improve performance, and what is involved to implement synergy management
	Alignment	The leadership of the synergy program lies in the middle management ranks.	A senior executive has taken leadership of, and responsibility for, the synergy program.
	Behavior	A senior executive endorses and invests in operational improvement.	A senior executive has publicly set synergy-related performance goals and is prepares to commit resources, make deep changes, and remove roadblocks in order to achieve these synergy goals
CULTURE	**Teamwork**	Teamwork is project focused, occasional, and atypical.	The enterprise commonly uses cross-functional project teams for improvement efforts.
	Attitude toward change	There is growing acceptance in the enterprise about the need to make modest change.	Employees are prepared for significant change in how work is performed.
EXPERTISE	**People**	A small group of people has a deer appreciation for the power of synergies.	A cadre of experts has skills in synergy management and the systematics behind it, they are additionally skilled in project management, communications, and change management.
	Methodology	The enterprise uses one or more methodologies for solving execution programs and making incremental improvements.	Synergy management teams have access to a basic methodology for synergy management.
GOVERNANCE	**Synergy map**	The enterprise has identified some synergies.	The enterprise has developed a complete synergy map, and the senior executive team has accepted it.

ES-3	ES-4	ES-1	ES-2	ES-3	ES-4
The senior executive team views the enterprise and its surrounding in synergy terms and has developed a vision of the ideal synergy configuration.	The senior executive team sees its own work in synergy terms and perceives synergy management not as a project but as a way of managing the business.				
There is a strong alignment in the senior executive team regarding the synergy program. There is also a network of people throughout the enterprise helping to promote synergy efforts.	People throughout the enterprise exhibit enthusiasm for synergy management and play leadership roles in synergy efforts.				
Senior executives operate as a team, manage synergies and are engaged in the synergy program.	The members of the senior executive team perform their own work aligned with the synergy concept, cooperate with external corporations to achieve synergies, include synergies in strategic planning and new business opportunities.				
Teamwork is the norm among synergy partners and is commonplace among managers.	Teamwork and synergy exploitation with customers and suppliers is commonplace.				
Employees are ready for major multidimensional change.	Employees recognize change is inevitable and embrace it as regular phenomenon.				
A cadre of experts has skills in large-scale change management, synergy management and enterprise transformation.	Substantial numbers of people with skills in synergy management including the systematics, implementation, project management, and change management are present across the enterprise. A formal process for developing and maintaining that skill base is also in place				
The enterprise has developed and standardized a formal process for synergy management including the synergy systematics and has integrated it with a standard process for process improvement.	Synergy management has become a core competence and is embedded in a formal system that includes environment scanning, change planning, implementation, and synergy-centered innovation.				
The enterprise synergy map has been communicated throughout the enterprise, is used to drive project prioritization, and is linked to enterprise level technologies and data architectures.	The enterprise has extended its synergy map to connect it with those of customers, suppliers and other external partners. It also uses the map in the strategy development.				

Table 30: Synergy maturity model (SMM)

The synergy maturity model is designed as the process maturity model. It reflects the maturity of the synergies (S1-4) as well as the maturity of the enterprise regarding the systematic utilization of synergies (ES1-4). Based on Hammer, the redefined SMM accounts for making the change with the synergy modules (S1-4) and sustaining the change with the enterprise synergy modules (ES1-4). The numbers reflect the level of progress of the organization in the systematic synergy change process from one – just getting started- to four – best in class-.

The SMM, as the PEMM can serve as a roadmap to implement a systematic synergy management, or process orientation, in organizations. Since both do not occur overnight, these models are able to support the implementation phase until all relevant changes are made. It is important that all principles included in the model are implemented; the nomination of a synergy manager without changes in human resource systems or metrics do not enable the corporation to systematically manage synergies. Especially larger companies, which usually cannot implement systematic synergy management simultaneously in all organizational units, are dependent on a systematic implementation scenario which includes the knowledge about how far the single units proceeded. The SMM supports gaining this knowledge and enabling a successful implementation and utilization of systematic synergies.

After the synergy controlling content was introduced in this and the previous subchapter, the approach for systematic synergy management, including i) synergy identification and characterization, ii) synergy analysis and validation, iii) synergy implementation and iv) synergy controlling, is finalized. In the following the BMW case studies, which supported the findings in this thesis, are introduced.

5.7 The synergy management procedure in a nutshell

The previous subchapters described the single elements of synergy management, starting with the identification of synergies. This chapter summarizes the procedure for managing synergies as follows.

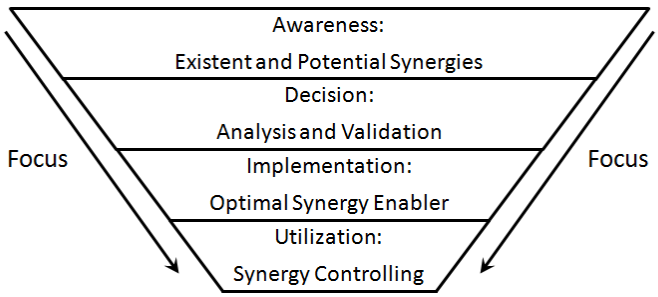

Figure 36: Synergy management in a nutshell

The synergy management process starts with the *awareness* about existent ant potential synergies within the organization. The tools for generating this awareness are introduced in chapter 5.3, including the definition of processes as initial point for the synergy identification procedure,[419] the definition of synergy categories[420] and synergy levels[421] whose combination result in the two-dimensional framework for the synergy identification.[422] The extension of this framework with the synergy enablers[423] results in the three-dimensional framework for synergy characterization.[424] While the two-dimensional framework identifies which potential and existent synergies are present, the three-dimensional framework additionally shows how these synergies are enabled.

Following this procedure the synergy manager:

- Defines all processes in a given organizational environment,
- Dedicates potential and existent synergy categories to each process, and
- Dedicates the existent and/or optimal synergy level to the process - synergy category combination.

For the synergy characterization he additionally:

- Dedicates the synergy enabler to all process – synergy category - synergy level combination.

The result is a listing of existent and potential synergies in a given organizational unit.

Therefore, the organization has the precondition to define which potential synergies are valuable to be implemented. The tools for this *decision*-making process are introduced in chapter 5.4. They support the user i) to validate the synergies in a broader organizational context by means of the synergy cost driver matrix,[425] which reflects the effect of each synergy on predefined cost drivers, and ii) to ensure a fit between the

[419] 5.3.2 Processes as Initial Point for Synergy Identification

[420] 5.3.4 Synergy Categories

[421] 5.3.5 Synergy Levels

[422] 5.3.5.1 The Two-Dimensional Framework for Synergy Identification: Combination of the Synergy Category and the Synergy Level

[423] 5.3.6 Synergy Enabler

[424] 5.3.7 The Three-Dimensional Framework for Synergy Characterization in Production Environments

[425] Table 20: Synergy cost driver matrix

synergies by means of the synergy fit matrix,[426] which rates the mutual influence of all synergies.

Following this procedure the synergy manager:

- Defines the weighting factors for each cost driver,
- Rates all potential synergies against these cost drivers,
- Predefines which potential synergies should be implemented,
- Identifies if these predefined potential synergies fit with each other, and
- Decides which potential synergies should be implemented.

The result is the definition of which of the potential synergies should be implemented.

After the decision is taken which synergies are to be *implemented*, chapter 5.5 supports the design of the proper implementation scenario by questioning and thus optimizing the use of the right synergy enablers by means of the implementation of the degree of difficulty model[427]. Additionally, the interrelations between all single work packages of the entire synergy implementation projects are clarified.[428]

Following this procedure the synergy manager:

- Defines the weighting factors,
- Rates the synergies to be implemented against the degree of difficulty,
- Optimizes the implementation scenario of the synergies by defining proper synergy enablers,
- Defines the synergy enablers for each synergy which is to be implemented, and
- Defines work packages for the implementation of the synergies.

The result is the awareness how the potential synergies will be implemented.

When the synergies are implemented and in use, their *controlling* becomes of importance for ensuring their positive contribution to the organizations. Synergy controlling is introduced in chapter 5.6. As part of the synergy controlling the synergy maturity model is introduced in chapter 5.6.1. The model supports the organization to identify its synergy maturity level based on the frameworks introduced in this thesis and aligned to the process and enterprise maturity model[429] by Michael Hammer. Thus, both

[426] Table 22: Synergy fit matrix

[427] Table 24: Implementation degree of difficulty model

[428] Table 27: Work package interrelation matrix

[429] Table 13: Process and Enterprise Maturity Model

models can be used to identify the organizations maturity of process orientation as well as synergy management.

Following this procedure the synergy manager:

- Defines proper controlling KPI for validating the effectiveness of the synergies, and
- Rates the synergy maturity level of the organization.

The result is the performance measurement of the implemented synergies as well as the indication how mature the organization manages synergies.

After the introduction of the synergy management procedure in this chapter, the three case studies which were used for the validation of the theoretical background and the design of the synergy management approach are presented.

6 Case Study Research

6.1 Introduction and General Consideration

This thesis is supported by the researcher's practical experience in synergy-related issues within the BMW Group gained during projects which are dealing directly with the topic of synergy management. It is also supported by insights into synergy-related topics acquired by his work experience at BMW in various positions. The insights and results are an integral part of the corresponding chapters in the thesis. In particular the synergy identification procedure presented in chapter 5.3 was developed, advanced and applied in all three case studies.

In the following chapters, a general overview about the BMW Group, the single case studies and the results of these case studies is given. Subchapter 6.2 gives a general outline of the organization of the BMW Group including process orientation as a specific organization form. Subchapter 6.3 introduces the three case studies. Subchapter 6.4 presents additional insights from the case studies which are relevant for a systematic synergy management in accordance to the PrOSyM designed in this thesis.

6.2 The Organization of the Object of Investigation

The BMW Group is functionally organized in eight divisions i. Sales and Marketing ii. Development iii. Finance iv. Corporate Management v. Purchasing and Supplier

Network vi. Human Resources vii. Production viii. MINI, Motorrad, Rolls-Royce .[430] Each division is represented in the BMW Group board. In addition to the line functions which exist in each BMW division, the group is structured into product lines[431] and modules which act as a matrix organization in the case study-relevant organization. The former, product lines, consist of single car projects, such as 3 Series convertible or 6 Series Gran Coupe, and divide the different projects into product lines. The latter are dividing the car into smaller portions, which are referred to as modules. Product lines and modules are working across the functional divisions and their organizational units.

Besides its organizational structure, the BMW Group also features a structure of its organization according to processes in line with the concept of process orientation. An overview about process orientation at the BMW Group is given in the following subchapter.

6.2.1 Process Orientation within the BMW Group

The BMW Group started an initiative, Process Improvement to Excellence (PRIME), to put an emphasis on process orientation. The approach is based on the research of M. Hammer.[432] The target is to combine and align the functional and process organization to achieve an economic optimum.[433] Due to this basis the researcher had the opportunity to examine the relevance of process orientation for synergy utilization in all three case studies.

Process orientation in the BMW Group is characterized by:

- The process design being cross-functional with a clear focus on the customer.
- The processes being defined coherently and documented to the necessary degree.
- The process operators knowing their processes and their positions in the end-to-end processes.
- Responsibilities for process design and process execution being clearly defined.
- Process metrics being actively used for performance measurement and process improvement.

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[430] The organizational structure of the BMW group is only described in the needed details which are relevant for this thesis. The introduction of the relevant organizational units where the case studies took place is to be found in the corresponding subchapter of each case study.

[431] Such as LG-Grand Series including cars such as 7 Series, 6 Series and X5, X6

[432] Compare chapter 3.3

[433] The following introduction is based on BMW internal documents.

- Processes being taken into consideration when decisions are made by the management.
- IT, HR, target systems and the structural organization supporting the processes.

According to PRIME, benefits for the BMW Group resulting from process orientation are:

- Clear responsibilities, process objectives and process ownership avoiding cross-functional problems.
- Consistent standards and ongoing measuring of defined indicators creating transparency.
- Faster and more efficient processes helping to reduce costs and improve quality.
- Consistent processes leading to more synergies and more commitment in the cooperation.

All these factors allow for costumer orientation within the BMW Group and optimize the competiveness of the company.

All high-level BMW processes are summed up in the BMW process model. This process model includes four customer processes[434] which focus on the customer and are adding value, plus twelve cross-functional enabling processes[435] on layer 0. These processes are described in particular on the next layers, which are divided into *structural* and *procedural layers*. Structural layers represent the hierarchical structure of the process. Details of the top layer can be found on the structural layers 1-3, with the third layer being optional. Further details are shown on the procedural layers which describe procedures and all necessary processual coherences, including: results/events, activities and process interfaces, referencing process roles, controls, application systems and business objects.

The four customer processes, which cross all functional BMW Divisions, are shown on the next side.

[434] Key process is used as a synonym for customer process in this thesis.

[435] The terms enabling process and support process are used as synonyms in this thesis.

Figure 37: BMW four customer processes

i. The goal of the Idea to Offer (ItO) process is to optimize time, cost and quality in the product development process. This target includes all cross-functional process steps beginning with the strategic initiation of a product family or product and ending with the successful market launch. This end-to-end view is an extended scope in comparison to the existing product development process (PEP).

Process metrics:

- **Concept Quality**
  Design problems after 90 days of ownership
- **Absence of Defects**
  Problems experienced within the last 12 months of ownership
- **Innovative and Successful Design**
  Achievement of design leadership
- **PREP[436]-Fulfillment**
  Increasing customer satisfaction
- **Modifications before/after SOP**
  Considered modifications 6 months before/after SOP
- **Time to Market**
  Development time
- **Fulfillment of Product and Project Targets**

[436] Produkteigenschaftsprofil – Product Feature Profile

- **Process Maturity**
  Measuring process maturity level as defined by M. Hammer[437]

ii. The target of the Offer to Order (OtO) process is to successfully selling products and services, starting with the marketing communication and ending with the placing of the actual order. The process includes all activities with regard to marketing communication, planning and execution of customer relationship management activities in sales, the selling processes of retailers, distribution and sales management.

Process metrics:

- **Brand Strength Index**
  Brand strength of BMW and MINI in relation to the best competitor
- **Customer Satisfaction Sales Process**
  Customer satisfaction with the overall sales process, including pre-sales activities.
- **Retail Target Fill Rate**
  Share of relevant customer orders compared to retail targets for each of the next 3 months.
- **Built-to-Order Rate**
  Share of built-to-order vehicle orders on overall orders. A vehicle order is regarded as built-to-order when it is allocated to a customer who will become owner of the vehicle in status “order freeze”
- **Transaction Prices/Cost of Retail**
  Comparison of sticker prices to the “real” transaction prices.
- **Conquest Rate**
  Share of BMW (or MINI) buyers who have not had a BMW (or MINI) as previous car
- **Process Maturity**
  Measuring process maturity level as defined by M. Hammer

iii. The Target of the process Order to Delivery (OtD) is the efficient provision of products for the customer at the right place and the right time, based on the orders placed by OtO. The process starts with the signed customer order and ends with the supply of the product to the customer through the retailer.

Process metrics:

- **Delivery Reliability**
  Ratio of the number of deliveries made without any error regarding time

[437] Compare chapter 3.3.4

- **Delivery Quality**
  Delivering the product as specified and expected by a customer
- **Costs per Unit**
  Accumulated costs of the OtD process divided by the specific number of cars
- **Days Stock Cover**
  Determines how long cars will be in stock, under stable market conditions
- **OtD Availability**
  Fulfillment of specifications concerning the product and the delivery
- **Delivery Time**
  Average time between placement of an order and delivery
- **Process Maturity**
  Measuring process maturity level as defined by M. Hammer

iv. The target of the Delivery to Customer Care (DtCC) process is to create customer care by satisfying the customer's desires and needs. That means to constantly reintroduce them to the OtD process for being able to sell additional products and services. The process includes all activities of delivering the product to the retailer, customer care, creating loyal customers and cross selling during the life cycle of the product.

Process metrics:

- **Customer Satisfaction Customer Care**
  Customer satisfaction with the overall customer care process
- **Loyalty Rate**
  Share of BMW (or MINI) customers who have repurchased a BMW (or MINI)
- **Retention Rate Retail Finance**
  Share of retail finance customers with terminated lease or loan contracts that have re-signed a retail finance lease or loan contract.
- **Cross Selling Household**
  Share of BMW and MINI cars in the household's garage
- **Process Maturity**
  Measuring process maturity level as defined by M. Hammer

The process metrics mentioned above influence the behavior of employees and the organization. They support a cross-divisional perspective by defining end-to-end measures from the process perspective. Additionally, they are used to define needs for action, to set targets and to trigger cross-divisional improvement activities.

Examples for the next process level are shown on the next side.

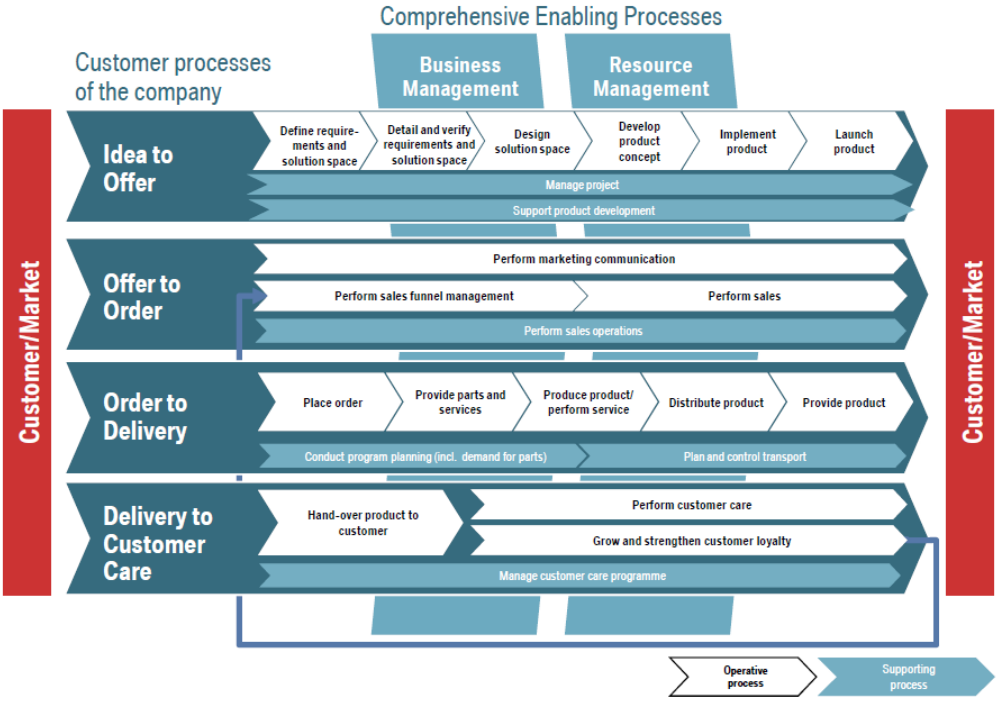

Figure 38: BMW core business processes level 1

The four core processes are supported by two enabling processes. The target of the twelve BMW enabling processes is to support all customer or core processes. The enabling processes are divided into business and resource management.

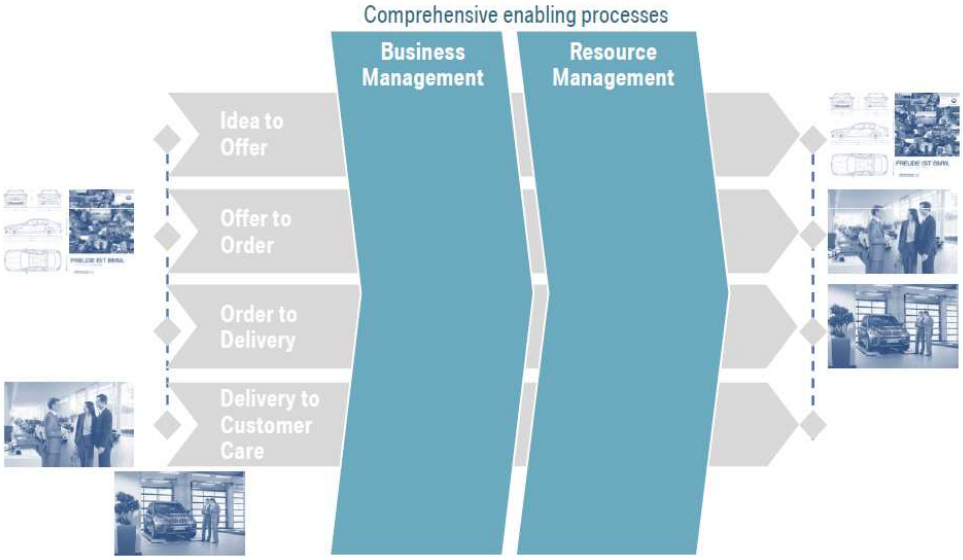

Figure 39: BMW enabling processes

Business management processes offer central services and execute governance tasks. The following processes rank among this group:

- Developing strategy & manage sustainability
- Managing external & internal relationships

- Managing legal issues & compliance
- Managing corporate auditing
- Managing quality

Resource management processes provide the customer with the necessary resources to create added value. The following processes rank among this group:

- Developing and manage human capital
- Managing information technology
- Performing controlling
- Performing accounting, reporting, taxes & customs
- Managing treasury
- Managing general services, corporate security & real estate
- Managing procurement

The standard for Business Process Improvement (BPI) at BMW is defined as follows:

Figure 40: BMW standard approach BPI

In the *initialization* phase, the process is either added to the BMW process model itself, or it is referred to an existent process within this process model. Weaknesses and requirements are described in an initial process mapping. It thus provides an orientation and classification of processes in the general corporate context.

In the *analysis* phase, a reference measurement is conducted, which determines process performance by means of process evaluation parameters. The actual process is recorded in detail and/or identified with its interface partners in the existent process model.

In the *concept* phase, solution scenarios are developed and aligned with the targets stipulated in the Balanced Score Card. The target process is described consistently top-down.

The *redesign and preparation* phase describes the process in the necessary level of detail for meeting the requirements of the maturity level model[438] and for being released prior to the implementation phase. The process is described in detail; all relevant objects are named and documented (business object, roles, IT applications, key parameters, results and activities).

[438] According to Hammer M., Hershman L. pages 289 ff.

In the *implementation* phase, the process release is carried out according to the approval and release management process. Process results are communicated. Change management and training activities have to be scheduled and conducted.

In the *stabilization* phase, the process stability is ensured and the continuous improvement process is supported; the new actual process is measured frequently with regard to performance and application. Frequent benchmarks and best practices are initiated. The maturity level defined in the target management is achieved step by step.

With the described organizational initial position, the BMW Group is a valuable object of study for investigating both, the synergy management in general as well as the potential to make use of process orientation for managing synergies systematically.

After the introduction of the general BMW organization and a detailed presentation of process orientation within the BMW Group, the three case studies, which provided evidence for this thesis, are introduced in the following subchapter.

6.3 The Case Studies

The evidence from the field which is used in this thesis was derived from three case studies which took place between the years 2009 until 2013.[439] The cases were used for validating the results of this thesis as well as designing the synergy identification procedure, introduced in chapter 5. The synergy identification procedure was advanced during all three case studies. In the following, the three case studies are introduced in detail. For a general understanding, the case studies are presented with the following contents: general presentation of the time frame, background, scale of operation, the objectives and the approaches of the projects as well as the organizational structure an exemplary process landscape and the specific findings[440] of the case studies.

6.3.1 Case Study Painted Body Munich

6.3.1.1 General

The case study *Painted Body Munich* (PB) started with the project -optimization of indirect processes- (OpIp) in June 2009 and ended in October 2010. This project was a

[439] Compare chapter Introduction1.3 Figure 1: Case studies

[440] Findings which specifically influenced the general findings presented in chapters 2 till 5.

part of the initiative to optimize indirect processes[441] in the BMW plant Munich. The painted body main department decided to use OpIp to tackle this problem.

As a PhD student at the BMW plant Munich, the researcher played a role within the project by developing a systematical approach including the organizational framework. Designing customized toolsets for the different project phases, interviewing key personnel, arranging and preparing workshops and preparing the results of the different project phases was also an integral part of his work. OpIp was also the impulse for the synergy characterization systematics developed by the researcher. It was applied initially in this project and developed further during this and other projects within the BMW Group.

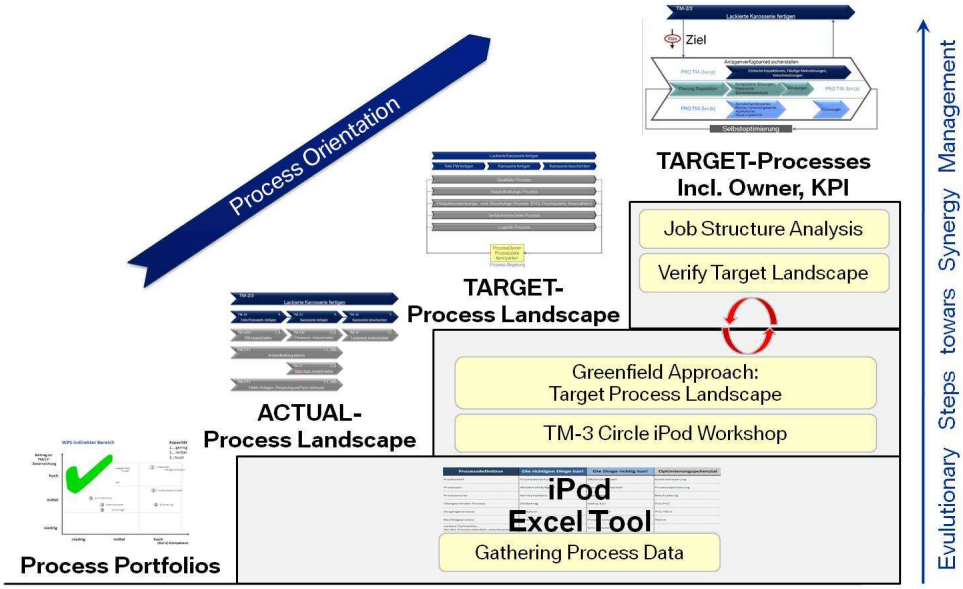

Figure 41: Project OpIp – steps

Figure 41 gives an overview of the different phases followed in the OpIp project. On the left side the conceptual and methodical initial points for the correspondent projects phases are shown. In the first project phase the initial point from another project in plant Munich was employed; in the other phases the initial points were the results of the previous step. The blue steps show the processes in the specific project phase. The overall target of the project is indicated on the top of Figure 41: a TARGET process landscape with synergy optimized, waste-reduced processes including the nomination of process owners and process KPI for the entire painted body process landscape.

[441] Indirect processes do not create a directly perceivable value for the end customer of the BMW Group. Such processes include, amongst others, quality management, maintaining equipment, or controlling operations.

The researcher focused on the concept of process orientation[442] from the beginning of his thesis. Accordingly, the OpIp project was influenced by process orientation from the first day. The application of this concept in all departments became more prominent since all persons involved got familiar with the concept with the progress of this project. This fact was supported by a central initiative of the BMW group called PRIME (Process Improvement to Excellence)[443] which started almost simultaneously in 2009. PRIME is highly based on Michael Hammer's research, following his principles and guidelines of process orientation or process reengineering, respectively. By enabling high-speed cross-functional[444] processes and the greatest possible transparency, PRIME aims at gaining more efficient business processes and stronger customer orientation in order to face tough market requirements. Due to this coincidental but supportive fact, the researcher decided to make use of the 2009 PRIME guidelines in order to define the processes and additionally to reason the need of following the principles of process orientation to the persons involved in the OpIp project.

The first phase of the OpIp project endured four months[445] and included the development of an Excel tool for data collection which was subsequently used for gathering process information. This was the first design of the synergy identification procedure. It was followed by a second one-month phase which covered the preparation time for the workshop and the subsequent breakdown of the resulting optimization ideas into work packages. In the final stadium of the project, which took roughly one year, general management was hold responsible for delivering the results of the single work packages.

Phase one comprised one-on-one interviews with the hierarchy of the Painted Body, from the director- to the group leader level[446], for gathering process data from their area of responsibility. In order to ensure a consistency of the data collected all interviews were conducted by the researcher. The Excel tool used for the interviews included the following information inquiry:

[442] Compare chapter 3.3

[443] Compare chapter 6.2.1

[444] Cross-functionality is of importance for an appropriate synergy constellation.

[445] This long time span is due to iterative phases in developing the Excel Tool and a four week-plant shutdown where only limited actions could take place.

[446] Organizational structure compare chapter 6.3.1.2

Process Description	**Attribute**	**Process Rating**	**Attribute**
Process title	Noun-verb combination	Repeatability	high, medium, low[447]
Process type	Core process, support process[448]	Target contribution	high, medium, low[449]
Process owner	Name	Core competence	high, medium, low[450]
Superordinate process	Process title	Is the process needed in the leadplant	must, can, not necessary
Preceding process	Process title	Is the process needed in the sisterplant	must, can, not necessary
Subsequent process	Process title		
Process level	1(group), 2 (department), etc.		
Input	Description and/or process title		
Output	Description and/or process title		
Number of employees	Digit		
Other organizational units owning this process	Departmental name		
Is the process needed in the leadplant	must, can, not necessary		
Is the process needed in the sisterplant	must, can, not necessary		
Synergy characterization[451]	**Attribute**	**Waste definition**	**Attribute**

[447] Definition: high=daily to weekly, medium=weekly to monthly, low=monthly or less

[448] Compare chapter 6.2.1

[449] In accordance to overall targets

[450] Definition: A core competence is valued by the customer and results in a competitive advantage. A core competence is difficult to imitate.

[451] Details about the Synergy Characteristics compare chapter 3

Operative synergies	Synergy, dissynergy[452]	Alignment of process performance and demand	exactly defined, defined, not defined[453]
➔ Actual synergy level	Group, department, etc.[454]	Information available	oversupply, adequate, insufficient
➔ Optimum synergy level	Group, department, etc.	Amount of interfaces	high, medium, low[455]
Knowledge synergies	Synergy, dissynergy	Level of standardization	high, medium, low
➔ Actual synergy level	Group, department, etc.	Adherence to schedule	high, medium, low
➔ Optimum synergy level	Group, department, etc.	Output quality	high, medium, low
Strategic Synergies	Synergy, dissynergy	Existence of KPI	Yes, no
➔ Actual synergy level	Group, department, etc.	Summary of optimization ideas	Description based on the previous statements
➔ Optimum synergy level	Group, department, etc.		
Sourcing Synergies	Synergy, dissynergy		
➔ Actual synergy level	Group, department, etc.		
➔ Optimum synergy level	Group, department, etc.		
Equipment Synergies	Synergy, dissynergy		
➔ Actual synergy level	Group, department, etc.		
➔ Optimum synergy level	Group, department, etc.		

[452] Definition Synergy and Dissynergy compare chapter 2

[453] With the customer of the process output

[454] Compare chapter 5.3.5 on Synergy Levels

[455] Interfaces with other processes and departments

Table 31: Project OpIp data query

During the interviews, all information listed above was allocated to each specific process. Gathering the process information from different hierarchical levels resulted in a hierarchical process description including different levels of detail making a total number of roughly 150 processes.

The inquiry is grouped into

- the general process description
- the process rating
- the synergy characterization and
- the waste definition

The *general process description* is partially based on the PRIME initiative and attributively describes the process[456] and its allocation in the process landscape. Furthermore, it provides the first hints towards potential synergetic relations by naming the superordinate, preceding, subsequent processes, plus other departments owning this process.

The *process rating* is an indicator for further prioritization and contains the logic of the project carried out prior to OpIp: allocating the core competence and the target contribution of the core competence of the process in the automotive context. The rating of the necessity of the process in both the leadplant and the sisterplant was an additional hint for potential synergies in the broader intra plant context.

The *synergy characterization* describes the actual as well as the potential synergy configuration of the process in accordance to the synergy systematics developed in chapter 5.3.

The *waste definition*, which was gathered at last, was an indicator for the possible minimization of waste within the process, and the existence of process KPI. All improvement insights were summed up in the last entry.

For reasons of clarity, the process description resulting from the interviews was transferred into a visual ACTUAL Process Landscape, including roughly 150

[456] Including the SIPOC (Supplier Input Process Output Customer) logic

processes.[457] The information, especially the optimization ideas, was the basis for the second phase of the project.

Phase two of the OpIp project started with a workshop of the TM-3 circle[458] in order to develop an ideal process landscape of the painted body organization following a green field approach. The scope was limited to the PB main department, not including potential process interfaces to the other main departments. After the development of the green field landscape it was subsequently aligned with the ACTUAL process landscape and the summarized optimization ideas resulting from the Excel tool. Even though both perspectives usually supported each other, the approaches and opinions how the synergy potentials should be realized differed i) within the TM-3 circle and ii) when comparing the ideas listed in the Excel tool, which also included input of lower hierarchical levels. The result of the workshop was a visual TARGET process landscape, which represented a matching of the greenfield and optimization idea solutions. This TARGET landscape was regarded as the "vision" of the TM-3 circle about how future processes should be. In accordance with this landscape, five work packages, which are owned by fife general managers, were defined in order to transfer the vision into a detailed working solution. The five groups were:

- Quality
- Maintenance
- Logistics
- Process engineering
- Productions management- and controlling

Phase three took place in the five defined working groups. The overall objective of all groups was to validate the TARGET process landscape, also considering the optimization ideas from the interviews, and derive an implementation plan for the verified changes. Since the optimization ideas – which were partially general, partially very complex – needed to be specified and a high interdependency of the departments was given, this project stage needed the longest timeframe. The general management presented the project status within the TM-3 circle on a regular basis. The researcher supported the working groups giving additional approaches which were more detailed and suitable for this phase.

[457] The interviews took one to four hours, depending on the level of detail. Long interviews were a result of detailed discussions about synergy-related questions.

[458] Consisting of the Painted Body general management, lead by the Painted Body director

6.3.1.2 Organizational Structure

As one of the Plant Munich (TM) main departments, the Painted Body consists of the PB Director (D), five General Managers (GM) reporting to him and fifteen Group Leaders (GL) reporting to the GM level. In total, about 2000 people are employed at the PB. The organizational chart below shows the department of the PB organization:

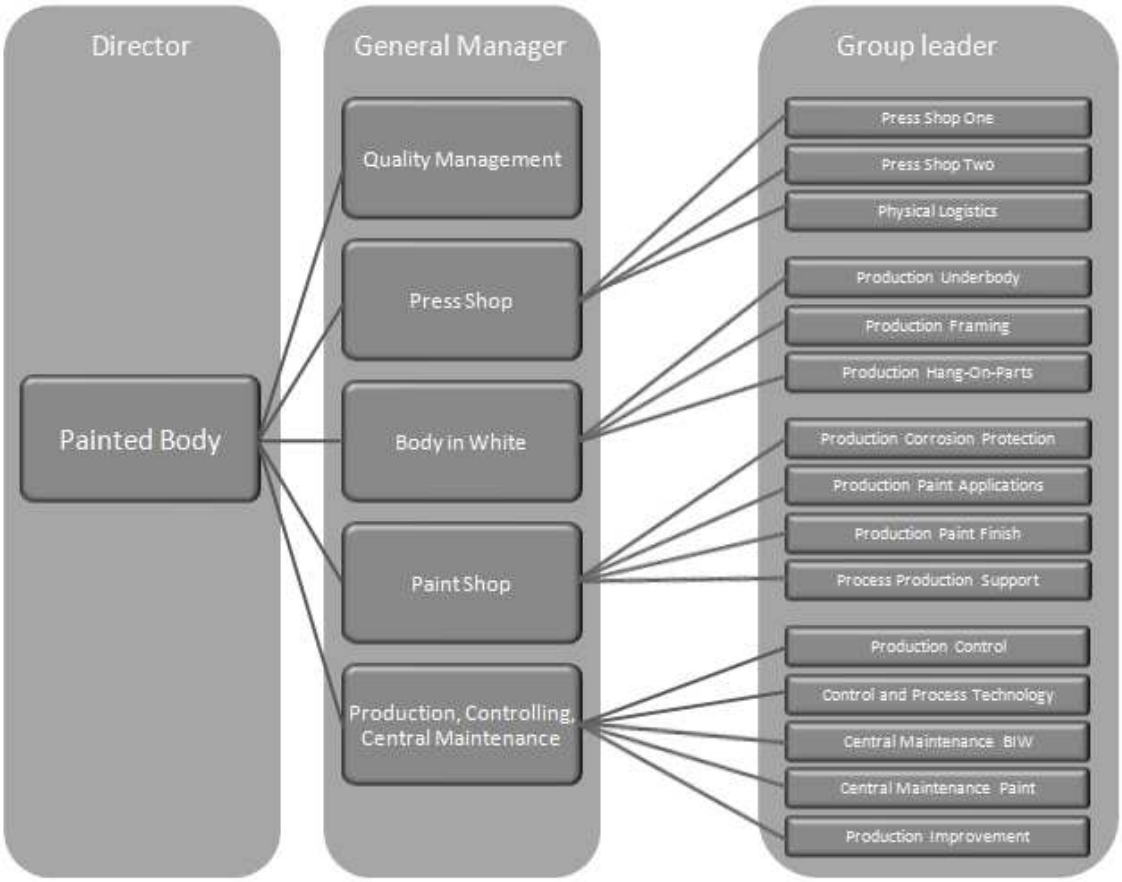

Figure 42: Organizational chart painted body plant Munich

In addition to the departments shown in the chart above, the PB organization is i) supported by BMW central departments, which are partly located in the PB buildings, such as central technical planning departments, or central quality departments ii) and partially involved in project-related activities.

The PB departments are located on the production site in Munich. The other main departments at the BMW production site in Munich are Controlling, Assembly, Total

Vehicle and Engines Production. In contrast to the second case study, the Engines Production is not an organizational part of the plant Munich structure.[459]

In addition to the structural organization an exemplary process landscape of the PB is introduced in the following chapter.

6.3.1.3 Exemplary Process Landscape of the Object of Investigation

The process landscape, which was developed during this case study, shown in Figure 43 and Figure 44 describe two levels of processes of the painted body organization. The former shows the second and third level of the key processes and the second level of the support processes. The latter shows the next lower, more detailed, process level of the 'ensure quality' process, corresponding to the third process level, as it is performed at the moment of the process mapping.[460]

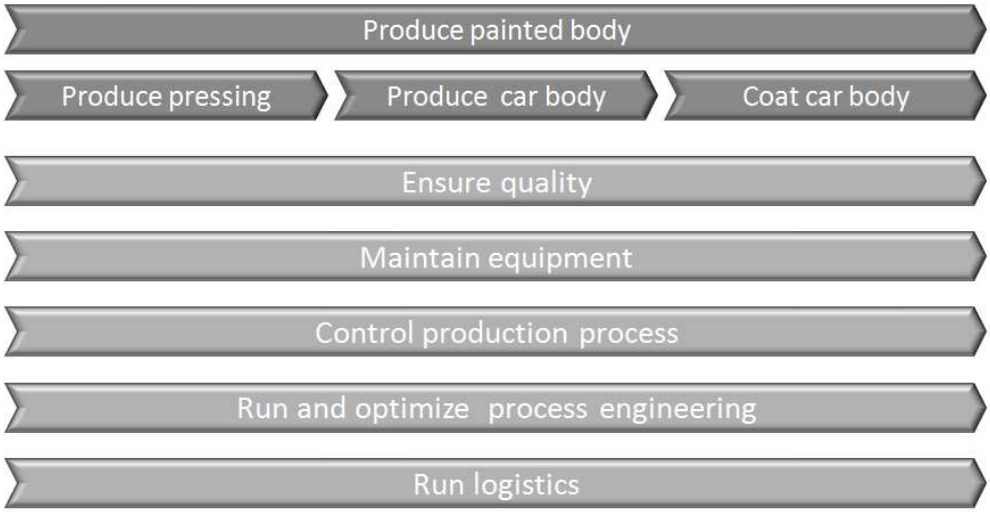

Figure 43: Painted body process landscape

On the top of the figure the key process of the PB is shown, 'produce painted body'. The lower three processes 'produce pressing', 'produce car body' and 'coat car body' detail this process, they are the three key processes on process level three. Below these key processes the five supportive processes on process level two are shown. From the PB management perspective these processes should be regarded from end-to-end on this

[459] Whereas the Engine Production in Hams Hall is a part of the organizational structure of the plant Oxford with one responsible managing director (MD)

[460] Note the first level process is the not indicated process 'produce car' which is assigned to the plant Munich level. The second level key processes are the subprocesses including the 'produce painted body' process.

detail level. The next detail level of the supporting processes is shown exemplary on the 'ensure quality' process, in the figure on the next side.

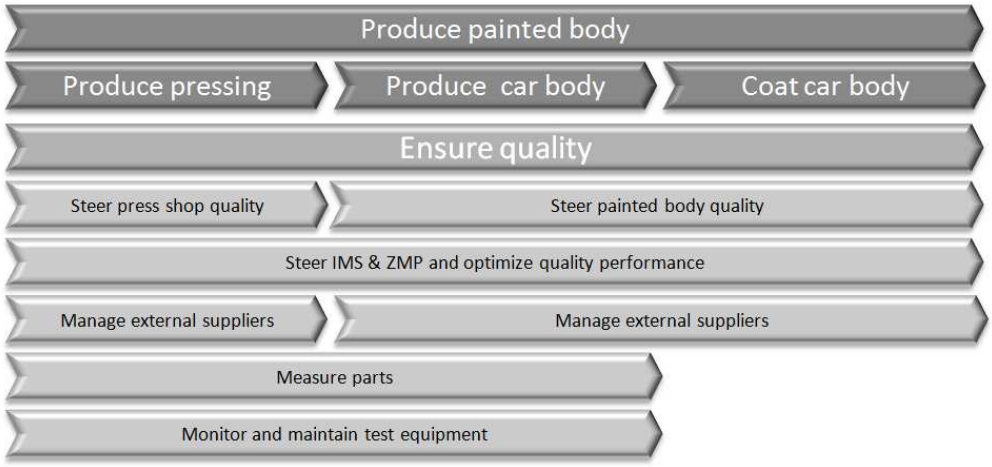

Figure 44: Painted body quality landscape

On the next detail level, further details of the 'ensure quality' process of the PB are shown. The light grey processes are accordingly on process level four. This process map shows how the processes are followed at this moment, and not how the optimized situation should be in the future. The single arrows indicate that some of the processes are not regarded from end-to-end in the PB organization but still show where the past organizational boarders were.[461]

The figure indicates that the 'steering ' process of the press shop and the painted body is performed independently. Thus, no specific cooperation between both processes exists. The same is true for the 'manage external supplier' process. In contrast to these two processes, the 'steer IMS & ZMP and optimize quality performance' process is conducted from end-to-end for the entire painted body. The 'measure parts' as well as 'monitor and maintain test equipment' processes only support the 'produce pressing' and 'produce car body' key processes.

6.3.1.4 Specific Findings from this Case Study

The specific findings of this case study were:

[461] The painted body main department organization consists of three previously independent organizational units i) press shop ii) body shop and iii) paint shop. In a first step the press shop was organized together with the body shop in one common main department, the paint shop remained an independent main department. In a second step the press and body shop were merged with the paint shop, resulting in the painted body main department.

- The importance of a simple approach with a guiding character for synergy identification
- The direct connection of synergies with organizational changes
- The resistance towards organizational changes
- The positive impact of processes as basis for the synergy identification procedure
- The complexity of the synergy identification procedure
- The complexity and expenditure of time for the synergy implementation

Since this case study was the pilot for the synergy identification procedure, it became evident how important simplicity with a guiding character is for this approach. At the beginning, the researcher slightly adapted the existent synergy categorization processes presented in chapter 2.3 for deriving a synergy identification procedure. The result was that the synergy categorizations were too complex for an easy understanding on all hierarchical levels; terms such as “tangible and intangible synergies” were not directly understood. Additionally, the missing guiding character resulted in a brainstorming in a broad field since, for instance, intangible synergies in production, referring to Porter, can have multiple manifestations such as sharing knowledge, working together with other departments, deriving strategies with other departments, etc. Thus, it became evident that the researcher had to design a synergy identification procedure which is simple to understand and at the same time offers a guidance for focussing on all potential synergies. The result was the two-dimensional framework for synergy identification presented in chapter 5.3.5.1.

During this, as well as the other case studies, it became evident that searching for synergies was most often related to organizational changes, without the reference to the synergy identification procedure. Even if the basis for the synergy was not directly related to the structural organization, the persons involved often regarded organizational changes as the enabler to use certain synergies. It was, for instance, mentioned that the quality of the maintenance would be increased if it was centralized because of the better possibility to exchange knowledge in this central department. Apparently, the structural organization does not necessarily need to be changed to enable the exchange of knowledge. Thus, it became evident that the synergy identification procedure should be supported by options, determining how synergies can generally be enabled. These options can be found in chapter 5.3.6 where the synergy enablers are introduced.

At the same time, the first case study has shown that organizational changes are not easy to implement and lead to resistances within the organization. This fact was first observed because the researcher entered the department of the painted body in a phase in which the former two departments, body shop and paint shop, were merged. Secondly the resistances became obvious when synergy ideas were discussed which should lead to structural organizational changes.

The researcher observed that processes which are taken as initial point for synergy identification had a positive impact on a holistic consideration of synergies. Prior to that

the search for synergies was rather a brainstorming process where it could not be ensured that all potential synergies within the organizational unit were taken into consideration. By deciding for processes as initial point, combined with the synergy category and level framework described in chapter 5.3, potential and existent synergies were holistically gathered.

Especially, during the first case study it became apparent how complex the search for synergies can be without an existing framework and procedure. Even after the application of the first draft of the synergy identification procedure, the need for involving a high number of different experts from different departments with different functional focuses complicate the procedure. This awareness resulted in the procedure described in Table 31: Project OpIp data query being reduced to the complexity during the synergy identification procedure.

The complexity and expenditure of time was observed already during the first case study when the first synergies found should be implemented. Especially, since missing standards and different ideas about the realization of the synergy from the different organizational units occurred, it was even more difficult to implement the synergies than anticipated. Because of this fact some synergies were even not realized at all. After the details of the painted body Munich (PB) case study were introduced in this subchapter, the following subchapter introduces the second case study which supported the findings of this thesis.

6.3.2 Action Research Maintenance Triangle UK

6.3.2.1 General

The second case, the Maintenance Project (MP) started in April 2010 with resulting subprojects still ongoing at the three MINI UK production sites[462]. The researcher was actively involved in the project from its initiation until October 2011 and still follows the progress of the project. Contrary to the "OpIp" project, the researcher actively consulted the maintenance project members referring to similar questions and approaches from the case in Munich. Since the researcher played an active role in the project, the scientific approach is classified as action research.

The MP was one of three projects attributed to the Duplication Free Business main project. Duplication Free Business, which was owned by two directors of the MINI UK

[462] Plant Oxford: Body in White, Paint Shop, Assembly and support functions; plant Swindon: Press Shop and Body in White; Engine Plant Hams Hall

organization,[463] was initiated to reduce redundancies such as double work, uncoordinated processes, or redundant data storage in different organizational areas. As a subproject the MP had the same general targets and, additionally, specific maintenance-related targets such as the reduction of breakdown times or the meantime between failures. The overall objective of the project is to enable an efficient maintenance process structure with less unnecessary departmental boundaries. This leads to a reduction of the "silo effect" which is caused by organizing the company in different functional units. As a result of the organizational structure of MINI UK, the project included the three plants Oxford, Hams Hall and Swindon with all departments being involved in maintenance activities.

The approach for the MP, which was an enhancement of the "OpIp" procedure, was reduced to the essential steps shown below. The main reason why the approach was adapted was that the researcher was located in Munich and was accordingly not able to follow a similar extensive project like OpIp in the UK. The project steps which were followed during the MP are shown below.

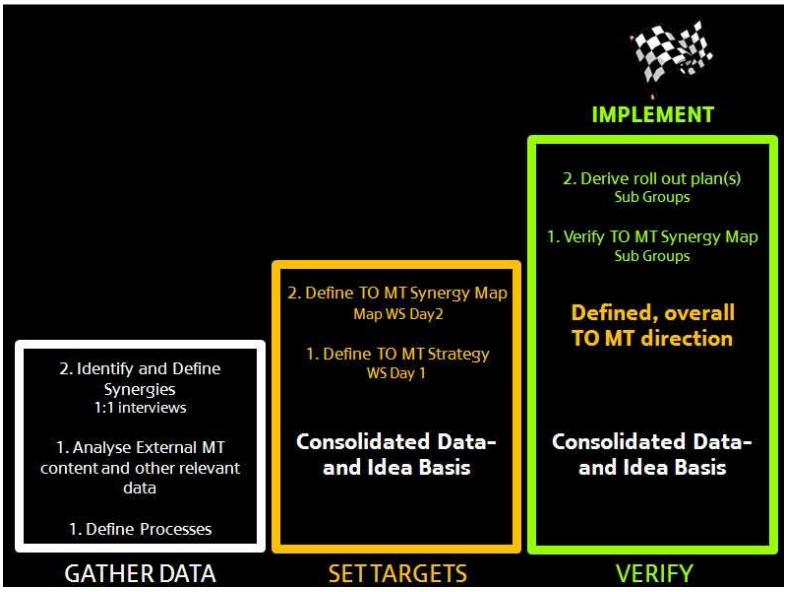

Figure 45: Maintenance project – steps

Compared to the project in Munich, MP concentrated on the most essential process information in the first step: gather data (shown on the left). This procedure already constitutes the second, enhanced design of the synergy identification systematics. In general, the procedure was comparable to the one carried out in Munich. The researcher conducted structured one-on-one interviews in all departments, this time only in those

[463] Details about the organization compare subchapter 6.3.2.2. From 2011 it was even owned by the managing director and another director.

departments which include maintenance-related processes. In addition to the OpIp project, BMW external maintenance content was also taken into consideration for enabling potential synergetic effects regarding externally performed operations.

In this case, the content of the interviews was limited to the definition of the process. Only the process name and the corresponding existent and potential synergy characterization were defined. The reason why this contextual reduction in the data gathering process was justifiable was that the other information gathered during the OpIp project did not add much additional value to the end result; this was mainly because the essential ideas resulted from the synergy characterization anyway. Due to the limited content of the interviews and an optimal scheduling of the interviews[464] the data gathering process, including the summarization of the results, took two weeks.

The second step of the MP, which was based on the data gathered during the first phase, was carried out as a two day workshop for setting the targets for the subsequent step. The participants were from different hierarchical levels, ranging from director to group leader level at organizational units. All participants were either core members of the duplication free business main project or key persons for maintenance-related topics.

As a result of the workshop, the participants decided on a maintenance synergy map which provided a basis for the further steps and which showed where intra-departmental approaches are wanted by the workshop participants. The map is based on the synergy identification systematics introduced in chapter 5.3.5.1and it indicates which synergy category is to be used at what synergy level related to the TO-organizational structure.

[464] Primarily resulting from top management support.

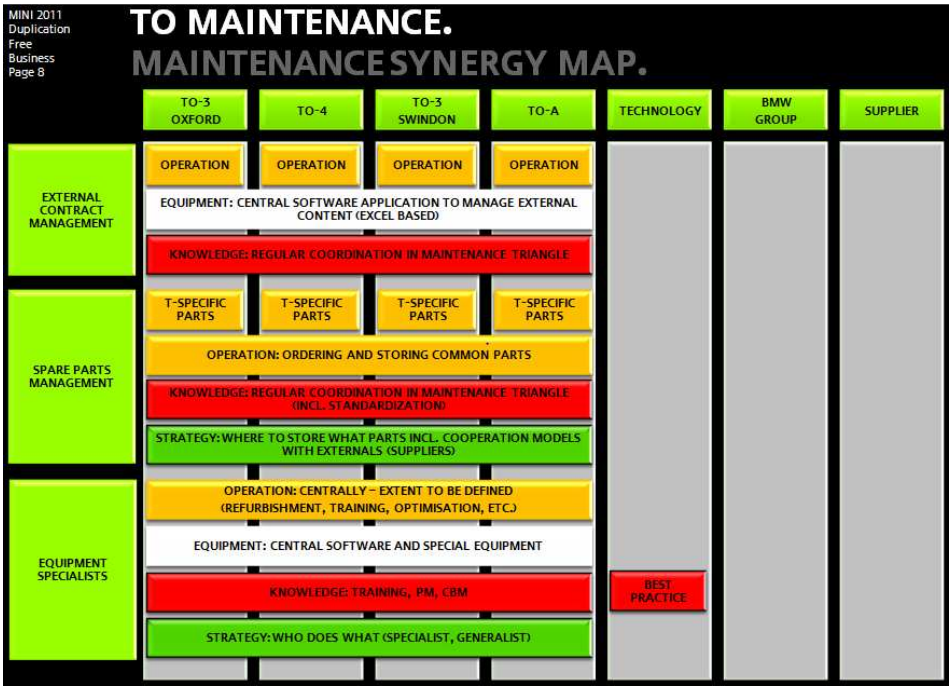

Figure 46: Maintenance synergy map

The figure above shows exemplarily a part of the maintenance synergy map as one of the results of the second stage of the MP. The map shows how the different synergy categories[465] should be utilized to enable the optimal synergy constellation. The left hand boxes show the processes 'external contract management' and 'spare parts management' and the function 'equipment specialist' which carries our various processes. The upper side indicates the departments located in the UK[466], the central technology department[467], the BMW Group as an entity and the suppliers. Operations are indicated in orange boxes, the white boxes stand for the equipment and the red boxes for the knowledge. For example, in the second process 'spare parts management' the following steps have to be taken:

- The operation (managing spare parts) needs to take place in each main department because the parts to be stored are technologically specific for each main department.
- The sub operation of ordering and storing common parts needs to take place centrally (orange) because these parts are the same for all main departments.

[465] Synergy categories see chapter 5.3

[466] TO-x.

[467] Basically located in Munich with support in the plants.

- The knowledge for coordinating the processes and standardizing the parts/equipment needs to take place centrally for the TO organization (red).
- The strategic decisions about where the parts are stored and which cooperation models with external suppliers are suitable have to be made on the TO level (green).

The third step of the MP was the verification phase which based on the data gathered in the first step, as well as the targets defined during the two day workshop in stage two. This stage started in summer 2010 and partly continued until August 2012. During this phase the task was to i) verify if the ideas found and defined are indeed viable in detail, ii) find out what needs to be taken into consideration, iii) determine the dimensions of an implementation plan and iv) implement the ideas. In contrast to the OpIp project, the workshop participants decided to cluster the content of the ideas gathered and, accordingly, to define smaller work packages in order to ensure a better mode of operation. The work packages of the MP were:

- Technical strategy
- Reporting tools
- Standard KPI
- Spare parts management and procurement
- Software management
- Standardization of equipment
- Standard skills matrix
- Maintenance organization
- Maintenance shift patterns
- External contracts

The work packages above were partially interdependent. In order to make sure that all dependencies were taken into consideration, an "interrelation matrix" was developed.[468] It indicated which project delivers which output to another project, thus determining the timing sequence.[469]

[468] Compare Table 27: Work package interrelation matrix

[469] Interestingly enough, the reduced approach was turned into a deep micro-macro-designing following the process orientation principles without the influence of the researcher in 11/2012. The persons involved in the process are committed to this approach and gave the researcher feedback; which helped to generate a better overall picture. This fact supports the idea of the synergy management approach: the involvement of the persons in the synergy identification process tremendously supports the change management process.

6.3.2.2 Organizational structure

Compared to the organizational structure of plant Munich, the main difference of plant Oxford is i) the engine plant in Hams Hall which organizationally is part of the MINI organization (TO)[470] and ii) that the press shop and body shop are partially located in Swindon. The three plants Oxford, Hams Hall and Swindon which are part of the TO organization are referred to as the "MINI Production triangle". TO employs a total number of approximately 5,300 people.

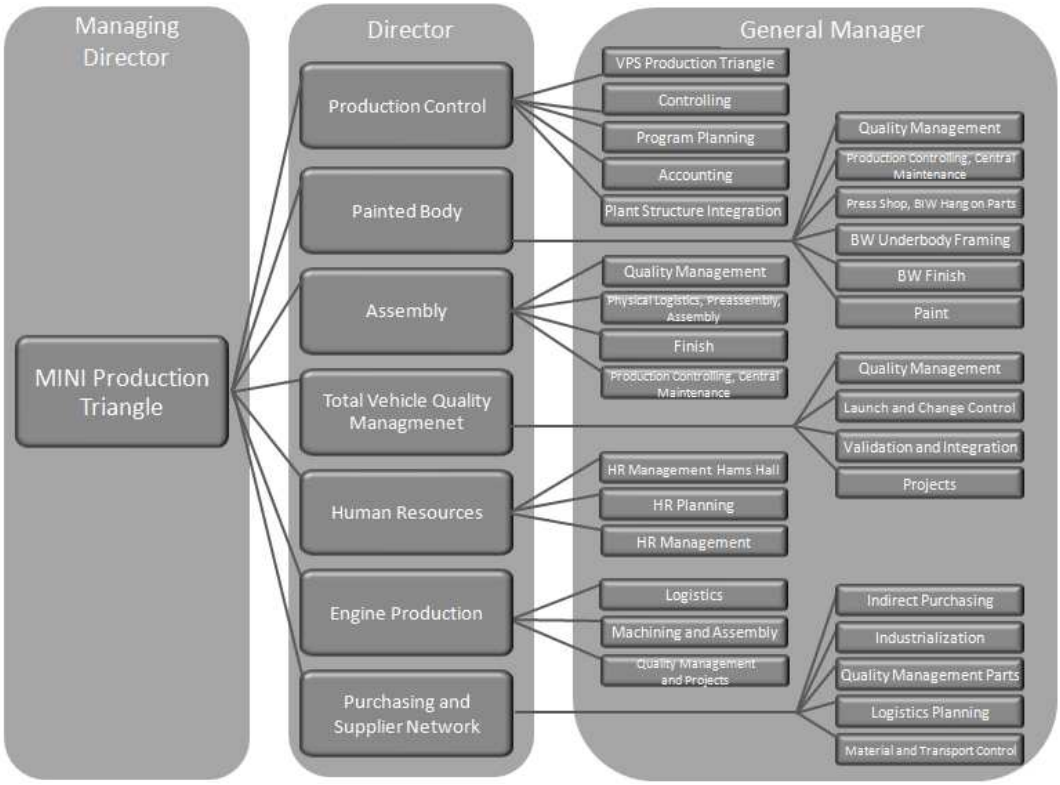

Figure 47: Organizational chart MINI production triangle

The figure above shows the organizational chart of the MINI production organization TO. Due to the fact that the MP project took place on the plant level the organizational chart shows a higher level of hierarchy than the organizational chart of the OpIp project, which was carried out on the main departmental level. For reasons of clarity, the group leader level is left out in Figure 47. In addition to the departments shown in the chart above, the TO organization is supported by BMW central departments, which are partly even located in the TO buildings, such as central technical planning departments, or

[470] The Engine Plant Munich is not a part of the TM (plant Munich) organization

central quality departments. Like the TM-3 organization, the TO organization is also involved in the project structure.

Basically, all main departments were involved in the MP since most of them have at least one department dealing with maintenance-related activities. The complexity in maintenance-related issues arises from the fact that most departments including many groups somehow deal with maintenance. In the painted body organization the departments dealing with maintenance-related issues are, for example:

- Production controlling, central maintenance
- Press shop, BIW hang on parts
- BIW underbody, framing
- BIW finish
- Paint

Under the first mentioned department 'Production controlling, central maintenance' three groups[471] are involved in maintenance relevant topics.

6.3.2.3 Exemplary Process Landscape of the Object of Investigation

Since the MT case study included a different process level compared to the PB case study, the process level introduced in the process landscape is one level higher.[472] The process landscape was used during the MT case study as the basis for synergy identification according to the two dimensional framework for synergy identification introduced in chapter 5.3.5.1. The following figure shows how the maintenance processes should be organized at TO for gaining the optimal synergy constellation.[473]

[471] More than 200 employees.

[472] The process landscape does not define synergies. Processes are the basis for synergy identification.

[473] Comparing the TO organizational chart in Figure 47 with Figure 48: MINI maintenance process landscape and Figure 46: Maintenance synergy map shows the advantage of detaching the search for synergies from i) the organizational chart in the first turn and ii) the process landscape, by means of the synergy categories, in the second turn. The resulting synergies are detailed, aligned to an existing organizational structure, but in the same turn independent from the actual organizational constellation.

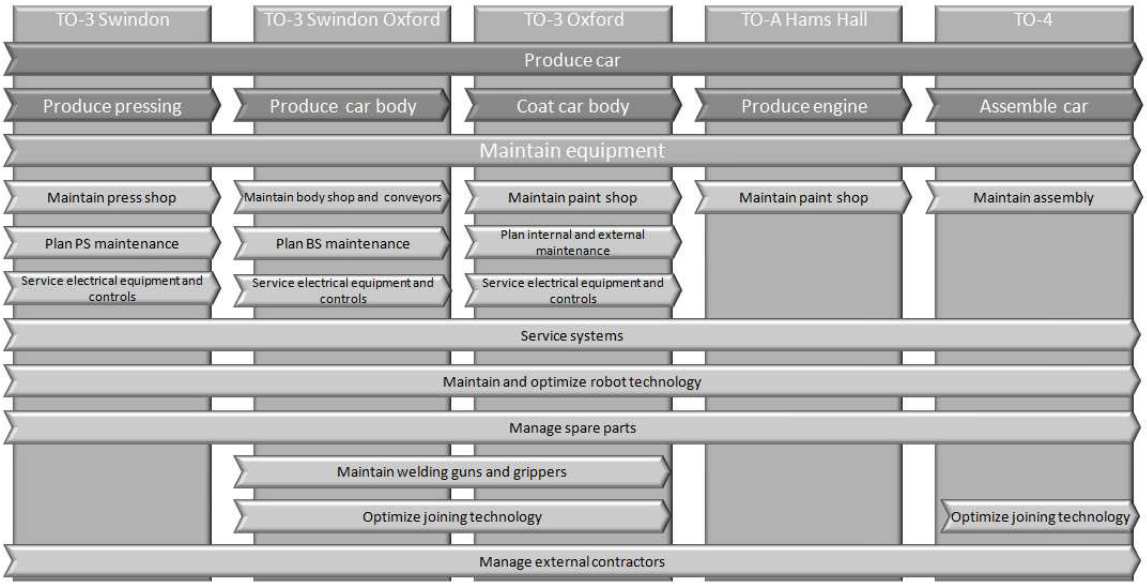

Figure 48: MINI maintenance process landscape

The figure above shows the key process of the TO organization, 'produce car', from the maintenance perspective which is on the first process level, including the functional organizational departments on the top of the figure.[474] These departments were added to the process map to make aware of the situation that some processes also take place in different locations. The first level key process consists of five key processes on the next lower second detail level. These processes are shown under this process. They include the 'produce pressing', 'produce car body', 'coat car body', 'produce engine' and 'assemble car' processes and take place on the second process level.

These key processes are supported by the 'maintain equipment' process, which was of central relevance for the MT project on the first support process level. The next lower process level, the second support level, of the 'maintain equipment' process is shown below the 'maintain equipment' process. These subprocesses include the organizational area specific 'maintain organizational area' processes. They all need to be specific; they are process segments and include minor functions such as lubrication or cleaning of the equipment. The more specific functions are to be found in the specialized processes, such as 'maintain and optimize robot technology', 'maintain welding guns' or 'service electrical equipment and controls.' Processes which are represented with one arrow reaching across different key processes on the second process level are performed commonly for all key processes.

[474] Departments such as Total Vehicle Quality Management, Human Resources, Purchasing and Supplier Network are not listed because they are not involved in Maintenance Processes on this detail level.

Thus, processes such as ‘maintain and optimize robot technology’ and ‘manage spare parts’ are conducted from end-to-end for the entire TO maintenance triangle. The process ‘optimize joining technology’ takes place as a combined solution for the ‘produce car body’ and ‘coat car body’ key processes and independently for the ‘assemble car’ key process due to technological specifications. Thus this process is a process segment one the one side for the painted body, on the other side for the assembly.[475]

6.3.2.4 Specific Findings from this Case Study

The specific findings of this case study were:

- With the right procedure synergies can be identified without a high expenditure of time.
- Structural organizational boundaries can hinder the utilization of synergies tremendously.
- Synergies can be used across local boundaries.
- The implementation phase needs to be well planned and monitored to ensure the utilization of the synergies found.

In the second case study, in which an advanced synergy identification procedure was applied, the time needed for the identification of existent and potential synergies decreased tremendously. Because the focus was set only on the essential information needed during the data gathering phase, the time required was reduced by more than 50% compared to the painted body Munich case study.

During the case study, more precisely after the synergies were identified, it became evident that a lot of synergies were not utilized before simply because the persons involved were part of different organizational units. This silo effect for instance hindered that the departments exchanged information concerning which preventative maintenance actions they apply or which contractors they employ at what price.

Before the second case study started, it was estimated that the distance between the three plants Oxford, Hams Hall and Swindon (approx. 1 hours drive) will hinder the utilization of synergies. However, the result was that a lot of synergies were found for which the distance did not affect the utilization negatively. Not only numerous knowledge synergies, but also operational synergies were identified. For example, the decision was made that at one plant a specific process can be carried out for all three

[475] Such process segments are predestinated to make use of synergies across the different production plants by means of cooperation between the single technologies of different plants.

locations. Also, it was possible to pool and renegotiate the contracts with external companies for all three plants irrespective of the distance.

What was also observed during this case study was that the implementation phase needs to be well planned and monitored, which also includes management attention on the long term. The reason is that the full synergy potential can only be gained if the general conditions, or synergy enablers such as standards, are given. These enablers cannot be implemented within a short period of time. Without a clear implementation plan for each synergy, including a target date, certain long-term synergies are simply not implemented. In 2012, particularly those synergies which required equipment standards were still not implemented, in some cases even rejected.

After the second case study of the MT was introduced, the following subchapter introduces the third case study, which also utilizes synergies outside the BMW Group boarders.

6.3.3 Case Study Purchasing and Supplier Network Munich

6.3.3.1 General

The third case of the Purchasing and Supplier Network Body and Exterior (MK) includes synergy-relevant experience of the researcher as Quality Manager Parts (QMT) employee. The researcher started this position in November 2010 and is still employed there at the time of the completion date of this thesis in early 2013. Depending on which aspects of this position are regarded, the approach is mainly to be considered as an action research approach.

Contrary to the other case studies introduced in this thesis, the insights do not result from a time limited project, but the researcher's permanent position and the resulting experience as QMT at the BMW group. Even though the position as QMT does not directly include synergy specific targets, such as the other cases, the insights given supported the content of this thesis. The synergy identification procedure introduced in chapter 5.3 was again applied and enhanced to the status presented in this thesis.

In his position as QMT the researcher deals with supplier-related i) series relevant quality topics, amongst others customer complaints from the field, ii) projects with a start of production (SOP) in the future where the suppliers are already nominated, amongst others supporting the industrialization phase and managing the quality relevant

extents of interest, and iii) projects where the suppliers companies still need to be nominated and rated from the quality point of view.[476]

The organizational structural frame, including the area of responsibility, is based on the BMW commodity structure.[477] In this case the researcher has worldwide responsibility for catalytic reduction parts for diesel engines comprising the interaction with all BMW plants where the parts are assembled and the according suppliers delivering these parts. He interacts with BMW internal departments in the Forschungs- und Innovationszentrum (FIZ), such as purchasing, research and development and logistics, the BMW production sites, the suppliers of the correspondent parts as well as other automotive OEM.

From the research point of view, the insights from the researcher's QMT position are of interest for this thesis due to:

- The comparability of two different organizational configurations of the supplier quality departments in the past and the present: due to the reorganization of the entire Purchasing and Supplier Network Division (M) in 2010, from a decentralized to a centralized solution.
- The examination of direct structural organizational and indirect organizational approaches supporting a complex networking organizational structure including key support elements such as software-based tools which are also of interest as synergy enables in this thesis.
- The experience the researcher gained by interacting with a multitude of BMW production plants including the corresponding synergetic enablers, effects and key success factors involved in this cooperation.
- The opportunity to experience and develop an inter-cooperation, quality cooperation with another automotive OEM; referred to as company A, which was initiated to enable synergetic effects. Thus allowing the researcher to actively test his approaches in a broader organizational context.
- The insights into synergy-related approaches and the corresponding key success factors of supplier companies.[478]
- The strong focus on knowledge synergies in the position as QMT, a specific synergy category[479] field of research which was not holistically integrated in the synergy perspectives yet.

[476] Details compare Figure 50: Process landscape quality management parts

[477] Compare subchapter organization.

[478] Such as Bosch, Continental, TI Automotive, or Kautex Textron.

[479] The characterization concept including the synergy categories is introduced in chapter 5.3.4

- The general comparison of the exploitation of synergies in a centralized organization, such as the M division in comparison to the relatively decentralized T division, where the first two case studies took place.

Regarding the first point of interest, the researcher had the possibility to see the results of a far reaching structural organizational change and partially compare the results with the previous structural organization. The reorganization pursued, amongst others,[480] the goal to initiate the most effective organizational structure for supplier-related quality work. The comparison with the previous structural organization was enabled by interviewing QMT colleagues on their experience on synergies of the old organization compared to the new constellation. Prior to the reorganization the QMT were parts of the BMW plant organizations, most of them were integrated into the new centralized organization. The reorganization resulted in new areas of responsibility which are primarily based on a part-focused worldwide perspective, where the employee has the responsibility for fewer parts for a multitude of BMW production plants.[481] These structural and process changes partially deal with organizational answers (and open questions) to the scientific problems of this thesis – 'which influential factors affect the successful utilization of synergies' and 'which effect does the organizational structure have on the exploitation of synergies'[482] – and enable a comparison of two principally different organizational structures.

The second point of interest shows which other supportive factors, besides the organizational structure, need to be developed to enable an effective synergetic mode of operation in an organization with a high need of complex interaction.[483] These insights are primarily of interest for the second scientific problem on which influential factors affect the successful utilization of synergies. The insights from the case deliver solutions and approaches on how these influential factors can be supported positively.

The third point includes the researcher's personal experience on the thesis relevant topic in a complex organization and also contains answers to the second scientific problem.

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[480] The reorganization was more far-reaching than only changing the mode of operation of the BMW supplier quality departments; it also changed the way how processes between buyers, research and development, QMT and logistics were organized including changes in areas of responsibility, the structural organization of the different departments and IT systems supporting the entire process environment. The details of the entire reorganization are not of interest for this thesis and therefore only described where the mode of operation from the synergetic point of view was changed.

[481] Instead of being responsible for more parts for only one BMW plant or derivative.

[482] Scientific problems two and three, compare chapter 1.2

[483] Between different cultures, different time zones, different car projects, different suppliers.

Additionally, it supported the researcher to question and evaluate his hypotheses and approaches in the daily mode of operation.[484]

The active attendance in a pilot cooperation project with another automotive OEM, which was specified on supplier quality issues and was initiated by board members of both companies, enabled the researcher to test and further develop his synergy characterization concept and simultaneously work on the second scientific problem. It also gave the researcher the possibility to experience which additional influential factors come into effect, when the organizational boarders of a company are left, in this case even by cooperating with a competitor.

His daily work, including the interaction with multiple major automotive suppliers, gave the researcher the possibility to examine and question direct and indirect organizational approaches of the suppliers on synergy-related issues; thus resulting in an active contribution to the second and third scientific problem. Due to the spotlight on quality-related issues of his daily work, a focus on knowledge-related synergies occurred. However, also other synergy categories were questioned and actively regarded during his interaction with the suppliers.

Generally, the synergy relevant insights of the researcher as QMT were highly based on knowledge and strategic synergy issues. Reasons are that this field of operation is highly based on the exchange of information and knowledge and the according strategies which define how specific issues can be tackled from the quality point of view. This fact supported the researcher to answer some questions/hypotheses from the previous cases regarding knowledge synergy-related issues and additionally to get major insights for the third scientific problem – how the structural organization affects the exploitation of synergies.

The centralized organizational structure of the M division also enabled the researcher to make comparisons from the synergy perspective with the more decentrally organized T division, where the first two case studies took place. Based on that, it was possible to get further answers to the scientific problem, ‘which effect does the organizational structure have on the exploitation of synergies’, and additionally to compare different approaches on how synergies are made possible within the particular organization.

Indirectly, all insights of the researcher’s work in the MK division also support the answer of the first scientific problem, how synergies can be characterized systematically. With his insights the researcher has the possibility to question and

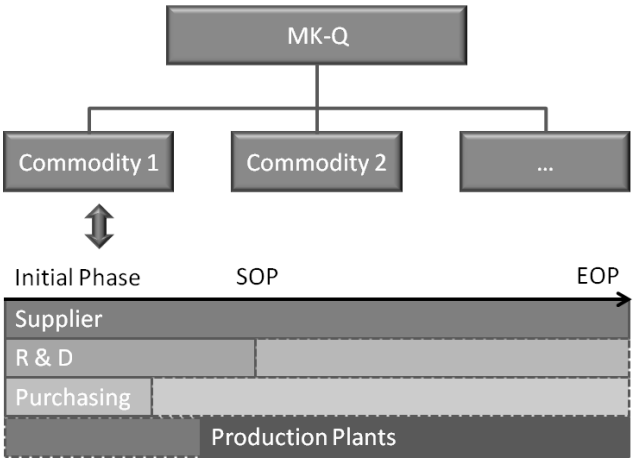
[484] Hypothesis and scientific problems see chapter 1.2

optimize his systematic synergy characterization approach in a slightly different context and proof for its general applicability.

6.3.3.2 Organizational Structure

The M division is divided into different divisions, MK being one of them, which generally all include i) buying, ii) quality and iii) logistics main departments. The buyers and quality main departments are reporting to the same managing director[485], the logistics main departments are organized in their own division within the M division. Generally, all M divisions are steered centrally, independent on the geographical allocation of the single department, group or employee.[486]

The MK division includes purchasing, quality and human resource main departments. The quality main department is structured based on the commodity structure which represents different (car) part ranges, for instance fuel systems or roof systems. Within these so-called commodities, groups or single persons account for specific parts of the commodity with a geographic worldwide responsibility from the design phase to the end of production. Quality and purchasing departments are grouped into similar/comparable commodity-structures to mach tandem partners for the corresponding time phases, especially the design phase. The figure below gives an overview of the MK divisional structure, including the interfaces to the BMW production plants as well as the responsibility timeline on the bottom.



[485] To enable a price-quality balance within the division and being able to set balanced targets.

[486] Amongst others by reporting to central organizational units, using central standard software systems and tools.

Figure 49: MK organization

For enabling an effective and efficient mode of operation in this complex organizational unit, correspondent communication units are needed.

From the scientific perspective of this thesis, regarding synergy interrelations and the corresponding key influential factors, the centralized structural organization of the M division represents a valuable difference towards the rather decentralized organizational structure of the T division which was examined during the case studies “OpIp” (TM plant Munich) and “Maintenance Project” (TO-MINI production triangle). It allows the researcher to challenge his statements regarding two principally different organizational structures and gain insights, especially on the key influential factors of successful synergy exploitation, which might be specifically dependent on the organizational structure.[487]

6.3.3.3 Exemplary Process Landscape of the Object of Investigation

Even though the MK case study also made use of synergies which took place outside the BMW organizational boarders and accordingly the processes included these cooperation partners, the process landscape introduced in the following is only based on the BMW internal processes.

[487] The results are presented in chapters 2.4and 5.

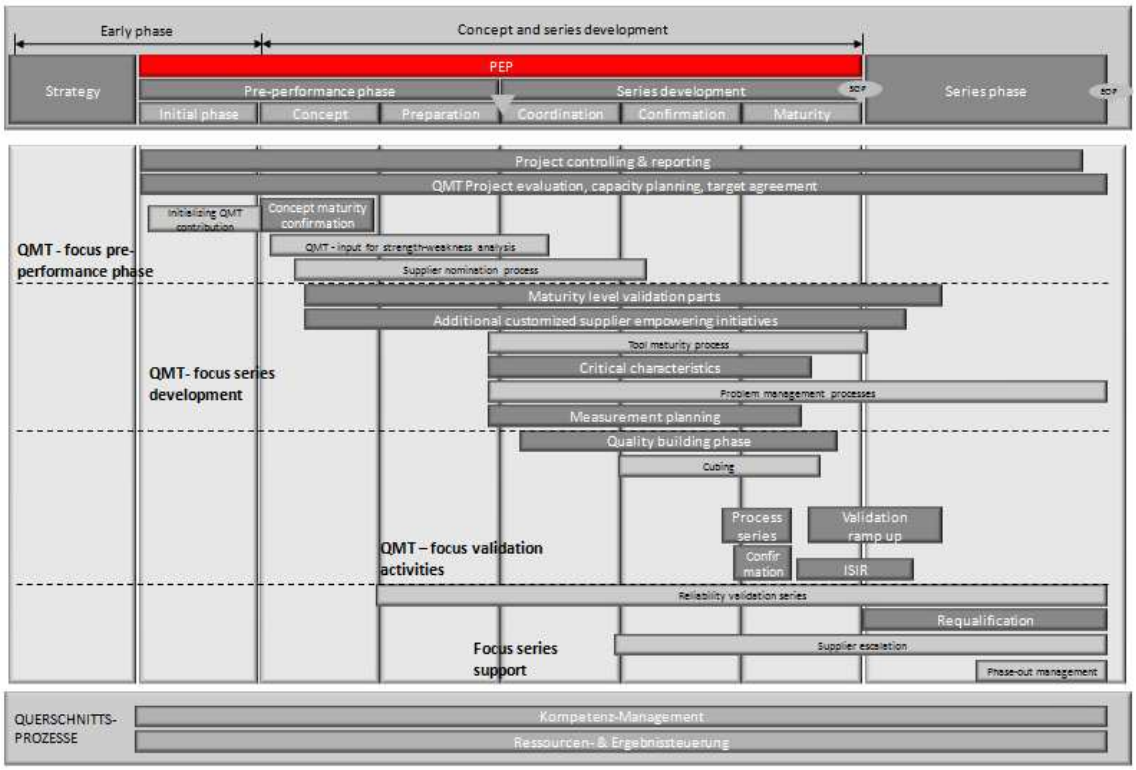


Figure 50: Process landscape quality management parts

In this case, the processes are referred to the project timeline which includes the i) initial phase, ii) the concept phase, iii) the preparation phase, iv) the agreement phase, v) the confirmation phase, vi) the maturity phase, vii) the start of production (SOP) as a centrally important mile stone, viii) the series phase after the SOP and the ix) end of production (EOP) as the ending point of all quality processes regarded in the MK context. The phases are indicated on the top of the figure. Below, all quality management parts (QMT) processes are shown. In contrary to the recommendation, the QMT landscape does include more than ten processes. The reason is that these processes are regarded from cradle to grave, thus including a long time span of approximately 11 years. Certainly, all processes are not conducted simultaneously, making this wide range of different processes justifiable.

The special fact about these processes is that some of them have a multitude of links to other organizational units of the BMW Group as well as external partners.[488] The process ‘confirm concept maturity’, for instance, is carried out by the engineering, the quality, the purchasing, the controlling as well as the logistics departments. The process ‘realize requalification’ is carried out together with the according supplier or, if agreed

[488] Compare Figure 49: MK organization

with BMW, by the supplier on his own. The latter case includes the supplier confirming the realization of the requalification by following predefined procedures and using standardized documents. Thus, the process perspective, in this case, tremendously supports the end-to-end perspective, irrespective of which organizational units are involved in the process. The details about who does what until when regarding the cross-functional processes are accordingly mapped on the next process levels.

When referring these processes to the BMW process landscape introduced in Figure 38: BMW core business processes level 1, all QMT processes are to be found as support processes of the four core processes ItO, OtO, OtD and DtCC.

The process landscape was used as basis for the identification of synergies with company A. In this case it was first questioned which of the processes also apply to company A and subsequently the synergies were identified according to the two dimensional synergy systematics[489]

6.3.3.4 Specific Findings from this Case Study

The specific findings of this case study were:

- The general applicability of the synergy identification procedure
- The importance of trusting the synergy partner
- The positive impact of process orientation on the utilization of synergies

Even though the synergy identification procedure was developed for the application in production environments, the third case study has proven its general applicability, in this case for the identification of synergies in supplier quality management. The application of the procedure was not different compared to the first two case studies. The only difference was that the synergies found in this context were rather based on knowledge synergies.

Another finding from this case study was that the trust in the synergy partner is crucial for enabling the utilization of synergies. This effect was also observed during the first two case studies which differed from the third case study due to the fact that all synergies found were based on the cooperation of BMW internal organizational units. The cooperation with external partners in the third case study has shown that the utilization of synergies is in this case rather hesitant. Also, not all possible synergies are used simply due to the complete trust in the synergy partner.

[489] See chapter 5.3.5.1

An important observation during this case study was the positive effect of process orientation on the utilization of synergies. During the time of the third case study the PRIME initiative has already existed for three years, multiple far reaching projects were introduced and the idea of process orientation has come to fruition in the BMW Group. At the beginning of 2013, departments which previously tended to perform within their own silo started to cooperate with other departments; processes were changed; and the idea of the overall optimum[490] started to affect the everyday business live. All these facts resulted in a strongly enhanced utilization of all five synergy categories.

6.4 Insights from the Case Study

6.4.1 Insights from the Case Study: General

This chapter introduces main observations which were gathered during the case studies and are of relevance for successfully using synergies in production environments. Even though no additional findings are introduced, the examples demonstrate the relevance of the theoretical knowledge of this thesis. The insights outline:

- Why a synergy systematic is needed.
- How processes and synergies could be mapped.
- How the organizational belonging influences management synergy behavior.
- What needs to be considered when using synergies with a competitor.
- What the central success factors for synergy utilization are, based on the case studies.

6.4.2 Insights from the Case Study: Synergy Systematics

Even though synergies are often used without a specific synergy systematics in corporations, the evidence of the case studies has shown the benefits of a systematic for dealing with synergies. It allows for an optimized synergy constellation. Before the three-dimensional[491] approach was introduced in the BMW case study and action research projects, the members involved i) did not have a common language and perspective on synergies, ii) did not have the same sensibility towards synergy effects and synergy enablers as well as iii) did not consider all synergetic interrelations.

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[490] Which is also of central importance for synergies.

[491] Correctly, it is two plus one since the synergy enablers were only of secondary interest during the case study and the interviews concerning them.

Not making use of the same language occurred, for instance, when 'quality synergies' were discussed between two parties: One idea referred to the adaption of the quality gates between the quality departments of the different functional areas[492] without organizational structure changes, while the other idea was to use one software solution for a specific process. After the introduction of the synergy systematics the first idea was translated into an operation synergy which makes use of a process regulation as synergy enabler, whereas the second was a resource synergy which makes use of a standard as synergy enabler.[493] Thus, the quality synergy was divided into two specific different synergies.

A common perspective is needed because even if the same language, in this case the 'standard software' instead of 'quality synergy' is used, it does not mean that one is talking about the same subject. Standard software might be one which is used for a department, but also one which is used for the BMW group as a company, including all departments. As trivial as this statement is, it caused problems in particular when persons were not able to leave their silo perspective. The needed common language and perspective are primarily ensured in the model by means of the synergy category – level construct.

Insensibility towards the correlation of the synergy enabler and the synergy effect is primarily given when a desired synergy effect is not allocated to the right source which enables this effect.[494] During the case study it occurred that synergetic potentials should have been implemented by organizational structural changes in the first place, instead of precisely defining the synergetic effect and afterwards deciding for a proper synergy enabler. In some cases, people generally talked about synergies for one specific process in the initial phase of the project and found the solution that the process needs to be centralized within the organization. In their opinion, this centralization was mandatory even though the synergetic effect could also have been enhanced by different approaches such as implementing meetings on a regular basis or introducing a standard software solution. After the implementation of the synergy categories with their corresponding synergy levels and potential synergy enablers the case study participants rather tended to make use of different synergy enablers than only deciding for centralization for enabling the synergy effect.

[492] In this case press shop, body in white, paint shop and assembly

[493] Synergy category see chapter 5.3.4for synergy enabler chapter 5.3.6

[494] This insensibility is reduced by listing potential synergy enablers in the first place and access their suitability by means of Table 24: Implementation degree of difficulty model

Neglected reactions towards synergetic interrelations account for the lack of understanding that a desired synergy effect can result in a manipulation[495] of another synergetic effect. One prime example where the implementation of one synergy would have eliminated other synergies was the idea to organizationally restructure the decentralized maintenance departments, which are integrated in the production departments, converting them into one central department for enabling synergetic effects. This approach might have led to synergetic effects in terms of optimized workforce allocation of maintenance personnel or optimized learning curve effects for the 'plant maintenance' process. At the same time, the centralized solution would also have negatively influenced the existent relations with the production departments, eliminating many of the synergies between production and maintenance, such as direct knowledge transfer from production to maintenance, fast response times in break downs, or the utilization of the same personnel for different tasks. The understanding how single synergies influence each other was supported by the researchers Table 22: Synergy fit matrix.

6.4.3 Insights from the Case Study: Process Mapping

The process mapping procedure differed between the three case studies. This procedure ranged from a detailed process map in the PB Munich case study, to a less detailed process map in the TO Oxford case study, to only an Excel sheet listing the processes in the MK Munich case study. They all had in common that they were based on one-on-one interviews conducted by the researcher which were subsequently consolidated in the according form. This procedure has the advantage that person-specific influences on the end result are eliminated, a fact which is centrally important for a consistent process map. Alternatively, formal guidelines for process mapping need to ensure at least a partial consistency[496] when applied in different organizational areas by different persons.

In the first case study a detailed process map was derived from Table 31: Project OpIp data query. This table included a multitude of details, some of which were rather of minor value for the projects. At the end, the researcher consolidated the data and derived a lean process map with the most important details indicating some of the defined synergy potentials. Yet, due to the depiction of processes, and not synergies, the process map was not able to portray all synergy categories, but was rather restricted to

[495] Positive and negative manipulation.

[496] Experience from the MK case study has shown that persons and organizational units can perceive processes completely differently. The same process was described by three functionally different organizational units with the result that they all differed from each other. Finally, a consolidated process map was developed.

operational synergies. They in turn represent the combination of activities and thus can be depicted as processes. All additional information which could not be illustrated remained in the Excel sheet.

The resulting Power Point process map was structured in different levels, which were linked with each other on different slides. When, for instance, the process 'ensure quality', which is a first level support process in the TM-3 process map, was clicked, the next lower level with details about the process opened. In addition to the process name, the process owner, process metrics as well as the process synergies were planned to be mapped. The process owner was factually indicated in the process map after the TM-3 circle defined the process owners for each process. The process metrics and the synergies used in the process caused problems for the mapping process. For the former this is because they were non-existent during the mapping phase since the persons involved thought that they could use their daily KPI as process metrics, which was in fact not the case. Daily business KPI usually indicate how specific portions, or activities, of the process are performed; they do not necessarily show the performance of the process. Synergy mapping caused problems as the five synergy categories could not be illustrated properly in the pure process map at that time. That is why the researcher designed a new approach for illustrating synergies and processes at the same time in the second case study.[497]

Nevertheless, despite these shortcomings the process map was a valuable source for further, detailed discussions about the optimization of the processes in general, and the utilization of synergies in particular.

In the second case study the researcher improved the process mapping procedure in so far that only the essential information was captured for deriving a suitable process map, and the synergy categories were part of the map. Again the information was gathered in an Excel sheet and subsequently presented in a Power Point format. This time the map was based on processes and additionally the five synergy categories in reference to the structural organizational units.[498] Hence, it was possible to indicate where the actual process takes place through demonstrating the operational synergy, and it was also possible to indicate where the other synergy categories are used. The result was that the utilization of synergies was illustrated detached from the performing of the process in the mapping and therefore corresponds to the synergy systematics developed in this thesis.

[497] The result was the synergy map shown in Figure 46.

[498] Compare Figure 46: Maintenance synergy map

This process – synergy map is certainly of advantage. All process participants as well as other organizational members are able to see which synergies are used within the process regardless of where the process takes place. During the second case study it was observed that persons being familiar with the fife synergy categories as well as the process map adapted the systematic quickly and started in turn to identify additional synergies independently form reorganizational ideas. By means of the synergy systematics including the synergy enablers and the according synergy map it became transparent that the utilization of certain synergies is not necessarily connected with a reorganization of the organizational structure.

In the third case study the researcher did not design a process map, even though the synergy systematics based on processes was used. Instead, only an Excel document was designed which listed all processes and the according synergies used as well as potential synergies. The result was that the synergy identification itself was not affected since it was exactly the same as in the first two case studies. Still, the understanding of the processes and the according synergies was not as detailed as in the first two case studies. Evidently, the design of an explicit process and synergy map supports the understanding and adaption process of the process and synergy concept.

In summary, the experience gained from mapping processes in the field of synergy identification requires to:

- Ensure a consistency between different process maps. Only consistent process and synergy maps of different organizational units can be compared with each other.
- Not overload the process map as well as the date gathering process with too much information. Not the amount of data is of importance, but its quality.
- Visualize all processes and synergies. The visualization of synergies and processes supports a comprehensive understanding of both concepts and enables their proper utilization.

In all case studies the process and synergy mapping was only based on the two-dimensional synergy concept, and not the three-dimensional synergy characterization approach. This is because it would have made the procedure of gathering the information even more complicated. The third dimension, the synergy enabler, was used after the synergies were identified to demonstrate how the synergy needs to be implemented. Evidence from the case studies which supports this two-dimensional approach is presented in the following subchapter.

6.4.4 Insights from the Case Study: Organizational Belonging and the Utilization of Synergies

During all three case studies it became evident that managers tend to search for synergies within their area of responsibility without including their hierarchically equal organizational partners into the process. In the PB case study, in which the search for

synergies was initiated by the director of this organizational unit, synergies within the painted body main organization were searched, while obvious synergies with other main departments were not regarded. A comparable, but more open situation occurred in the MT Oxford case study, which was initiated by the managing director. The main difference between these two case studies was that this managing director i) has ever since focused on a cooperation of his subordinates and ii) was already experienced with the implementation of synergies and thus asked from the beginning of the project to also regard synergies with the central planning departments which are mainly located in Munich. In the MK case study, synergies were primarily searched within one commodity, but in the cooperation with a competitor.

All case studies had in common that they regarded synergies within the organizational area which the initiator was responsible and accountable for or which he could at least partially influence. This procedure is not egoistic, but rather logical because it is the only possible way to in fact change the mode of operation. One cannot dictate the process partner on the same hierarchical level how and with whom he or she has to cooperate, but one can do this with one's subordinates since one takes the responsibility as their directive. Especially, if one-sided benefits occur in a synergy situation, only the superior can effectively claim the implementation of such synergies. In the same turn, all managers, irrespective of their hierarchical belonging, are free to cooperate with external partners, such as competitors, suppliers or customers.

In the PB case, for instance, obvious synergies were detected between the painted body and the assembly main departments without the director wanting to implement these synergies. He reasoned that they do not lie within his area of responsibility and therefore could not be expedited by him. This point of view was absolutely correct since this synergy would have been a one-sided one lying outside of his area of responsibility. Thus, only the managing director of plant Munich could be responsible for initiating and sponsoring the implementation of such synergies. The finding from the three case studies is important when it comes to the search for synergies. The initiating hierarchical level decides which synergies can primarily be tapped and which will remain synergy potentials as they are within another area of responsibility.

The only divergence from this behavior was observed in the PB case study between the persons responsible for the logistics at the location Munich. Even though the PB project actually did not consider other main departments, the logistics process owner of the PB initiated the search for synergies between the PB, the assembly and the engine plant Munich. He did so because he was convinced that synergies between these departments are present, but also because he had a good relationship with his logistics colleagues from the other two main departments. Hence, he was also aware that his colleagues would support the idea if it is beneficial for the overall situation.

It is therefore essential to bear in mind two important things: First, as a manager one should try to initiate an open and cooperative mindset within the subordinate team; actions which automatically support the utilization of synergies on the next lower level.

Second, one should question if the initiator of a synergy project is on the proper hierarchical level for searching for certain kinds of synergies: Without top management support the level at which the synergy effects are expected should be one below the hierarchical level of the initiator, otherwise they can be identified but not implemented.

6.4.5 Insights from the Case Study: Synergy Utilization with a Competitor

During the MK case study the researcher had the opportunity to examine the rather rare search for synergies with a competitor. The supplier quality cooperation is limited to a specific range of parts, which is part of the researcher's daily work, and started in early 2011 and is still ongoing. During that time, the researcher gained additional insights of the proper utilization of synergies as well as the influence of the key influential factors introduced in this thesis.

At the beginning, both sides doubted if the cooperation could be beneficial for both parties. After they committed to this cooperation the unsystematic search for synergies started.[499] After a certain time period both parties defined specific activities which they would do together: mainly supplier management-related processes which are carried out before the SOP. Already during the first cooperation phase it became evident how important standards are for enabling synergies. If the cooperation partners had not decided for compromises, most of the synergies would not have been feasible. It is especially the existence of a multitude of guidelines and the according software solutions for supplier quality means which hindered the cooperation tremendously. In fact, if the cooperation partners had not decided to abide by the internal regulations, which sometimes even require filling out internal formats, the cooperation would not have been possible for a multitude of activities. The compromise usually implied either following the guidelines of company A or considering the BMW regulations for other activities.

It is noteworthy that the trust into the synergy partner, which is also listed as one of the key influential factors of using synergies, changed over time. It started with the first cooperation attempts when the cooperation partners got to know to each other and primarily meetings were held together with the suppliers, continued with deciding on common standards for the cooperation which usually included leaving the corporative guidelines, up to the decision of both commodity leaders to expand the cooperation on the other parts which they are responsible for. After the cooperation partners understood the value of their cooperation, the synergy systematics supported to identify which synergies are already used and which synergy potentials still exist. At this stage the

[499] The researcher did not want to make use of the synergy systematics from the beginning for the purpose of elaborating if a non-systematic synergy utilization is also possible in this specific situation.

ideas were, amongst others, that certain supplier management activities for specific projects will only be carried out for both by one of the companies. At the beginning of the project the parties involved never thought about going this far. This experience clearly shows how important mutual trust is and that the utilization of certain synergies needs time.

The most important synergies used in such cooperations between quality management units clearly do not lead to direct cost savings; yet other effects play a central role. During the entire case study certain potentials were detected where one party did something for the other, resulting in resource savings; these had a rather minor impact on the bigger picture. Especially the exchange of knowledge and deployment of power supported both companies tremendously. The former enabled both companies to improve internal processes, the reaction time for specific problems and additional issues where the learning curve effect brings to bear and the extent of empirical value is of relevance. The latter was of importance for motivating the suppliers to getting things done. Especially larger suppliers tend to be reluctant when solving issues for only one customer; when both companies, i.e. customers, have the same demand it is easier to solve the problem in the required period of time.

For cooperation with a competitor, such as company A, it is centrally important to question if a cooperation of this kind can lead to disadvantages for one synergy partner or, more importantly, if the subject of cooperation is a source of differentiation between the two companies which is perceived by the customers. The latter is of importance because customer perception often has to be considered in the first place. If one of the cases applies firms should not enter into cooperation with a competitor.

Insights from this particular case study show that i) the cooperation with competitors to use synergies takes longer than a synergy used within the own company, ii) a certain trust in the synergy partner is even more important than a trust in organizational internal partners and iii) the subject of cooperation needs to be chosen with caution towards external effects.

6.4.6 Insights from the Case Study: Recommendations for the Practitioners

In this subchapter, observations from the three case studies are introduced which support practitioners in synergy management projects. The findings are based on the experience the researcher gained during the three case studies and are supported by the corresponding examples.

The do’s and don’ts of synergy management:

- Do properly structure synergy projects
- Do proceed top down; the higher the initial management level, the more beneficial the total synergies

- Do be patient; making use of the full synergy potential takes time
- Do be persistent when it comes to implementing synergies
- Do favor a continuous synergy management rather than synergy projects for taping the full synergy potential
- Do make single persons responsible for the synergy implementation
- Don't decide for the wrong hierarchical level of the persons responsible

The benefits of a synergy systematics have been introduced sufficiently in previous chapters. However, it is not only of importance to use this systematics, but also to reflect about how the entire synergy project, up to the consolidation of a synergy management should be organized. For complex projects *structure* is indispensable. All three case studies have shown the researcher the high level of complexity of synergy management and the according projects, especially when many persons from different organizational units or even companies are involved. Trying to utilize synergies on a larger scale is only possible with a clear plan which indicates how to proceed and which central milestones are to be met. Resulting from the case studies it is not sufficient to have a clear plan until the identification or even validation of the synergies; the plan needs to end with the consolidation of the synergy utilization. The MT case study, for instance, was clearly structured until the synergy identification phase. Yet, a distinct project plan with a binding timeline for establishing the identified synergies was missing and the team which was responsible for implementing synergies attended one meeting after the other without having a clear plan about what needs to be done by whom until when. The result was that many of the rather complex synergies which would have entailed the highest benefits were not implemented due to a missing structure of the project management.

It is also of importance to question where the search for synergies is initiated. For this purpose, a *top down procedure* is of value for synergy management as well as synergy projects for designing a consistent synergy configuration. The reason is that it is not necessarily possible to combine independent synergy solutions from a lower hierarchical level on the next higher hierarchical level. The evidence was observed during the PB and MT case studies. The design of the maintenance synergies within the PB main departmental organization made perfectly sense at the time they were defined. They were well thought out, coordinated by all parties involved and presented an optimization of the status quo. However, it was an isolated solution on the main departmental level which was designed. If these results had wanted to be matched with the next higher synergy levels, compatibility problems would have occurred because the requirements of other main departments were not included.

The next higher synergy level, which was regarded in the MT case study, required existing standards between the main departments. The lack of a common IT system basis, equipment standards between the main departments and different processes and procedures which indicate how to run maintenance obstructed a quick realization of synergies in the UK maintenance triangle. Thus, the efforts of the PB maintenance team would have to be questioned if the synergies of the next higher level had been regarded.

Most probably, the elaborated synergy solutions would have to be adapted for fitting into the bigger picture. Certainly, the need for the adaption of the synergy solutions is also applicable when regarding the MT UK project if inter-plant synergies were required there. Still, a compromise between the highest reasonable synergy level and the efforts required for enabling such synergies needs to be found.

One should still bear in mind in this situation that the efforts needed to identify and implement synergies on the next higher synergy level are much higher than on lower levels. This leads directly to the next important advice; *take time and be patient* when implementing synergies. The implementation of synergies on a high synergy level takes time, but the benefits are usually much higher than those of synergies on a low synergy level. In the MT case study the utilization of the full synergy potential takes years since certain standards, especially equipment standards, cannot be installed over night. Nevertheless, in this case there are still enough 'low hanging fruits' which enable quick beneficiary synergy effects; at the same time the other potentials need to be focused over a longer time span. This has to be understood by all parties involved for avoiding disappointment; synergies do not arise overnight.

This is why it is of central importance to be *persistent* when dealing with synergies. After the initial commitment to the synergies identified in all three synergy projects the major problem was to maintain this commitment over time. In all three case studies it was observed that the persons being in charge of working out interim results for enabling the synergies lacked even more speed of work the further the progress of the project was. This phenomenon goes hand in hand with the decreasing interest of the top management to monitor the current state of progress of the single project. For a successful implementation of synergies, it is inevitable to present the interim results to the top management and to thoroughly manage the path of the implementation of the synergies. Only continuous efforts combined with a certain discipline not to lose sight of the final target can enable a successful implementation of the desired synergies.

A beneficial way for fulfilling this requirement is to install a *continuous synergy management* within the organization, rather than regarding synergy management as a single project. Certainly, it is reasonable to start synergy management as a project; but after a specific time, it is necessary to transfer the project to daily management work for ensuring that the objectives are accomplished. The right time for transferring the project work to daily management is, for instance, given after the synergy identification or at the latest after the synergy analysis and validation phase. The PB as well as the MT project lacked transferring projects into daily management work. Especially after project-relevant managers changed their positions the pace and the commitment for the implementation of the identified synergies decelerated.

Thus, it is strictly recommended to *make single persons responsible* for the implementation of specific synergies. The implementation progress needs to be reported in this case as a part of daily management to the superior manager. When persons change their positions, the responsibility for the synergies needs to be transferred to a

successor. Without following this approach the implementation of beneficial, but complex synergies, which needs a long realization time, can never be made possible in organizations. This recommendation was not followed consequently during the PB and MT case studies where multiple synergy potentials were not implemented simply because no specific person felt responsible for them and had the according authority.

Finally, it must be ensured that the responsibilities are delegated *according to the hierarchical authorities* of the manager. During the MT case study, a general manager was made responsible for the implementation of a larger portion of synergies which should be utilized across the main departments. He struggled especially when the cross-departmental team needed to make decisions about synergies which benefit one organizational area more than another or were even detrimental for certain main departments. The manager could deal with the situation for a longer time because he received support from the top management for solving such situations. When problems of this sort occurred, the situation was handled by the next higher hierarchical levels. Thus, it is crucial to question if the manager in charge for the implementation of synergies is able to fulfill the task based on this authorities. If this is not the case, this manager needs at least direct support from the according management level for accomplishing the task. Apparently, it is not possible to always make the highest management levels responsible for the implementation of synergies; still their support and sponsoring needs to be guaranteed.

To sum up, it needs to be stressed that the implementation and management of synergies is complex and requires high and enduring efforts. A large number of the synergy ideas found during BMW internal projects has already existed before. They were still not implemented because this often involves high efforts or because the systematics how the benefits can factually be tapped was not understood properly.

Porter's finding that

"the failure of synergy stemmed from the inability of companies to understand and implement it [Synergy], not because of some basic flaw in the concept.[…] Even in instances where companies possessed a genuine opportunity to harness synergy, they often failed because the tools for analyzing it were lacking or they could not overcome the substantial organization problems of implementation."[500]

was proven to be correct in all three case studies. At the same time, they all have provided evidence for that a systematic synergy management with the according top management focus is able to overcome these problems.

[500] Porter M. 2004 page 318

7 Conclusion

7.1 Introduction and General Consideration

A concluding summary of the results of this thesis and an outlook on future scientific work is given in this chapter. While subchapter 7.2 answers the scientific problems of this thesis, including subchapter 7.2.1 which elaborates a related scientific question, subchapter 7.3 presents the limitations of the scientific research method chosen in this thesis and subchapter 7.4 gives a perspective on further research fields in the context of synergy management.

7.2 Answers to the Scientific Problems

This chapter concludes the findings of this thesis in reference to the scientific problems which are introduced in chapter 1.2. The results presented include the answers to the specific question as well as further consideration, which appeared to be of relevance during the elaboration of this thesis. The scientific problems were defined as follows:

1. How can synergies be characterized and identified systematically in production environments?
2. Which influential factors affect the successful utilization of synergies?
3. Which effect does the organizational structure have on the utilization of synergies in production environments?
4. Is process orientation suitable for enhancing synergy utilization?
5. How can synergies be managed systematically in production environments?

1. Resulting from the literature research, the first scientific problem could not be answered adequately with an existent scientific approach. This is why a new systematics was developed in this thesis to identify and characterize synergies in production

environments. The answer to the first scientific problem is presented in chapter 5.3 where the two-dimensional synergy identification model, plus the three-dimensional synergy characterization model are introduced. Both models are based on the definition of synergies from the process perspective including the synergy category[501] and the synergy level.[502] The three-dimensional model additionally includes the synergy enabler[503] as the third dimension. Though processes are the initial point they do not characterize the synergy.

Synergy categories are the generic synergies from the process perspective. They include all possible process immanent synergies and describe what kind of synergy one is dealing with. The synergy categories are neither mutually exclusive nor collectively exhaustive. Thus, several synergy categories can be utilized for the same process. The synergy categories are:

- Operation synergies
- Knowledge synergies
- Sourcing synergies
- Resource synergies
- Strategic synergies

The synergy levels illustrate the hierarchical structure of the organization, such as group, department, main department, etc. They describe where the synergy category is allocated hierarchically and clearly refer to the hierarchical organizational structure of a company. The combination of the synergy category with the synergy level based on processes identifies synergies. By asking the questions [504]

1. Which synergy category is used for the process?
2. On which synergy level is the specific synergy category used?
3. On which synergy level should the specific synergy category be used?
4. Which additional synergy categories can be used for the process?
5. On which synergy level should the additional synergy category be used?

the synergies are identified.

Synergy enablers are the triggers of synergies. They describe how synergies are made possible and are of importance for questioning if the right enabler is used in order to

[501] Compare chapter 5.3.4

[502] Compare chapter 5.3.5

[503] Compare chapter 5.3.6

[504] Compare chapter 5.3.5.1

utilize the aimed synergy. The combination of the synergy category, the synergy level and the synergy enabler characterizes the synergy from the process perspective.

Why it is valuable to base the identification and characterization of synergies on processes is developed in chapter 5.3.2. Which important and supportive links exist between process orientation and synergies is developed in chapter 4. Regarding the first scientific problem the decision for processes as initial point for the synergy identification and characterization has the advantage that theoretically all synergies can be identified systematically. This is because this starting point is able to map all activities for the organizational area of interest; thus it also holistically captures all potential sources for synergies.

2. The second scientific problem – which influential factors affect the successful utilization of synergies – is elaborated in chapter 2.4. The findings presented are primarily based on expert interviews carried out during the case studies at the BMW Group, evidence from these case studies as well as literature research. The key influential factors identified are categorized into direct and indirect influential factors. The former can be influenced directly by the organization to optimize the utilization of synergies. By contrast, the latter cannot be influenced directly by the organization, at least not in a short or middle term. The key influential factors of using synergies identified in this thesis are

Direct Influential Factors

- Organizational structure
- Range of cost center
- Range of responsibility
- Management behavior incl. top management support
- Trust in synergy partner
- Interpersonal factors
- Standards
- Technological specifications
- Transparency

Indirect Influential Factors are:

- Corporate culture
- National culture
- Size of enterprise
- Economic situation

Though the above influential factors do not give the total number of all influential factors on synergies, they are the most relevant ones in reference to the expert interviews as well as the evidence from the field. The variety of the factors indicates that the utilization of synergies if affected by a multitude of internal and external

decisions, persons and partially has a strategic character. Thus, the successful utilization of synergies should not be left to chance, but needs systematical top-down guidance in organizations.

The important question – how organizations can react on these key influential factors to support the utilization of synergies – is introduced in chapter 2.4.2 by means of the key influential factors on using synergies; but also in chapter 5.3.6 in which the synergy enablers are developed.

3. One of the key influential factors identified was the organizational structure. Thus, the third scientific problem which is questioning which effect the organizational structure has on the utilization of synergies is already partially answered; the organizational structure is a key influential factor for synergy utilization.

The hypothesis for this research question that:

The organizational structure of a company has major influence on the utilization of synergies.

is confirmed based on the evidence of the case studies as well as expert interviews.

The sub-hypothesis that:

The utilization of synergies can generally be influenced positively by implementing a proper organizational structure which favors the use of synergies.

is confirmed based on the evidence of the case studies as well as expert interviews. Additional evidence is given in chapter chapter 2.4.2 and 5.3. The former subchapter introduces organizational support factors for using synergies which are not solely based on structural organizational changes. The latter provides evidence based on the defined synergy categories that not for all synergies specific structural organizational constellations are mandatory for allowing the utilization of synergies. One exception is operational synergies, which tend to require structural organizational adoptions for making them possible.

Regarding the role of the structural organization it needs to be stressed that i) required structural organizational changes often lead to resistances and are harder to implement than other synergy enablers and ii) the structural organization is often only able to satisfy one specific synergy constellation of the synergy balance;[505] thus favoring the utilization of one synergy and hindering the utilization of other synergies.

[505] Compare Figure 32: Synergy balance

A promising approach for reducing the drawbacks of the structural organization for the utilization of synergies is the combination of a structural organization with a simultaneous process organization. This approach adds a further organizational layer to the corporation which is specifically valuable for the utilization of cross-departmental synergies as well as horizontal synergies. While the former are able to overcome the drawbacks of functional structural organizations, the latter surmounts disadvantages of area-based structural organizations.

4. These findings lead over to the next scientific problem; if process orientation is suitable for enhancing the utilization of synergies.

The basis for answering this scientific problem is given in chapter 3 where the links between process orientation and synergies are elaborated. The results indicate that the main principles of process orientation generally support the utilization of synergies. In particular, the end-to-end responsibility or process ownership has a very positive effect on the utilization of synergies; it is able to overcome the "silo effect" of structural organizations and supports the utilization of cross-functional synergies. Moreover, the nomination of a process owner facilitates the management of synergies and supports the identification of new synergies. Recognizing this potential, the target system of the process owner needs to be aligned with the synergy concept in a way that synergy management becomes a part of the process owner's responsibilities.

Additional positive effects of process orientation on the synergy concept are identified in chapter 4.3 where the effects of the main principles of process orientation on the key influential factors of synergy utilization are elaborated. The principle of the end-to-end responsibility or process ownership was again detected as the main positive driver; additional very positive effects are expected from the principle of modularization. Modularization provides the opportunity to reuse the same product, process and resource modules in different areas of application and is hence a synergy driver.

Along with the positive effects of process orientation supportive general commonalities between process orientation and synergy management are derived in chapter 4.4. The positive effects of process orientation on synergies as well as the commonalities between both concepts confirmed a positive fit between process orientation and synergies. Based on that findings chapter 5 makes use of processes in general and process orientation in particular as basis for many items of the Process Oriented Synergy Model; thus additionally proving that process orientation is suitable for enhancing the utilization of synergies.

In conclusion, process orientation is suitable for enhancing the utilization of synergies and is additionally a valuable source for synergy management.

The hypotheses which are of relevance for this scientific problem:

The principles of process orientation support the use of synergies; processes are regarded from end-to-end without referring to organizational boundaries which can negatively influence the use of synergies.

Synergy management can partially be based on process orientation for enabling a systematic use of synergies.

are confirmed based on these findings.

5. This leads directly over to the final scientific problem – how synergies can be managed systematically in production environments. The answers for this scientific problem are developed in chapter 5, where the Process Oriented Synergy Model is introduced. The model is based on the theoretical foundation from chapters 2 to 4 as well as evidence from the field. It consists of the four elements i) identify, ii) assess and validate, iii) implement and iv) control and is based on process orientation including the according principles.

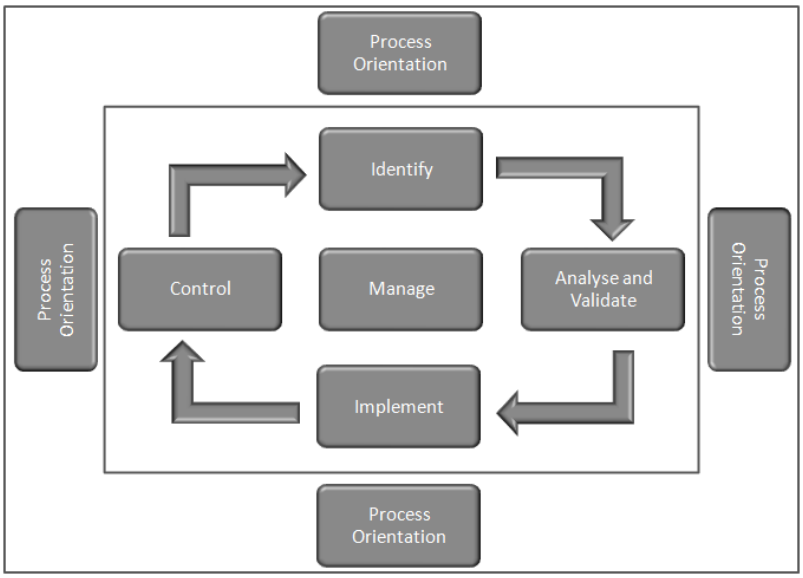

Figure 51: Process Oriented Synergy Model

The model answers the question how synergies can be managed systematically in production environments by introducing a toolset for synergy management for the specific elements. The toolset includes the synergy systematics as the central tool for providing the needed guidance for consistent synergy management.

Key requirements for ensuring an effective synergy management are

- Regarding synergy management as a permanent management obligation, not a project; synergy management can be initiated as a project but subsequently needs a continuous character
- A top-down procedure when initiating synergy management
- Properly structured synergy projects when initiating synergy management

- Consistently organized responsibilities for consolidating synergy management
- Adequate authority of the synergy manager in his or her area of responsibility
- Change management expertise for implementing synergies
- Patience because making use of the full synergy potential takes time
- Persistence when it comes to implement synergies
- Top management support because synergies can initiate radical changes

After the answers to the initial scientific problems were summarized an additional scientific problem is discussed in the following subchapter. This problem occurred when the role of process orientation for the utilization of synergies was discussed with the BMW process orientation expert. The hypothesis was that synergies could also be regarded as a direct result of process orientation. Due to its general relevance this question is elaborated in the following subchapter.

7.2.1 Additional Scientific Problem: Are Synergies a Direct Result of Process Orientation?

This thesis has proven that processes in general are a valuable initial point for the identification of synergies and that process orientation in particular can be a valuable basis for synergy identification. Asking the question if synergies are a direct result from process orientation[506] goes further because it questions which role process orientation – as a standalone solution – has on the utilization of synergies. This question is based on the findings in chapter 4 which indicate that certain PO principles can directly lead to synergies and others can support the utilization of synergies.

If the answer to the question is yes, the subsequent logic would allow for using process orientation as the only source for synergy management. Thus, the synergy systematics introduced in this thesis could be omitted if an organization is based on process orientation. In the same turn, the relevance of the Process Oriented Synergy Model could be questioned; if synergies are a direct result of PO, organizations do not specifically have to i) identify, ii) analyze and validate, iii) implement, iv) control and v) manage them – process orientation would already cover these needs.

Since the five synergy categories i) operation, ii) knowledge, iii) sourcing, iv) resource and v) strategic are based on processes, it is useful to question if solely processes are able to reflect them. By doing so it needs to be regarded that the synergy categories can be positioned on different synergy levels and that they can have a cross-functional characteristic which can also include the cooperation with partners outside the corporation.

[506] Process orientation as described in chapter 3.3.

Operational synergies refer to the activity process element and are based on the organization how the activities within corporations are linked together. The optimum constellation of the activities, which can be cross-functional, ideally results in a synergy. This synergy can be perfectly identified and managed by means of process orientation. Process orientation aims exactly on that ideal constellation of single activities, which can be cross-functional, for having the optimal process result. The optimal process result can be equated with the synergy effect. However, it is not able to reflect constellations outside the organizational boarders. Thus operational synergies can directly result from process orientation, as long as operational synergies with partners outside the organization are omitted.

Knowledge synergies refer to the resource and the capability process element and are based on the combination or sharing of knowledge. With these specifications knowledge synergies cannot result directly from process orientation because knowledge is not specifically regarded in this context. If knowledge is regarded in the PO context, then only as an input, or output of the process. It is also conceivable to design the transfer and pooling of knowledge by means of "knowledge modules" which are tapped by other processes. Both solutions are principally possible but complex to manage. Hence, if knowledge synergies should be regarded from the process orientation perspective as a standalone solution, the realization of synergies is combined with complex and detailed process descriptions which would lack of systematically detecting if specific knowledge should be shared or combined with other processes or not.

Sourcing synergies refer to the resource process element, more specifically the purchasing of resources. They are based on the combination of sourcing demands and do not necessarily require an organizational centralization but a centralization of the sourcing demand. According to these specifications process orientation would be able to make use of these synergies within the process organizational boarders. A sourcing process would be defined with the according process owner, the process metrics of this process would be, amongst others, to minimize the purchasing costs; this way the process owner is motivated to identify saving potentials, which are in this case often based on economies of scale. Since the process owner has a cross-functional responsibility, he would detect exactly the same sourcing synergies as the two-dimensional synergy identification process.[507]

Resource synergies refer to the resource process element; they determine which resources are used in what way. They are based on sharing resources and thus enabling an optimized utilization of these as well as the utilization of technologically sophisticated solutions. Process orientation is not able to deal with resource synergies because it does not specifically take them into account. Some of them are covered by

[507] Provided that the area of responsibility of the process owner has the right scope.

the definition of the input of the process. But even in this case there is again no systematic way of how process orientation can make use of resource synergies. Certainly the definition of a process owner for the process 'ensuring optimal resource utilization' would be possible, but absurd. Thus, process orientation is not able to account for systematically modeling the resource synergies adequately.

Since strategic synergies cover by definition the future constellation of the other four synergy categories, the resulting effects of process orientation on them is similar as explained for the four synergy categories.

In summary the answer if synergies are a direct result of process orientation is "partially", because:

- operational and sourcing synergies can directly result from process orientation, as long as they take part in the organizational boarders
- knowledge and resource synergies cannot directly result from process orientation because process orientation as a standalone solution is not able to handle them

With this result it becomes evident that process oriented firms can not solely trust on process orientation to ensure that all synergies are used. Even if in the best practice process constellation[508] most of the operational and sourcing synergies are covered, knowledge and resource synergies are not properly taken into consideration. Hence, process orientation supports the utilization of synergies, but not all synergies result from process orientation; plus process orientation can only be regarded as a basis for systematic synergy management but cannot simultaneously act as a synergy management procedure as a standalone solution.

Thus, also process oriented corporations require using an additional concept for enabling a systematic and holistic utilization of synergies.

7.3 Limitations of Research Method

Resulting from the case study as well as action research approach applied for this thesis the results presented do not imply absolute universal validity. In particular, i) company-intrinsic, ii) person-dependent and iii) time-dependent conclusions which are based on the iv) limited case study extent and v) the researchers personal perception presented are to be considered.

[508] Requiring an optimal process structure regarding operations and sourcing.

Company-intrinsic restraints are present insofar that corporate organizations have their own values after their organizational behavior is aligned. These values and the corresponding behavior originate, amongst others, from the organizational historical background, the industry sector or in general what is referred as the corporate identity supplemented by the location-specific modifications of corporate identity.

Personal dependence is given by deductive statements resulting from the case study and action research approach which is based on specific actions and decisions of explicit persons or groups. Therefore, actions described and general statements deducted are influenced by the perspective of a limited amount of single individuals. However, because the findings were cross-referenced between different case studies as well as different persons, this influence was minimized.

Time-dependence results from time-relevant influential factors such as the economical situation as well as general business economical tendencies, which are, for example, centralization or decentralization waves influencing the perception of the object of study.

The limited case study extent influences the results of this dissertation insofar that not all findings could be cross-referenced between the single case studies. This fact implies that certain observations were exceptional but generalized due to missing or insufficient cross-referencing.

Finally, the findings presented in this thesis were gathered and elaborated by one single individual; a fact which bears the risk of implicating the researcher's personal perception in the findings of this thesis. This limitation was reduced by cross-referencing the findings of the thesis with the case studies as well as theoretical sources and additionally discussing the results with other persons.

7.4 Perspective on Further Research Fields

This thesis developed a basis for systematic synergy management in production environments by means of the combination of the concepts of process orientation and synergies, as well as additional systematics which allow corporations to systematically utilize synergies. However, due to the generally limited extent of a thesis, additional scientific relevant questions already occurred during the elaboration of this thesis. They are of relevance for a more detailed understanding of the concept of synergy, the concept of process orientation, and the combination of both as well as the systematic synergy management approach developed in this thesis. Subsequently, the central questions are introduced which identify further research fields for the object of interest of this thesis:

- Is the synergy systematics developed in this thesis also applicable for non-producing companies such as banks or service providers? If so, what are the central differences from the synergy perspective?
- What is the difference between traditionally organized and process oriented companies regarding the utilization of synergies?
- In what way is the formal and informal organizational structure affected when systematic synergy management is implemented? What are the main changes?
- Which efforts are needed to implement a holistic and consistent synergy management in small, medium and large corporations? How long does the implementation in the according companies take?
- What are the quantitative differences between firms systematically managing synergies and firms using synergies randomly or unsystematically with reference to the size of the company?

Even though the synergy systematics which was developed in this thesis was particularly designed for the application in production environments, the key characteristics of the systematics could enable a broader applicability. The first indications were already proven by using the same systematics in the MK case study, which still was in the production-related environment but also had service-related interfaces. Additional indications, which support a broader applicability of the designed systematics, are:

- Processes are present in all organization, independent from functional areas or branches; hence the basis for the synergy systematics is universal.
- The synergy systematics with the according synergy categories, levels and enablers should also be applicable irrespective of functional areas or branches; the synergy categories are generally valid, synergy levels are based on the specific hierarchical structure of the organization and the synergy enablers can but must not vary in different application areas.

If this synergy systematics was applicable for other areas along with the production environment, it would be of interest to know which differences are present between functional areas and branches when it comes to utilize synergies. Do service-based companies, for instance, use knowledge synergies more often than production companies; are other synergy enablers preferred or do even additional synergy enablers exist?

The second question refers to potential differences existing between traditionally organized and process oriented companies when regarding the utilization of synergies. Evidence from the case studies and the according examples and findings has shown that process orientation has a positive influence on the utilization of synergies. Thus, it would be of interest to know if there are differences regarding the explicit utilization of the five synergy categories. Do process oriented companies, for instance, use knowledge synergies more often than traditionally organized firms?

Evidence from the case study has shown that the identification of synergies can lead to formal and informal organizational changes resulting from the synergy enablers which are needed to make the according synergy possible. In this turn, it is crucial how the formal and informal organizational structure changes over time after a systematic synergy management is implemented. It is of particular interest to register what exactly changes; is it, for instance, solely the structural organization, are IT knowledge management solutions increasingly implemented, can the systematic synergy management even influence the organizational culture or can any other primary changes occur?

It is relevant to determine which different efforts are factually needed to implement a systematic synergy management in businesses of different sizes. With this knowledge one can derive for which company sizes it is beneficial to implement this type of management. At the same time it is important to be aware of the time it takes for the differently sized organizations to implement the systematic synergy management. The findings from the case study indicate that the implementation of a systematic synergy management in large organizations cannot be done in the short term.

The final question is of interest for being able to verify if a systematic synergy management is worth the efforts or if the beneficial effects of a systematic synergy management are perhaps not noticeable in the long term. This question needs to be referred to small, medium and large companies as it will most probably affect them differently. For reducing the inability to measure certain synergy effects, which are for instance resulting from knowledge synergies, from day one, it is of interest to compare the differences on a long-term basis.

List of literature

ARMISTEAD, C. ROWLAND, P. (1996): Processes: Not New Phenomena. Managing Business Processes: BPR and beyond, pages 31-38. John Wiley & Sons, Chichester

ANGERMAYER, B. OSER, P. (2002): Die Berücksichtigung von Synergieeffekten bei der Unterbewertung, from PEEMÖLLER, V.H. (2002): Praxishandbuch der Unternehmensbewertung, Aufl.2, Herne/Berlin 2002, P.701-715

ANSOFF, H.I. (1965): Corporate Strategy: Business Policy for Growth and Expansion, New York

ANSOFF, H.I. (1984): Implementing Strategic Management, Englewood Cliffs

ANSOFF, H.I. (1988): The New Corporate Strategy, New York

BACHMANN, C.W.R. (2001): Synergie- und Nutzungspotenziale von Unternehmenszusammenschlüssen: Definition-Realisierung-Messung, Wiesbaden

BARNEY, J.B. (1991): Firm resources and sustained competitive advantage, Journal of Management, 1991, 3 (6), pages 639-657

BAUERNHANSL, T. (2003): Bewertung von Synergiepotenzialen im Maschinenbau, Dissertation: Wiesbaden

BIBERACHER, J. (2003): Synergiemanagement und Synergiecontrolling, München

BISANI, F. (1990): Synergiemanagement: Ein Begriff macht Karriere, aus Gablers Magazin 1990, Jg.4, H.3, P. 10-16

BMW PRIME (2012): Process Orientation within the BMW Group: Introduction and Overview, Presentation

BRAGANZA, A., KORAC-KAKABADSE, N. (2000): Towards a Function and Process Orientation: Challenges for Business Leaders in the New Millennium, Knowledge and Process Management, 7, Nr. 3, pages 177-186

BUCHANAN, D., HUCZYNSKI, A. (2010): Organizational Behaviour, Harlow

BURDE, F. (2010): Bewertung von Synergiepotentialen: Quantitative Synergieerfassung in der Unternehmensbewertung, Hamburg

CHANDLER, A.D. (1962): Strategy and Structure: Chapters in the History of the American Industrial Enterprise, Cambridge (Mass.)/London

CHATTERJEE, S. (1986): Types of Synergy and Economic Value: The Impact of Acquisitions on Merging and rival Firms, from Strategic Management Journal 1986, Jg.7, H.3, P.119-139

CHATTERJEE, S. WERNERFELT, B. (1991): Related or Unrelated Diversification; A Resource Based Approach. Academy of Management Proceedings, Academy of Management, August 1988 pages 7-11

CHATTERJEE, S. (2007): Why is Synergy so Difficult in Mergers of Related Businesses?, Strategy and Leadership, Vol.35, No.2, pages 46-52

CHILDE, S.J., MAULL, R.S., BENETT,J. (1994): Frameworks for Understanding Business Process Re-Engineering. International Journal for Operations and Production Management. 14, 22-34.

CLARKE, C.J. (1987): Acquisition Techniques for Measuring Strategic Fit. In Long Range Planning 1987. 20/3. Pages 12-18

COULSON-THOMAS, C. (1995): Business Process Re-Engineering: The Development Requirements and Implications. Executive Development, 8:3-6,

DAMODARAN, A. (2005): The Value of Synergy. http://pages.stern.nyu.edu/~adamodar/pdfiles/papers/synergy.pdf

DAVENPORT, T.H, & SHORT, J.E. (1990): The new industrial engineering: information technology and business process redesign. Sloan Management Review. 31. 11-27.

DUNCAN, R. (1979): What is the right organization structure? Decision tree analysis provides the answer, Organizational Dynamics, 7 (3), pages 59-80

EBERT, M. (1998): Evaluation von Synergien bei Unternehenszusammenschlüssen, Hamburg

FICERY, K. et. al. (2007): The Synergy Enigma. http://www.accenture.com/SiteCollectionDocuments/PDF/119685_SynergyEnigma_4.pdf

FORD, H., Crowther, S. (1924): My Life and Work, London

FRANKE, F. (2009): Synergien in Rechtsprechung und Rechnungslegung. Behandlung von Synergiepotenzialen im Gesellschafts- und Handelsrecht. Dissertation. Wiesbaden.

FUNK J., SIGLE H. (1993): Negative Synergieeffekte bei Unternehmenszusammenschlüssen: Dargestellt am Beispiel von Gemeinschaftsunternehmen. In Betriebswirtschaftslehre, Unternehmenspolitik und Unternehmensbesteuerung, Festschrift für Gerhard Mann zum 65. Geburtstag, Berlin, pages 143-160

GULATI, R. (2007) Abschied vom Silodenken. Harvard Business Manager, Nr. 12, pages 90-106

GUMMESSON, E. (2001): Are Current Research Approaches in Marketing Leading us Astray?, Marketing Theory, Vol.1, Nr. 1, pages 27-48

HABERFELLNER, R. (2010): Projekt-Management auf Basis des Systems Engineering: Grundlagen und Methoden der Systemgestaltung und des Projektmanagement, Skript, Graz, http://ufo.tugraz.at/assets/Teaching/PM/pm-descript2010.pdf

HABERFELLNER, R., DE WECK, O.,FRICKE, E., VÖSSNER, S. (2012): Systems Engineering. Grundlagen und Anwendung. 12., völlig neu bearbeitete und erweiterte Auflage. Orell Füssli Verlag AG. Zürich.

HAMMER, M. CHAMPY, J. (2006): Reengineering the Corporation, New York

HAMMER, M. (2007): The Process Audit, Harvard Business Review

HAMMER, M. HERSHMAN, L. (2010): Faster, Cheaper, Better. New York

HENDERSON B.D. (1984): Die Erfahrungskurve in der Unternehmensstrategie, Frankfurt am Main

HINTERHUBER, H. (1995): Business Process Management: The European Approach. Business Change and Re-engineering, 2, Nr.4 pages 63-73

HOFMANN, E. (2004): Strategisches Synergie- und Dyssynergiemanagement, Köln

HOERMANN, G. and TIBY, C. (1991): Projektmanagement richtig gemacht. In Arthur D. Little, Editor, Management der Hochleistungsorganization, pages 73-91, Wiesbaden

KARENFORT, S. (2011): Synergy in Mergers & Acquisitions: The Role of Business Relatedness, Köln

KOGELER, R. (1992): Synergiemanagement im Akquisitions- und Integrationsprozess von Unternehmungen, München

KÖPPEN, J. (2004): Synergieermittlung im Vorfeld von Unternehmenszusammenschlüssen. Beurteilung der Vorgehensweise andhand eines Referenzmodells, Dissertation, Wiesbaden

KOTTER, J.P. (1996): Leading Change, Boston

KÜTING, K. (2007): Synergieeffekte, in Vahlens großes Auditing Lexikon, München

LAWRENCE P.R., LORSCH J.W. (1963): Differentiation and Integration in Complex Organizations. J.A. Litterer. Organizations: Systems, Control and Adaptation, pages. 229–253. New York

LUGERT F. (2005): Mergers&Acquisitions. Synergierealisierung bei horizontalen Unternehmenszusammenschlüssen. Eine theoretische und empirische Untersuchung. Dissertation. München

METZ, M. (2002): Controlling des Integrationsprozesses bei Mergers & Acquisitions, Wiesbaden

MORGAN, G. (1989): Creative Organization Theory, London

OSTERLOH, M., WÜBKER, S. (1999): Wettbewerbsfähiger durch Prozess- und Wissensmanagement. Gabler, Wiesbaden

PAPROTTKA, S. (1996): Unternehmenszusammenschlüsse: Synergiepotenziale und ihre Umsetzungsmöglichkeiten durch Integration, Wiesbaden

PERIN S. (1996): Synergien bei Unternehmensakquisitionen. Empirische Untersuchung von Finanz-, Markt- und Leistungssynergien. Dissertation. Wiesbaden.

PORTER, M.E. (1985): Competitive Advantage: Creating and sustaining superior performance, New York

PORTER, M.E. (2004): Competitive Advantage: Creating and sustaining superior performance, New York

PROBST, G. RAUB, S. (1995): Action Research: Ein Konzept angewandter Managementforschung, from Die Unternehmung

REIßNER, S. (1992): Synergiemanagement und Akquisitionserfolg, Wiesbaden

ROCKHOLTZ, C. (1999): Marktwertorientiertes Akquisitionsmanagement. Due-Diligence-Konzeption zur Identifikation, Beurteilung und Realisation akquisitionsbedingter Synergiepotenziale. Dissertation. Frankfurt am Main

RODERMANN, M. (1999): Strategisches Synergiemanagement, Wiesbaden

ROMMEL, G. BRÜCK, F. DIEDERICHS, R. KEMPIS, KLUGE, J. (1993) Einfach überlegen, Stuttgart

SANDLER, G.G.R. (1991): Synergie: Konzept, Messung und Realisation, Dissertation, Bamberg

SAUTTER, M. (1989): Strategische Analyse von Unternehmensakqusitionen, Frankfurt a.M.

SCHMIEDEBERG, A (1995): Seeking synergy : the role of organizational learning in corporate diversification strategies, Bonn

SCHANTIN, D. (2004): Makromodellierung von Geschäftsprozessen. Deutscher Universitätsverlag, Wiesbaden

SHANE, S. (2009): Technology Strategy for Managers and Entrepreneurs, New Jersey

SIROWER M.L. (1997): The Synergy Trap. How Companies Lose the Acquisition Game, New York

SIROWER M.L. (2001): Der Synergie Effekt. Chancen und Risiken von Fusionen für Unternehmen und Anleger, München

SIROWER M.L., MÜLLER D.C. (2003): The Causes of Mergers: Tests Based on the Gains of Acquiring Firms "Shareholders and the Size of Premia", Managerial & Decision Economics, Vol. 24, No.5, pages 373-391

SMITH H., FINGAR P. (2002): Business Process Management: The Third Wave, Meghan-Kiffer Press., Tampa

STIMPERT, J.L. DUHAIME, I.M. (1997): In the Eyes of the Beholder: Conceptualizations of Relatedness held by Managers of Large Diversified Firms, Strategic Management Journal, Vol.18, No.2, pages 111-125

SUTER, A. (2004): Die Wertschöpfungsmaschine. Industrielle Organisation, Zürich

TRAUTWEIN F. (1990): Mergers Motives and Prescriptions, Strategic Management Journal, Vol.11, No.4, pages 283-295

VIZJAK, A. (1990): Wachstumspotenziale durch strategische Partnerschaften: Bausteine einer Theorie der Externen Synergie, Hersching

WALA T., MESSNER S. (2007): Synergiecontrolling im Rahmen von Mergers und Acquisitions.*www.fhvie.ac.at/content/download/1322/.../WP40_Wala_2007.pdf*

WALTON, M. (1986): The Deming Management Method, Perigee Books. New York, NY

WEBER E. (1991): Berücksichtigung von Synergieeffekten bei der Unternehmensbewertung. Akquisition und Unternehmensbewertung. Schriften des Instituts für Revisionswesen der Westfälischen Wilhelms Universität Münster. IDW-Verlag pages 99-115. Düsseldorf

WHITTINGTON, R., PETTIGREW, A., RUIGROK, W. (2000): Struktur und Strategie müssen ins Konzept passen, in Financial Times Mastering Strategie, H.10, page 10-12

WIRTZ, B.W. (2003): Mergers & Acquisitions Management. Strategie und Organisation von Unternehmenszusammenschlüssen, Wiesbaden

YIN, R.K. (2009): Case Study Research: Design and Methods, 4th Edition, London

ZIEGLER, M. (1997): Synergieeffekte bei Unternehmenskäufen: Identifikation im Beschaffungs- und Produktionsbereich von Industriebetrieben, Wiesbaden

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