# EXPLORING ENABLING FACTORS FOR PURCHASING INTEGRATION INTO THE INNOVATION PROCESS IN A GERMAN MEDIUM-SIZED SYSTEM INTEGRATOR OF CONSUMER ELECTRONICS PRODUCTS

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# Student Declaration

I declare that the work in this thesis was carried out in accordance with the regulations of the University of Gloucestershire and is original except where indicated by specific reference in the text. No part of the thesis has been submitted as part of any other academic award. The thesis has not been presented to any other education institution in the United Kingdom or overseas.

Any views expressed in the thesis are those of the author and in no way represent those of the University.

**Signed: _____** **Date** 27 March 2016

## Abstract

The generation of attractive innovations is one of the most important and complex tasks companies undertake, the process of open innovation is being used to support this endeavour. SMEs often face difficulties applying and commercialising external sources' technologies for their own purposes due to liability of smallness and related lack of capability of co-ordination. In particular, small and medium-sized system integrators of electronic consumer products (SIs) are (1) highly dependent on close collaboration with external organisations, (2) have to cope with turbulent technology markets, and have to manage (3) the continuous shortening of innovation cycles. These factors necessitate small and medium-sized SIs of electronic consumer products to increase their dynamic capability to innovate, which subsequently forms the basis for the SIs' sustainable competitiveness. The effective embedding of the Purchasing Organisation (PO) into the innovation outside-in process can potentially become a major driver in improving the overall innovation process and company performance. However, given academic research does not provide sufficient insight concerning relevant Enabling Factors (EFs) and related drivers. Therefore, academics allude to a demand for further research in the field of early purchasing involvement in the innovation process. In addition, purchasing practitioners point to the low maturity of Purchasing Organisations with regard to securing innovations. To explore relevant Enabling Factors for purchasing integration into the innovation process, the qualitative study design was based on an embedded case study inquiry with multiple units of analysis. Data collection and analysis was realised through a sequential qualitative → quantitative mixed-method approach. For this reason, interviews were conducted with 7 purchasing experts from the medium-sized German television set manufacturer Loewe. To obtain insights as to the generalisability of the findings, a purposive selected sample of 11 purchasing experts from other SIs with high dependency on innovation suppliers were interviewed via web-based questionnaires. The study identified:

EF1: External Interconnectedness

EF2: Preferred Customer status Process

EF3: Management Commitment to the PO

EF4: External Interconnectedness

EF5: Early Integration into Product Planning

EF6: Degree of Professionalisation of the PO

EF7: Innovation Management System and

EF8: Open-minded Relations based on Trust as a relevant Enabling Factor.

Furthermore, the study suggests direct relations between the EFs and 32 drivers that are formative to the related Enabling Factors. Based on the study findings, 14 strategic measures were defined via focus group interviews. In this way, the study contributes to given academic knowledge in the field of early purchasing involvement into new product development processes (NPD). With regard to such new product development processes, this study suggests integrating the PO, as a third element, into the R&D and marketing interface.

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## List of Abbreviations

| | |
|---|---|
| AR | Action Research |
| BRIC | Brazil, Russia, India and China |
| CE | Consumer Electronics |
| CEI | Consumer Electronics Industry |
| CM | Causal Mechanism |
| CPO | Chief Purchasing Officer |
| CR | Causal Relation |
| DBA | Doctor of Business Administration |
| DCBV | Dynamic Capability Based View |
| DEV | Dynamic Environmental Variables |
| DV | Driver |
| EEs | External Interviewees |
| EF | Enabling Factor |
| EI | External Interconnectedness |
| EIP | Early Integration into Product planning |
| EPI | Early Purchasing Involvement |
| ESI | Early Supplier Integration |
| ETH | Eidgenössische Technische Hochschule / Swiss Federal Institute of Technology |
| ETP | Extended Task Package |
| EUR | Euro |
| EV | Event |

| | |
|---|---|
| FHD | Full High Definition |
| GfU | Corporation supporting the consumer electronics industry in Germany |
| IN | Inhibitor |
| II | Internal Interconnectedness |
| IMS | Innovation Management System |
| IP-TV | Internet Based Television |
| IT | Information Technology |
| LG | Lucky GoldStar |
| Loewe | Loewe Technologies GmbH |
| MC | Management Commitment |
| MNC | Multi National Company |
| NIH | Not Invented Here Syndrome |
| NPD | New Product Development |
| ODM | Original Design Manufacturer |
| OI | Open Innovation |
| OLED | Organic Light-Emitting Diode |
| ORT | Open Relations based on Trust |
| PC | Personal Computer |
| PCP | Preferred Customer status Process |
| PD | Purchasing Department |
| PDP | Professionalisation Degree of the PO |
| PDCA | Plan Do Check Act |
| PI | Purchasing Integration |

PLS Partial Least Square

PO Purchasing Organisation

PSM Purchasing and Supply Management

R&D Research and Development

RBV Resource Based View

RO Research Objective

RP Research Participant

RQ Research Question

SC Sub-Condition

SI System Integrator of electronic consumer products

SME Small and Medium-sized Enterprises

SPSS Statistical Package for the Social Sciences

SQA Supplier Quality Assurance

TCL The Creative Life

TPS Toyota Production System

TV Television

UHD Ultra High Definition

USP Unique Selling Proposition / Unique Selling Point

VDA Verband der Automobilindustrie / The German Association of the Automotive Industry (VDA)

VRIN Valuable, Rare, Inimitable, Non-substitutable/Non-transferable

VRIO Value, Rarity, Inimitability and Organisation

*"In today's world, where the only constant is change, the task of managing innovation is vital for companies of every size in every industry. Innovation is vital to sustain and advance companies"* (Chesbrough, 2006, p. xvii).

# 1 Introduction

This chapter aims to familiarise the reader with this research. At first, the motivation to conduct this study is delineated. Afterwards, focus is given to the research problem, purpose and related research questions and objectives. Then, this chapter considers the research methods applied by previous research and introduces the research design of this study. Chapter 1 closes with a summary, which recapitulates the main points and gives an overview of the thesis structure.

## 1.1 Motivation to conduct this study

This study was motivated by the recognised organisational shortcomings of the outside-in innovation process of the German TV-set manufacturer Loewe. Major organisational shortcomings were identified resulting from the inadequate collection and processing of innovation and technology information or from the late involvement of the Purchasing Organisation in the new product development process (NPD). For example, relevant technology information was partially not processed and monitored effectively. In some cases, innovation suppliers did not get appropriate feedback concerning suggested innovation approaches and became demotivated. These observations pointed to a general lack of coordination of outside-in innovations (Chesbrough, 2006; Gassmann & Enkel, 2004). Consequently, there is the risk that available external innovation potential is not reliably exploited. Due to these observations, the effective integration of Loewe's PO into the innovation process became a matter of interest. In this connection, the appropriate integration of the PO into Loewe's innovation process is viewed as a major condition for efficient and effective supplier integration (ESI) into the innovation process. However, comparing to the domain of early supplier integration into new product development (ESI), given academic research neglects the topic of early purchasing involvement (EPI) into the innovation process. For this reason, the current study aims to explore, in the context of Loewe's PO, relevant Enabling Factors for purchasing integration into the outside-in innovation process.

## 1.2 Research problem

The generation of attractive innovations is one of the most important and complex tasks companies undertake. The process of Open Innovation (OI) has been used to support this endeavour to achieve sustainable competitive advantage (Chesbrough, 2006). Gassmann and Enkel (2004) divide the Open Innovation process into three archetypes:
(1) inside-out
(2) coupled, and
(3) outside-in.

The target of the outside-in process is to utilise the innovation potential offered by third parties for a SI's own product portfolio. Valuable outside-in innovations are innovations that have the potential to leverage a SI's competitiveness based on the potential:
(a) to reduce the goods/service cost and/or
(b) to serve as a product differentiation factor.

SIs are companies that co-ordinate and integrate their development work based on a mature system architecture and on the level of finished products thereby mostly utilising modules and components developed and supplied by specialised technology suppliers (Boutellier & Wagner, 2009; Henderson & Clark, 1990). SIs that are not capable of generating valuable innovations in time and of an attractive quality face increasing pressure on their performance results (Kano, Seraku, Takahashi, & Tsuji, 1984). The research field of innovation management is related to organisational learning theory (Lam, 1998; Sanz-Valle, Naranjo-Valencia, Jimenez-Jimenez & Perez-Caballero, 2011). Open Innovation (OI) (Chesbrough, 2006) seems to be a promising approach for SIs that are dependent on external technology suppliers to generate innovations in sufficient quantity and quality. However, OI requires that SIs realise permeable organisational structures and processes to ensure that a third party's innovation-potential can be tapped as efficiently as possible (Chesbrough, 2006). This thinking mode concords with the resource based view whose school of thought is that unique company resources need to be exploited as well as possible in order to gain competitive advantage (Barney, 1989, 1991, 1995, 2001, 2012; Barney & Zajac, 1994; Wernerfelt, 1984). Chesbrough (2011) further advocates the integration of services on product platforms to escape the commodity trap. However, small and medium-sized SIs of electronic consumer products is:

(1) highly dependent on close collaboration with external organisations and
(2) have to cope with turbulent technology markets as well as
(3) the continuous shortening of innovation-cycles.

In the consumer electronics industry, market complexity and turbulence are primarily caused by the uncertainty of technology trends, short innovation cycles and the high dependency of consumer electronic product companies on technology suppliers. These characteristics require close and early alignment with technology suppliers (Wynstra, van Weele & Weggemann, 2003). Therefore, small and medium-sized SIs of consumer electronic products need to achieve a high degree of organisational absorptive and learning capability (Cohen & Levinthal, 1990; Kolb, 1984; Lewin, 1948). This, in turn, requires that small and medium-sized SIs of electronic consumer products build up their dynamic capability to innovate, which subsequently forms the basis for the SIs' sustainable competitiveness. Only then, incremental and/or disruptive innovations can be assessed in a timely manner by the SI concerning their effects on the dominant system architecture of goods (Henderson & Clark, 1990; Phillips, Noke, Bessant & Lamming, 2006b). The effective embedding of the SI's Purchasing Organisation (PO) into the outside-in process can potentially become a major driver in improving the overall innovation process and company performance. However, this requires an understanding of the Enabling Factors for purchasing integration into the innovation process.

## 1.3 Research purpose and demand

The purpose of this research is threefold:
First, it explores the Enabling Factors for the effective integration of the Purchasing Organisation (PO) into the outside-in innovation process.
Secondly, it aims to derive a strategic agenda for a medium-sized system integrator (SI) of electronic consumer products to enhance its PO's capability to generate valuable innovations. Thirdly, it demonstrates the relevance of the identified Enabling Factors to other system integrators.

In this way, this research adds to the viewpoint of a medium-sized company of the consumer electronics (CE) branch concerning the effective integration of the purchasing function into the innovation process and the related target to generate valuable outside-in innovations. Hult, Hurley, Guinipero and Nichols (2000) outline further research demand in the

context of organisational learning and the determination of variables which "*influence or enhance organisational learning*" (Hult *et al.*, 2000, p. 318). However, the role of the PO in the innovation process has been widely neglected in academic research. As Schiele (2010) points out, previous research in the field of innovation and new product development (NPD) chiefly focused on the importance of the marketing and R&D interface (e.g. Boutellier, Gassmann & von Zedtwitz, 2007; Faas, 1985; Griffin & Hauser, 1996; Gupta & Wilemon, 1991; Kyriazis, Couchman & Johnson, 2012; Shaw & Shaw, 2003) and "*contrasts with the dearth of attention paid to functions like production, logistics and purchasing in NPD"* (Schiele, 2010, p.139). He further states,"*presumably with the implicit assumption that other functions will fulfill purchasing tasks"* (Schiele, 2010, p. 139), that the role of the Purchasing Organisation is even neglected in germane research fields such as early supplier involvement (e.g. Handfield, Ragatz, Petersen & Monczka, 1999; Lakemond, Berggren & Weele, 2006). Consequently, academic scholars point to the need for further research (Calvi, Johnsen & Phillips, 2011; Glock & Hochrein, 2011; Luzzini & Ronchi, 2011) concerning the role of the PO in the innovation process and the lack of academic research. Some authors conclude that, compared to ESI, "*there is very little research on the purchasing-focused equivalent: Early Purchasing Involvement (EPI*)" (Calvi *et al.*, 2011, p. 6). Schoenherr *et al.* (2012) identified substantial research demand "*beyond the early supplier involvement, to leverage the supply base for knowledge, capabilities and innovation*" (p. 4560). As argued by Schiele (2010), ESI in the new product development can only be expected to work successfully if there is an organisational interface, such as the PO, that takes over the co-ordinator and driver role concerning the active collation, co-ordination and processing of third party innovation potentials (products, processes, services). Besides academics in the PSM field, purchasing practitioners recognised the low maturity of purchasing with regard to securing innovations (Roland Berger Consultants, 2014).

### 1.4 Research questions

With regard to the research aim, the study aims to clarify 3 major research questions.

The first research question is concerned with the identification of Enabling Factors that are decisive for the effective integration of the PO into the innovation outside-in process of a selected SI of electronic consumer products. As explained above, Enabling Factors, in the

sense of this study, make it possible for the PO to actively co-ordinate and drive the outside-in innovation management process of technology suppliers and/or service providers. Therefore, the 1st research question (RQ1) is:

RQ1: What are the Enabling Factors for the effective integration of purchasing into the outside-in innovation process?

The 2nd research question is concerned with the observed organisational shortcomings subject to the appropriate integration of Loewe's Purchasing Organisation into the outside-in innovation process. Based on the identified Enabling Factors, a strategic agenda and appropriate measures are worked out with the PO members of the selected research unit. Thus, the study will advance the practical managerial knowledge in the research field and serves as a guideline and proposal for the executive management of the selected research unit. Based on this target, the 2nd research question (RQ2) is:

RQ2: Which strategic agenda and measures can be derived for the selected medium-sized system integrator by using the Enabling Factors?

Beside the advancement of practitioner knowledge, the study intends to give first insights whether the identified Enabling Factors are confirmed or not by purchasing representatives who have working experience in other companies that are also dependent on innovation suppliers. Based on this target, the third research question (RQ3) is:

RQ3: Are there indications that the identified Enabling Factors are relevant for other system integrators?

The subsequent section discusses the related research objectives.

## 1.5 Research objectives

Saunders, Lewis and Thornhill (2012) suggest that research objectives are a complement to research questions and state how the researcher intends to structure the research process. Creswell (2008) locates the definition of research objectives to quantitative research and not to qualitative research. Saunders, Lewis and Thornhill (2012) point out that the research objectives should operationalise the research questions so that they serve as a key

step in the research project. Based on these suggestions, this study has the following three research objectives:

RO1: To understand the Enabling Factors by reviewing academic and practitioner knowledge.

RO2: To devise a strategic agenda and measures for the effective purchasing integration into the innovation process of the selected medium-sized system integrator.

RO3: To investigate whether or not the identified Enabling Factors are confirmed (or not) by purchasers of other system integrators.

## 1.6 Research design of this study

This study was based on a qualitative research design. An embedded case study strategy was applied for the enquiry (Yin, 2009). Data collection and analysis were realised with a sequential qualitative → quantitative explorative design (Creswell, 2008). In order to consider multiple-perspectives with regard to relevant Enabling Factors (Yin, 2009), findings from the literature review served as a structural input for the intensive interview phase of this study, concerned with the specific context of Loewe's PO (Sayer, 1992, 2000). Qualitative data were collected through in-depth interviews and analysed with thematic analysis methods (Guest, MacQueen & Namey, 2012). Apart from Loewe's PO members, 11 purchasing experts with working experience in other SIs with high dependency on innovation suppliers participated in the study. To achieve face and external validity (Yin, 2009; Guest, MacQueen & Namey, 2012), qualitative themes identified were transformed into structured questionnaires. Related quantitative data were collected from the research participants through interview surveys (Easterby-Smith, Thorpe & Jackson, 2012). Quantitative data analysis was based on simple descriptive statistics and the majority principle. However, there is no paradigm mix as the use of simple descriptive statistics is subordinated and aimed at substantiating findings generated by qualitative data collection and analysis.

## 1.7 Summary

This study was motivated by observed organisational shortcomings concerning the integration of Loewe's PO into the innovation outside-in process. Subject to the effective integration of the PO into the outside-in innovation process, current academic research does not give sufficient insights with regard to relevant Enabling Factors for the effective integration of the PO into the outside-in innovation process, specifically in the context of a medium-sized SI of consumer electronic products. Because of this, this study has the objectives of understanding the Enabling Factors by reviewing academic and practitioner knowledge (RO1), of devising a strategic agenda and measures for the effective purchasing integration into the innovation process of the selected medium-sized system integrator (RO2) and of investigating whether the identified Enabling Factors are confirmed (or not) by purchasers of other system integrators (RO3). Case study design with sequential qualitative → quantitative methods for data collection and analysis was applied.

## 1.8 Thesis structure

This research is structured and presented in six chapters. Chapter 1, the Introduction, reasoned the motivation to conduct the study and delineated the research problem, purpose, questions, objectives and the selected research design. Chapter 2, the literature review introduces relevant academic papers and locates the research topic within the field of purchasing and supply chain management (PSM) and with regard to wider management literature. Based on the findings, a conceptual framework was devised. Chapter 3, Research Design and Methodology, gives a rationale for the selected research design and applied methods for data collection and analysis. Chapter 4, Data Analysis and Results, describes the process of data collection/analysis and while Chapter 5 discusses the major findings. Finally, Chapter 6, the Conclusion, delineates the contribution to knowledge and related theoretical and practical implications. Furthermore, Chapter 6 dwells on the limitations of the study and potential future research.

# 2 Literature Review

The narrative literature review started at the beginning of the DBA taught phase. As the Google Scholar website presents more than 2.2 million results for the topic of innovation management, a management professor who undertakes research in the field of innovation management supported the manual selection of relevant scoping literature from the wider sphere.

As recommended by Bolton (2009), the study of academic papers from the wider sphere serves as an input for the subsequent thought and reflective process. In this way, the selected literature (sub-chapter 2.1) widened the understanding concerning the innovation topic and related management theories. It was concerned with the innovation process of SIs, the management theories of organisational learning respectively Open Innovation, the development path of the PO and the resource based respectively the dynamic capability based view. Each of these management theories provided theoretical insights with regard to the PO's potential role in the innovation outside-in process. Furthermore, it proved that the manually selected material was the appropriate starting point as, besides the discussion of the innovation management and purchasing topic, the reference section of the titles also indicated further relevant research work. Besides acquiring a general understanding of the innovation topic and research in connection with the domain of the Purchasing Organisation, the initial step of dealing with the wider innovation and purchasing literature was an important element concerning the narrowing down process of the research topic that finally resulted in the research title of this thesis. Sub-chapter 2.2 locates the research topic within the PSM field and with regard to the wider management literature.

In contrast with the upstream process step of obtaining a first understanding of relevant managerial themes, objective of the subsequent review of academic papers, which was conducted via the database search, was to identify academic papers that are specifically concerned with the domains of the Purchasing Organisation and innovation process. In this way, based on the insights gained through the review of the wider scoping literature, relevant themes (Enabling Factors) could be identified and substantiated on the basis of a predefined maturity level. Sub-chapter 2.3 outlines the process of the database search and data analysis that further resulted into noteworthy themes, the definition of Enabling Factor terms, a structure of causal explanation and related tendencies. Based on the given findings and the identified research gap (sub-chapter 2.4), a conceptual framework was devised

(sub-chapter 2.5). The chapter ends with a summary and dwells on the limitations of the literature review. Concerning RO1, the literature review provided a first understanding subject to the relevant Enabling Factor.

## 2.1 Discussion of scoping literature

The following sub-chapters introduce the theoretical scoping literature. Sub-chapter 2.1.1 dwells on the innovation process of SIs and specific risks with which SIs have to cope. Sub-chapter 2.1.2 introduces the topics of organisational learning and the related management theory of Open Innovation that is viewed as an applied form of an organisational learning process. Sub-chapter 2.1.3 focuses on the resource-based view and the dynamic capability based view while sub-chapter 2.1.4 outlines the development path of the Purchasing Organisation. Finally, sub-chapter 2.1.5 places OI into the context of SME.

### 2.1.1 Innovation process of SIs

Thompson (1965) defines innovation as "*the generation, acceptance and implementation of new ideas, processes, products or services*" (Thompson, 1965, p. 36, as cited in Hurley & Hult, 1998). The system architecture of mature products is usually based on a dominant architectural design that has achieved general acceptance in an industrial sector over the years (Henderson & Clark, 1990). The development of new products takes place in a business-to-business process which is characterised by the participating customers' and supplier network's special know-how. In this process, SIs co-ordinate and integrate their development work on the level of the finished product (Boutellier & Wagner, 2009), mostly utilising modules developed and supplied by technology suppliers. A system-architecture reflects how components of a system or product are linked to each other. For example, a television set consists of a display (panel), a main unit for signal processing with active and passive semiconductors on the printed circuit board, a power-unit, the housing, control units for local and remote control and a software stack consisting of different layers. The way all components and modules are interlinked with each other reflects the system architecture from a technical point of view. From a managerial point of view, SIs combine the components and subsystems of a functioning new system, the product, based on the dominant system architecture and development work. In this thesis, the term/abbreviation 'SI' always refers to SIs which design and manufacture electronic products based on the integration of components and modules. The 'not-invented-here' (NIH) syndrome (Katz & Allen, 1982) and the high dependency on key-component suppliers are potential barriers to

the innovation process. The following two sub-chapters concentrate on both topics because of this.

#### 2.1.1.1 Not-invented-here (NIH) syndrome and architectural innovations

Katz and Allen (1982, p. 7) define the 'not-invented-here' (NIH) syndrome "*as the tendency of a project group of stable composition to believe it possesses a monopoly of knowledge of its field, which leads it to reject new ideas from outsiders to the likely detriment of its performance*". On the other hand, previous research identified engineers' personal contacts as the primary means of acquiring technical and innovation information (Allen, 1977; Menzel 1965 as cited in Katz & Allen, 1982). However, if the frequency of communication to external sources diminishes, the risk of overlooking important external innovation/technology information increases. With regard to engineering work, the tendency to neglect external technical ideas might be amplified by functional related organisation structures that are based on the dominant system architecture of goods (Henderson & Clark, 1990). For example, a functional department description like 'development team module X' gives an implicit job description to team members. An organisation principle that is based on a dominant system architecture might be even amplified by development teams that bind their value and status in the company to their capability to develop the related modules by themselves. Nelson and Winter (1982) point out that embedded organisational routines act as control-systems which tend to resist mutations, even in case of desirable innovations. Subject to new market opportunities, Argote and Ren (2012) argue that transactive memory systems facilitate collective filtering and sensing of information. This is supported by Henderson and Clark (1990) who found that established communication channels emphasise and strengthen the given organisational structure, component knowledge and dominant architectural design. However, established communications channels act as information filters (Henderson & Clark, 1990), potentially weakening a SI's capability to timely recognise and appropriately assess important incremental innovations that impact the given dominant system architecture. Henderson and Clark (1990) reason this inability to timely and appropriately assess incremental architectural innovation with communication channels that are molded by a dominant architectural design (Henderson & Clark, 1990). As long as the architectural design and components remain the same, established firms might even strengthen their market position over time (Henderson & Clark, 1990). However, if relevant architectural innovations are filtered out, SIs run the risk of falling back behind their competitors. The mix of:

(a) the NIH syndrome

(b) established information channels of market leaders and

(c) a dynamic and turbulent market environment

act so that it even allows new competitors/players who recognise incremental component innovations that cause an impact on the dominant system architecture in time, to change the rules of competition valid in mature product markets for many years. Henderson and Clark (1990) described these effects on the example of the photolithographic alignment equipment industry and the multiple market and technological leadership changes. An example from the fairly recent past is the case of Nokia. Nokia was the market leader for mobile phones with a market share of more than 40% in 2007 (Know Your Mobile, 2008). Even if Nokia worked extensively on future mobile phone generations, the company missed the trend towards Smartphones with mobile internet access and revenue generation via service platforms for apps and entertainment content. Therefore, Nokia seems to have become the model example for a SI which concentrates on the further development of the dominant component and architectural design whereas other players, like Apple, concentrated on building up new component knowledge for touch screens and an internet based eco-system that generates turnover with the media services offered. It is obvious that Nokia failed to build up knowledge for new and alternative components and additional services in time and subsequently had to suffer a dramatic decline in market shares that resulted in a tremendous loss situation and the sale of the Nokia's mobile phone activities to Microsoft in November 2013. Meanwhile, Apple is under attack by Samsung, which is building its success on the superior vertical integration of key components in Samsung's value chain and the open Android operating system whose market share achieved 85% in 2014 (Source: Strategic Analytics, 2014b). These examples indicate that, in order to attain sustainable competitive advantage or at least the edge on competitiveness, SIs need to augment their capability to closely monitor developments that are beyond the scope of the current dominant product component and architectural design (Henderson & Clark, 1990).

#### 2.1.1.2 Dependency on innovation/technology suppliers

In this study, the term innovation supplier refers to suppliers of hardware (electronic components and modules), mechanical/cosmetic design components, software solutions and applications and technologies subject to intellectual property rights. The term 'Innovation Supplier' is further used as an umbrella term in this study. As an example, the following table illustrates the market shares for tablet panels as used in tablet PCs.

**Global Media Tablet Display Panel Market Share Ranking**
**(Market Share Percentage Based on Unit Shipment Volume)**

| Rank | Company | Country | 2011 Market Share | 2010 Market Share |
|---|---|---|---|---|
| 1 | LG Display | South Korea | 46.0% | 67.0% |
| 2 | Samsung | South Korea | 35.0% | 31.0% |
| 3 | Chimei Innolux | Taiwan | 7.0% | 0.0% |
| 4 | Chunghwa Picture Tubes | Taiwan | 4.0% | 0.0% |
| 5 | Hitachi Displays | Japan | 3.0% | 0.0% |
| 6 | Beijing Orient Electronics | China | 3.0% | 0.0% |
| 7 | E-Ink | Taiwan | 1.0% | 2.0% |
| 8 | Tianma Microelectronics | China | 1.0% | 0.0% |
| | Total | | 100.00% | 100% |

Figure 1: Market shares of tablet-panel suppliers: Source: IHS iSuppli Research, May 2012. Retrieved from http://www.isuppli.com/PublishingImages/Press%20Releases/2012-05-30_Tablet_Display.jpg

The table shows that only eight companies worldwide produce tablet panels and two of them had a combined market share of 81% in 2011, whereas touch panels are used in hundreds of different applications. The dependency on innovation/technology suppliers is a further potential barrier to the SI's innovation process. One of the best-known examples from the consumer electronics industry is Apple, a company responsible for specification, design and software programming of its products. The manufacturing itself is outsourced to an external electronics manufacturing service company. Key components such as processors, memories and touch modules are procured from key suppliers, some of them even competitors for finished products like Samsung (Hessedahl, 2009). This means that even MNCs have to deal with suppliers of key components who have, at least temporarily, a strong supplier power. Especially small and medium-sized SIs usually do not have a broad vertical value-added chain and, therefore depend heavily on access to external resources (Ellegaard, 2006; Schumacher *et al.*, 2008). Due to lack of financial and technological resources, it is obvious that the capability to absorb new technologies is even more problematic for the small and medium-sized SIs (Thomas, Miller & Murphy, 2011), which do not have an outstanding market position like Apple. Therefore, academics emphasise the importance of networking capabilities for SMEs in order to maintain and set up a continuous information flow concerning component knowledge (Ellegaard, 2006, 2009; Pressey, Winklhofer & Tzokas, 2009; Thomas, 2000). It is easy to recognise that classical purchasing levers (Schumacher, Schiele, Contzen & Zachau, 2008) do not work in the case of such oligopolistically termed supply markets.

### 2.1.2 Resource-based and dynamic capability based views

This study refers to the managerial tenets of the resource-based view (Barney, 1991, 1995, 2011; Penrose, 1959; Rumelt, 1984; Wernerfelt, 1984) and its further development into the dynamic capability based view (Eisenhardt & Martin, 2000; Stalk, Evans & Shulman, 1992; Teece, 2011; Teece & Pisano, 1994; Wang, 2007) The theoretical foundations of the RBV and the DCBV can be traced back to the work of Joseph A. Schumpeter (1934) who portrayed the entrepreneur as a driver for the realisation of new factor combinations which generate novelties or, in other words, process or product innovations. The following sub-chapters introduce the foundations of the resource-based view (RBV) and the dynamic capability-based view (DCBV).

#### 2.1.2.1 Resource-based view

In contrast with the market-based view which is outwardly directed towards market forces (Porter, 1981), the RBV's and the DCBV's focus is inward-orientated. Barney (1991, 1995, 2001, 2012) views resources as "*bundles of tangible and intangible assets, including a firm's management skills, its organisational processes and routines, and the information and knowledge it controls*" (Barney, 2001, p. 625). Competitive advantage can be achieved based on imperfect factor markets, which lead to companies being heterogeneous in their resources, which are not perfectly mobile across firms (Barney, 1991, 1995; Peteraf, 1993). In order to generate competitive advantage, resources must be valuable, rare, inimitable, non-substitutable, non-transferable (VRIN). According to Barney's VRIO framework (Barney, 1995), in order to achieve competitive advantage, the exploitation of VRIN resources needs to be organised by companies via suitable organisational structures and processes (Barney, 1995). The RBV and the DCBV postulate that the overall target for a firm is to continuously improve the exploitation of its resources and thus to enhance distinctive capabilities which lead to sustainable competitive advantage. Based on the high-quality co-ordination of available and accessible resources, competitive advantages are achieved due to effects caused by isolation mechanisms (Barney, 1991, 1995). Isolation mechanisms are formed through interconnectedness, social complexity, causal ambiguity, a firm's unique path through history and historic effects. Real and sustainable competitive advantage can be achieved via efficient and effective co-ordination, reconfiguration and learning processes (Sammerl, 2006).

#### 2.1.2.2 Dynamic capability-based view (DCBV)

##### 2.1.2.2.1 Critique of the RBV

The RBV postulates heterogeneity of tangible and intangible resources as a source of competitive advantage. However, it is argued by academics (e.g. Helfat, 2000; Helfat & Peteraf 2003; Teece & Pisano, 1994; Wang & Ahmed, 2007) that the RBV does not answer how heterogeneity can be achieved and transformed into competitive advantage by firms over time. According to Helfat and Peteraf (2003), this requires an evolutionary and life-cycle-based understanding of resources and capabilities. The DCBV (Stalk, Evans & Shulman, 1992; Teece & Pisano, 1994; Helfat & Peteraf, 2003) further develops the RBV and combines it with the aspect of changing external environments of companies which requires certain strategic management responses concerning "*organisational skills, resources and functional competences toward the changing pace of innovation …*" (Teece & Pisano, 1994, p. 196).

##### 2.1.2.2.2 Relation between resources and capabilities

Academics outline a hierarchical relation between resources and capabilities (Ambrosini, Bowman & Collier, 2009; Wang & Ahmed, 2007; Winter, 2003), whereby resources reflect the basic (zero) element on which, if the specific resource is turned to a VRIO resource, competitive advantage can be attained for a certain period of time (Ambrosini, Bowman & Collier, 2009; Wang & Ahmed, 2007; Winter, 2003). From such a hierarchical perspective, Wang and Ahmed (2007) further categorise 1st-order capabilities to be deployed by companies to attain goals, for example, to improve certain performance indicators, whereas 2nd-order capabilities are defined as core competences which are a bundle of a firm's resources and capabilities, strategically important to achieve its competitive advantage at a certain point in time (Wang, 2007, p. 11). This point of view implies that sustainable competitive advantage can be achieved via the development of 2nd-order capabilities which depend on a company's unique reconfiguration of capabilities and the subsequent emergent unique processes (Eisenhardt & Martin, 2000). Examples in industry include the Toyota Production System (TPS), Walmart's cross-docking system (Stalk, Evans & Shulman, 1992) or Zara's responsiveness to customer needs (Wang & Ahmed, 2007). The basic hierarchical understanding of dynamic capabilities that attributes reconfiguration, co-ordination and learning processes to 2nd-order meta-capabilities is also used by other academic authors (for example Eisenhardt & Martin, 2000; Sammerl, 2006). A key question of the DCBV is whether a capability solves a real customer need (Stalk et al.,

1992) and whether the investment in the respective capability is lower than future discounted returns (Dierickx & Cool, 1989). Only in these conditions does the capability deserve to be named a strategic or 2nd-order capability.

#### 2.1.2.2.3 Capabilities and dynamic capabilities

The DCBV is based on the RBV but takes into account the aspects of a dynamic company environment and the goal to achieve sustainable competitive advantage via a privileged market position that *"is achieved or protected by the deployment of scarce assets"* (Dierickx & Cool, 1989, p. 1059). Nelson and Winter (1982) point out that capabilities are embedded in organisational structure and are the source of heterogeneity. Also, Winter (2003) defines capabilities as a *"high level routine (or collection of routines) that, together with its implementing input flows, confers upon an organisation's management a set of decisions for producing significant outputs of a particular type"* (Winter, 2003, p. 991). Furthermore, Helfat and Peteraf (2003) argue that capabilities refer to the ability of firms to co-ordinate relevant tasks concerning the efficient utilisation of resources to achieve business objectives.

In contrast with ordinary (zero-level) capabilities, however, dynamic capabilities, as the term suggests, are concerned with 'change' (Helfat & Winter, 2011; Winter, 2003). The principal underlying idea of the DCBV is that companies have to ensure sustainable competitive advantages, whereas the RBV is rather focused on a resource situation at a given point in time. Moreover, the DCBV's focus lies on assets which are not co-ordinated by prices. Teece, Pisano & Shuen (1997) define the term 'dynamic' as a company's capability to renew competences *"so as to achieve congruence with the changing business environment"* (Teece, Pisano & Shuen, 1997, p. 515). Helfat, Finkelstein, Mitchell, Peteraf, Singh, Teece & Winter (2007) define dynamic capabilities as *"the capacity of an organisation to purposefully create, extend, or modify its resource base"* (Helfat *et al*., 2007, p. 4). In order to keep pace with changing business environments, a strategic management's role is to build up capabilities that enable firms to adapt, integrate, combine and reconfigure internal and external resources and/or skills (Teece, Pisano & Shuen, 1997). Thus, dynamic capabilities are built up based on knowledge, co-ordination, learning and reconfiguration processes (Teece & Pisano, 1994; Sammerl, 2006). In this way, dynamic capabilities enable firms to devise and introduce new products and services, which are costly to imitate, as a

response to changing market environments (Helfat, 1997; Helfat & Winter, 2011; Teece, Pisano & Shuen, 1997; Winter, 2003).

With regard to organisational learning processes, Helfat and Raubitschek (2000) distinguish capabilities as (a) core-knowledge that is specific to understanding relevant technologies and (b) integrative knowledge that is concerned with a company's co-ordination capability relating to the integration of product components, services or new processes. According to the authors, integrative knowledge includes the co-ordination of codified and tacit knowledge which can lead to cost reduction or, perhaps even more importantly, to new products or even business models that provide platforms for future expansion (Helfat & Raubitscheck, 2000; Teece, 2007, 2010). This reflects Teece et al.'s (1997) definition of core competences which views them as distinctive and directly related to a firm's fundamental business core. In this sense, they should be different and hard or costly for competitors to imitate (Barney, 1991, 1995; Teece et al., 1997, 2007). In addition, Helfat and Peteraf (2003) point out that heterogeneity can also be achieved should a company devise a better version of a certain core competence, for example, as realised by Toyota with its superior production system for car manufacturing.

#### 2.1.2.2.4 Adaptive, absorptive capabilities and learning

According to March (2006), a changing environment and related incomplete information require adaptation. However, in order to avoid stagnation caused by myopic adaptation which is centred on short term exploitation, companies have to achieve an appropriate mix and interplay of exploration and exploitation of new opportunities (March, 1991, 2006; Taylor & Helfat, 2009). Subject to an appropriate balance between exploration and exploitation, firms have to consider the speed of change of their relevant environment (March, 1991; 2006). In this connection, Wang *et al.* (2007) further categorise 2$^{nd}$ order core-capabilities into adaptive, absorptive and innovative capabilities which need to be selected with a priority based on companies' strategic targets. Absorptive capabilities are rather inward looking, thus enabling a company to recognise, assimilate and capitalise on external knowledge, whereas adaptive capabilities are rather outward looking and reflect a company's ability to identify and capitalise on emerging market opportunities as Wang, *et al.* (2007) suggest. They also state that adaptive, absorptive and innovative capabilities correlate with each other "*but are conceptually distinct*" (Wang *et al.*, 2007, p. 18). In order to build up the 2$^{nd}$-order innovation capability, experience in the past suggests that SIs have to first prioritise the operative and strategic co-ordination of adaptive and absorptive capa-

bilities that subsequently induce learning processes that establish and maintain innovative capabilities which, in turn, lead to innovative activity (Cohen & Levinthal, 1990; Eisenhardt & Martin, 2000; Sammerl, 2006). This is reasonably described as "*the ability to evaluate and utilise outside knowledge is largely a function of the level of prior related knowledge*" (Cohen & Levinthal, 1990, p. 128). This means that learning processes require a certain level of knowledge concerning a specific discipline which can be achieved, according to Helfat and Raubitschek (2000), by means of path-dependent incremental learning processes or, in terms of more fundamental changes of system architectures (Henderson & Clark, 1990), by means of step-function learning processes (Helfat & Raubitscheck, 2000). Should a company not have a certain degree of required knowledge, learning and subsequent innovation processes cannot take place. Teece *et al.* (1997) point out that learning processes are intrinsically social and collective, require common codes of communication, reside in routines or processes and occur in the forms of imitation, or emulation and through joint contributions to solve complex problems. Similarly, dynamic capabilities can be viewed as co-ordinating mechanisms to initiate intra- and inter-organisational learning processes (Teece *et al.*, 1997). In this regard, Teece (2007) argues that enterprises with strong dynamic capabilities shape business eco-systems "*through innovation and through collaboration with other enterprises, entities and institutions*" (Teece, 2007, p. 1319). Therefore, SIs operating in an environment of turbulent markets and short innovation cycles have to build up adaptive and absorptive capabilities in order to enhance their capability to innovate.

#### 2.1.2.2.5 Sensing and seizing

The efficient and effective processing of external market signals requires that companies establish a continuing process which embeds dynamic capabilities in regard to sensing, seizing and transformation of business opportunities (Teece, 2007; Wang & Ahmed, 2007). In this way, reconfiguration processes generate improved new products or services (Teece, 2007; Wang & Ahmed, 2007). Referring to the dynamic sensing capability of outside-in innovations, Ridder (2011) proposes internal scouting, searching, scanning and filtering processes as related sub-processes. In regard to the inward seizing capability, Ridder (2011) proposes the sub-processes of transforming, integrating, complementing and retaining, further arguing that sensing and inward seizing result in higher innovation-inventories which, in turn, accelerate the firm's innovation capability. This thesis suggests that a professionalised PO is particularly suitable to take over the co-ordination or strategic and op-

erative outside-in innovation management processes that represent, from a hierarchical perspective, a 2nd-order capability or a meta-capability that further forms a formative element of a SI's innovation capability and sustainable competitive advantage.

The following sub-chapter will further discuss the development path of the PO and the required competences to take over the process of ownership for the outside-in core process.

### 2.1.3 Organisational learning and Open Innovation

Subject to the generation of knowledge and knowledge diffusion inside organisations (Nonaka and Takeuchi, 1995; Thomas, 2000), the Open Innovation approach is considered as a sub-discipline of organisational learning, especially in the context of a medium-sized SI which is highly dependent on the exploitation of external and internal company resources. This chapter discusses how learning processes, as a fundamental theoretical base for innovation processes, work in organisations (Nelson & Winter, 1982; Nonaka & Takeuchi, 1995). An exhaustive discussion of organisational learning theory would be far beyond the remit of this study.

Selected managerial tenets considered as especially important in the context of this study are discussed further below. In this regard, this section highlights the role of tacit or explicit knowledge and the single and double-loop theory developed by Argyris and Schön in the context of action science (Argyris, 1993; Argyris & Schön, 1978; Schön, 1984). Additionally, this chapter outlines the knowledge generation theory of Nonaka and Takeuchi (1995). Furthermore, academic papers concerned with organisational theory are linked to the resource-based or dynamic capability based views, introduced in sub-chapter 2.1.2 of this thesis (for example, Argote & Ren, 2012; Yuchtman & Searshore, 1967).

#### 2.1.3.1 Organisational Learning

Academic research emphasises the importance of organisational learning as the innovation capability of companies and its effects on firms' sustainable competitive advantage (e.g. Argote & Ren, 2012; Hurley & Hult, 1998; Nelson & Winter, 1982; Sammerl, 2006). Knowledge diffusion is a process by which organisation members learn from each other while the degree of diffusion depends in organisations depends success of using new knowledge (March, 2006). Moreover, Thomas (2000) points out that the diffusion process of new technologies is a learning process for small and medium-sized enterprises. Similarly, Hult *et al.* (2000) propose using organisational learning as a strategic tool*"that can be*

*used to solve purchasing and supply chain problems within and outside the normal scope of established processes"* (Hult *et al.*, 2000, p. 318). March (1991) found that organisations which achieve a learning performance above a normal learning distribution improve their competitive advantage. Organisational learning is linked to the dynamic capability-based view, as learning is the pre-requisite for being able to react to shifting market environments (Teece & Pisano, 1994). In the context of managerial strategic foresight scenarios, this viewpoint is also reflected by Rhisiart, Miller and Brooks (2013) who suggest learning as a primary resource of managerial reconfiguration processes. Companies have a certain knowledge base which, at the basic level, resides in the memory of the individual company member (Nelson & Winter, 1982). Knowledge can be divided into explicit knowledge and tacit knowledge (Nelson & Winter, 1982; Polanyi, 1966). Explicit knowledge can be codified and easily transferred. An example in companies is the product testing regulation in the context of new product development. Tacit knowledge can hardly be explained by human beings and is rather described as implicit, intuitive knowledge, which is quasi-programmed and automatically applied, and also concerns the selection of numerous choices that are in the repertoire of individuals (Nelson & Winter, 1982). Nelson and Winter (1982) also point out that the *"performer is not fully aware of details of the performance and finds it difficult or impossible to articulate a full account of those details"* (*Nelson & Winter, 1982, p.73)*. Prominent examples of tacit know-how are (a) facial recognition of human beings and (b) biking. In both cases, the exact process can hardly be defined in written or verbal form. Therefore, tacit knowledge can be more readily shared via demonstration. From the epistemological point of view, the transfer of tacit knowledge requires personal interaction or illustration by the tacit knowledge holder (Nelson & Winter, 1982; Nonaka and Takeuchi, 1995). This means that the process of knowledge diffusion always starts with an individual who is willing to share his or her tacit knowledge with others. Based on this insight, Nonaka and Takeuchi (1995) explain the process of knowledge generation inside and among companies with a four-step cycle:

(1) socialisation
(2) externalisation
(3) combination and
(4) internalisation.

The idea that learning is a cyclical process has its roots in experiential learning theory and can be traced back to the academic work of Dewey (1938) and Lewin (1948). Lewin's

(1948) Experiential Learning Model illustrates a continuous process of creating knowledge and does not view learning just as an outcome.

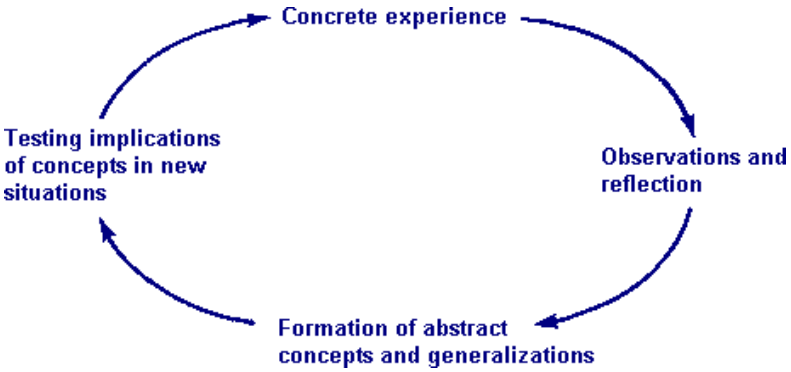



Figure 2: The Lewinian Experiential Learning Model. Source: Kolb, 1984, p. 21

Kolb (1984, p. 5) defines experiential learning as the process that links education, work and personal development. There has been further development of this approach under the term 'Kolb's learning cycle', a variant of Lewin's (1948) experiential learning model consisting of the stages:

(1) concrete experience

(2) reflective observation

(3) formation of abstract conceptualisation, and

(4) applying respective active experimentation.

Returning to the knowledge generation spiral (Nonaka & Takeuchi, 1995), socialisation of tacit know-how takes place via the sharing of "*mental models and technical skills*" (Nonaka & Takeuchi, 1995, p. 62) such as via face-to-face communication among company members or observation. This requires that company members have the ability to receive and interpret relevant information that results from an ongoing process of *"creating and learning about something new"* (Nelson & Winter, 1982, p. 256). In this way, recipients of tacit knowledge are able to reconstruct, for example, the chain of arguments of the tacit knowledge holder. Based on the gained new knowledge, the recipient becomes able to select appropriate routines from his repertoire in order to achieve objectives (Nelson & Winter, 1982). With reference to the complementary co-cooperation of stakeholders, for example via team-structures, Argote and Ren (2012) point to the positive effects of transactive memories that are foundations of dynamic capabilities. From this point of view, collectively encoding, storing and retrieving of information facilitate combinative knowledge-exchange and re-configuration or combination processes of complementary expertise (Ar-

gote & Ren, 2012). In this regard, the step of externalisation aims to visualise and codify the recognised tacit knowledge via theories, pictures or models and, in this way, implicit (subjective) tacit knowledge becomes (objective) explicit knowledge (Nonaka & Takeuchi, 1995). The subsequent combination process combines and reconfigures knowledge out of different domains, which can be exchanged via different media. This means that explicit knowledge of different areas will be combined, thus producing new explicit knowledge. By internalising, the company member sublimates the generated explicit knowledge again into implicit knowledge. For example, an abstract structural model can activate a thought process and the insights gained can further accumulate the tacit knowledge base of the knowledge holder. Then, the knowledge generation process starts again with the effect that a company's knowledge base will be further increased and can be shared with other companies. The figure that follows illustrates the modes of knowledge conversion (Nonaka & Takeuchi, 1995, p. 71):

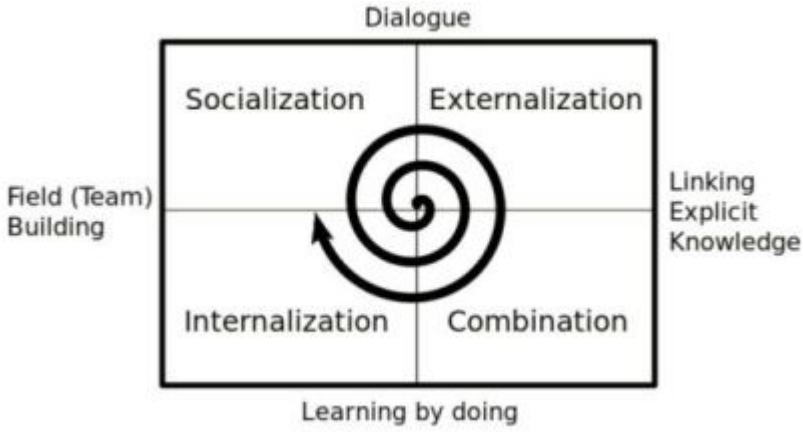



Figure 3: Modes of knowledge conversion and learning spiral. Source: Nonaka and Takeuchi (1995, p. 71)

Nonaka and Takeuchi (1995) further illustrate the knowledge accumulation process within and among companies:

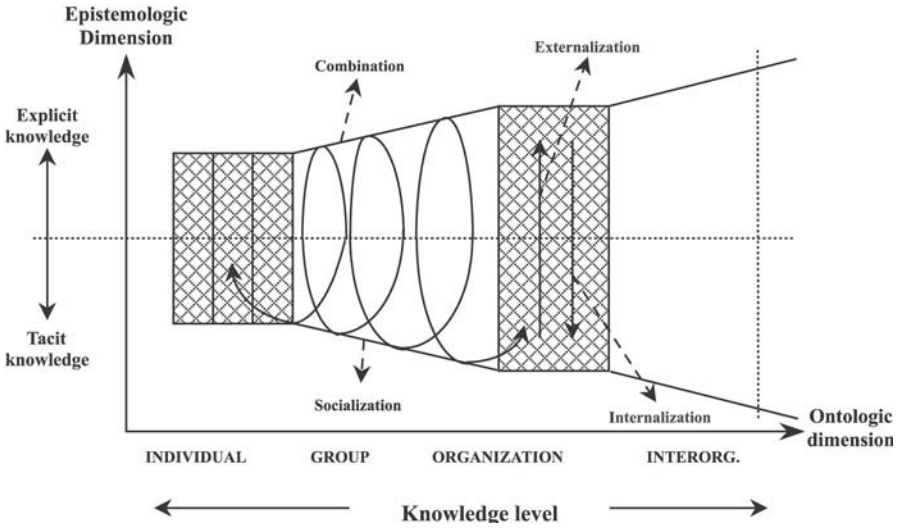



Figure 4: The spiral of knowledge creation. Source: Nonaka and Takeuchi (1995, p. 73)

The model visualises the importance of stakeholders' personal interaction in order to turn tacit knowledge into explicit knowledge (Goffin & Koners, 2011). Furthermore, the model gives an idea of the path and time dependency of knowledge accumulation (Barney, 1991, 1995; Dierickx & Cool, 1989; Sammerl, 2006). Path dependency refers to historical effects and previous management decisions concerning strategic orientation whereas time dependency refers to the fact that knowledge creation and accumulation takes time. Therefore, knowledge gaps cannot conveniently be filled via time compression efforts (Dierickx & Cool, 1989; Sammerl, 2006). The crucial point in the context of the outside-in core-process is that a company can only tap external knowledge in cases where a sufficient level of knowledge is available inside the company. In other words, if a recipient of information cannot link the semantic content of the information to the given or accessible knowledge, then it is not possible to understand the process and reconfigure the new information. Weizäcker (1974) illustrates this effect with the 'first time-confirmation model' (Weizäcker, 1974, as cited in Sammerl, 2006) and Cohen and Levinthal (1990) argue, in the context of absorptive capabilities, "*that the ability to evaluate and utilize outside knowledge is largely a function of the level of prior related knowledge*" (Cohen & Levinthal, 1990, p. 128). At the most elementary level, this prior knowledge includes basic skills or even a shared language but it may also include knowledge of the most recent scientific or technological developments in a given field. Thus, prior related knowledge confers an ability to recognise the value of new information, assimilate it, and apply it to commercial ends. Therefore, a company should systematically increase its knowledge base, for example, regarding upcoming technologies that may be important for prospective product properties of

a company's product and service portfolio. Especially companies operating in a highly dynamic and competitive market environment have to organise the knowledge accumulation process efficiently and effectively, which in turn means that the respective company has to achieve a sufficient level of absorptive capability (Cohen & Levinthal, 1990, Taylor & Helfat, 2009). A further aspect to be raised by the knowledge generation spiral is the conditions in which human beings are willing to openly share tacit information (Nonaka & Takeuchi, 1995). As outlined earlier in this thesis, socialisation of tacit knowledge requires the social interaction of human beings. In this process, the co-ordination of affected stakeholders is central to achieve *"productive organisational performance"* (Nelson & Winter, 1982, p. 104). In order to gain non-distorted information, a sufficient level of mutual trust needs to exist between people (Colombo, Dell'era & Frattini, 2011; Fang & Rice, 2013; Pereira, Ferreira & Alves, 2012). This aspect leads directly to Argyris and Schön's (1978, 1984, 1993) tenets of action science and its concept of single-loop and double-loop learning, which they affirm is very rare in organisations due to the fact that people, if faced with difficult and/or threatening situations, seem to follow a common master programme or theory in use, applied by human beings and continuously amplified since childhood (Senge, 1990). The theory in use (Argyris, 1993) can contrast with an espoused theory and is determined by the overarching values:

(1) to have unilateral control over other people
(2) to strive to win and not to lose
(3) to suppress negative feelings and
(4) to be as rational as possible

Argyris and Schön (1978, 1984, 1993) attribute this defensive behaviour to the so-called Model I (single loop learning), which, probably by nature, is automatically applied by the majority of people. Furthermore, they rationalise people's programmed defensive tendency with an inner fear that other people might find errors in the underlying reasoning or theory in use. Model I behaviour can be reasonable if urgent decisions need to be taken by management, for example, in emergency situations or if errors identified in a controllable system can be corrected by changing routine behaviour (Argyris, 1993). Model II behaviour does not seek unilateral control but is rather based on the idea of self-reflection concerning the question of how to increase other people's "*capacity to examine their defensive reasoning and the unrecognised negative consequences*" (Argyris, 1993, p. 13). Therefore, the

utilisation of Model II is appropriate for complex, threatening, embarrassing and difficult situations. These attributes apply to the innovation management process, especially in the product definition phase (Gassmann & Sutter, 2011) characterised by uncertainty. Effective innovation management requires a shared understanding between innovation stakeholders subject to market needs and related characteristics of innovative products and services. Real learning can only be initiated if it is possible for people to express their reasoning (theory in use) about innovation ideas without fear of embarrassment. Therefore, companies should create an innovative climate which supports people's freedom to also express their conflicting reasoning about the ways in which innovative product properties can be achieved (Senge, 1990). Otherwise, no real learning processes can be initiated and the innovation success of companies solely depends on the performance of a few individuals located in speciality departments. It is obvious that a Model I approach can hardly lead to sustainable success in a complex and dynamic firm's environment. These insights point to the importance of trust and open-minded relations among innovation stakeholders. Furthermore it is argued that a professionalised PO well-embedded in the innovation outside-in process can make a considerable contribution to the facilitation of learning processes and the subsequent dissemination of knowledge among the innovation stakeholders (

#### 2.1.3.2 Open Innovation – an applied form of organisational learning

As outlined above (sub-chapter 2.1), a company's innovative capability is based on an organisational learning process. Therefore, in this thesis, Open Innovation is viewed as a special form or category of organisational learning (Chesbrough, 2006). The basic idea of Open Innovation is that companies come from a closed innovation paradigm to an Open Innovation paradigm (Chesbrough, 2006). Therefore, Open Innovation requires permeable boundaries in the innovation process which enable companies to utilise external ideas on the one hand, but, on the other hand, to open up their own research and development results, often protected via intellectual property rights, such as patents, to other companies. This means that, for example, patents are not 'piled up' in a company's innovation warehouse just to protect innovations from access by other organisations. Contrary to the protective approach, Open Innovation makes a company's knowledge accessible to third parties, for example, if an innovating company has decided not to market a newly developed technology for its own purposes.

Chesbrough (2006) describes:

(1) the openness of an organisation for the ideas and technologies of external organisations, for example, universities and start-ups

(2) crosslinking of the internal and external organisational units

(3) monitoring of technology companies and university spin-offs

(4) to offer actively companies patented technologies, for example, via license programmes, the trade-off of patents and

(5) providing venture capital for start-ups, as specific features of OI.

From an economic point of view, the OI approach enables an innovating company to generate additional income, for example, via the charging of licensing fees for the technologies demanded. Further approaches include marketing technologies in other market settings, such as co-operation with other companies in the form of joint ventures or the foundation of start-up companies. The following figure of the innovation funnel illustrates the Open Innovation paradigm.

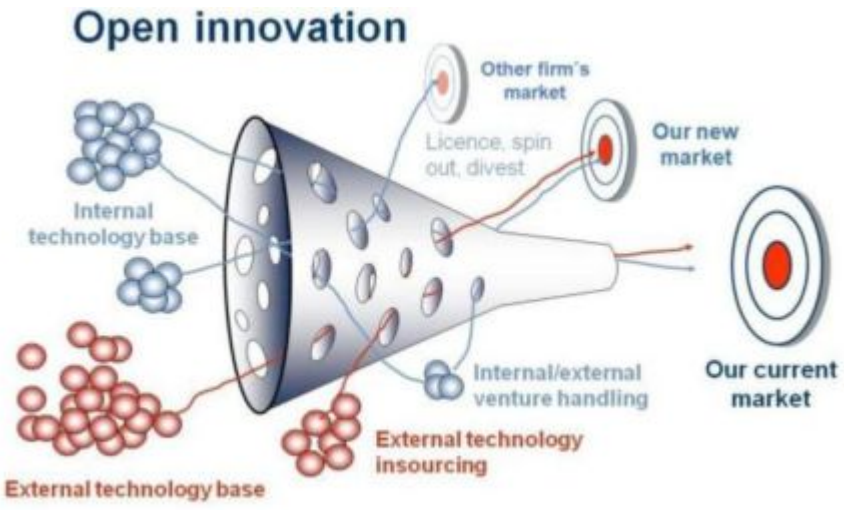



Figure 5: Open Innovation Funnel. Source: H. Chesbrough UC Berkeley, Open Innovation: Renewing Growth from Industrial R&D, 10th Annual Innovation Conference, Minneapolis Sept. 27, 2004.

The table below illustrates the contrasting principles of closed and Open Innovation:

**Contrasting Principles of Closed and Open Innovation**

| Closed Innovation Principles | Open Innovation Principles |
|---|---|
| The smart people in our field work for us. | Not all the smart people work for us. We must work with smart people inside *and* outside our company. |
| To profit from R&D, we must discover it, develop it, and ship it ourselves. | External R&D can create significant value; internal R&D is needed to claim some portion of that value. |
| If we discover it ourselves, we will get it to market first. | We do not have to originate the research to profit from it. |
| The company that gets an innovation to market first will win. | Building a better business model is better than getting to market first. |
| If we create the most and the best ideas in the industry, we will win. | If we make the best use of internal and external ideas, we will win. |
| We should control our IP, so that our competitors do not profit from our ideas. | We should profit from others' use of our IP, and we should buy others' IP whenever it advances our own business model. |

Figure 6: Contrasting principles of closed innovation and Open Innovation.
Source: Chesbrough (2003), page xxvi

The main target of the inside-out process is to offer the company's technologies or other assets to third parties in order to gain economic value (Gassmann & Enkel, 2004). Typically, this is the case for the licence business. A further possibility is the investment in start-up companies. The target of the coupling is to combine the innovation potential of companies. This is practically manifested in co-operation agreements and/or via the foundation of a joint venture. The target of the outside-in process is to utilise the innovation potential of third parties for the company's own product portfolio. This fits with reduced R&D expenses and this, in turn, leads to a more efficient utilisation of financial resources.

Compared with the closed innovation approach, the outside-in process is especially important for the SI as it brings manifold chances to enhance the SI's possibilities for product differentiation. Like the coupled process, the outside-in process helps to reduce R&D expenses. But the major effect results from the fact that the outside-in process taps into the innovation potential of third parties and thus opens a space for new differentiation potentials. For example, crowdsourcing (Howe, 2006), which is a variant of the outside-in pro-

cess, offers the opportunity to gather ideas and solutions for specific product problems placed with an interested internet community. Taking the enormous potential of thousands of problem-solving contributors (which are a mix of different professional and research disciplines) into account, even the ancestral R&D potential of multinational companies (MNCs) seems to be very limited.

Gassmann and Enkel (2004) point out that the absorptive capability is most important for the outside-in process *"since many companies lack the ability to listen to their external world and efficiently process the signals received"* (Gassmann & Enkel, 2004, p. 13). Cohen and Levinthal (1990, p. 128) state that the "*ability of a firm to recognise the value of new, external information, assimilate it, and apply it to commercial ends is critical to its innovative capabilities"*. However, this requires the PO to build up a functioning network for internal and external stakeholders of the innovation process. In this context, Dierickx and Cool (1989) coined the term 'interconnectedness' which summarises the communication processes between external and internal innovation stakeholders. An example of the automotive industry for outside-in innovation is the introduction of the carbon-ceramic braking disk in the Porsche 911 at the end of the 1990s, an outside-in innovation, which exactly delivered the product characteristics promised by Porsche's brand values to the targeted customers group (Rink & Wagner, 2009). This example shows the importance of a clear value proposition to be developed by the SI (Chesbrough, 2006), who, in his 2011 work, further advocates the integration of services into companies' business models and value propositions to escape the 'commodity trap'.

The approach to differentiation via services is especially interesting for companies which operate in a highly competitive, mature market which is accompanied by low margins. The integration of services into the business model and then into a SI's value chain can create a new space of differentiation factors for SIs which, in turn, provides a company with the position of realising higher profit margins. In order to escape the commodity trap Chesbrough (2011) suggests turning the product into a platform which serves as a basis for the integration of further company services. This means that the customer experience does not end with the exchange of products but considers further customer needs. Neely (2009) describes this approach as servitisation of manufacturing and which implies the adding of services and solutions. The identification of customer needs considers the consumer or user experience. A practical example for electronic goods can be, for example, installing services, financial services or the availability of software updates during the lifetime of prod-

ucts. This means that the goods offered are customised according to individual customer needs (Chesbrough, 2009). In this regard, the objective of service innovation is to consider the total customer experience and needs as part of the portfolio offered not only the products (Chesbrough 2011). Neely (2009) uses the term servitisation which implies the shift from selling products to services and solutions via products or in association with delivered products. For example, a SI can create value propositions in the field of financing, logistics and/or manufacturing. However, services should offer a real value proposition to customers (Chesbrough, 2009). Therefore, services should solve a real customer problem and should not be seen as a 'nice-to-have feature' offering solutions that do not meet customer requirements.

In order to recognise a real value proposition, Chesbrough (2006) proposes an organisational thinking mode which enables a company to generate a value proposition based on the effects of an immediate pain-reliever. Chesbrough (2006) reasons this thinking model from an economic point of view, as customers are usually willing to pay a higher price for immediate pain-relievers. Furthermore, he points out the importance for a company to have good knowledge about the targeted market segment. This means that where a targeted market segment is concerned, a company needs to have a clear understanding of the real consumer problems and the subsequent consumer motives for buying a certain product or service.

The knowledge of a company's (a) value proposition and (b) knowledge about the customer motives of the targeted market segment form the decisive basis for outside-in innovations. In this context, knowledge about the targeted market segments needs to go beyond nominal and/or categorical statistical data like income, age, gender and the number of potential customers. Therefore, potential customer motives should be at the starting point of market research and identified customer motives should be subsequently translated into more technical language but not in the sense of giving a very detailed technical description but rather in the sense of a verbal description of essential product properties. Akao (2004), for example, systematically develops this approach with the quality function deployment process. In regard to the above outlined example of the smartphone industry, the major underlying motive of adolescent smartphone users might be to stay integrated in their social network which can be linked to the human need for love and belonging (Maslow, 1943).

In the context of outside-in innovations, the description of underlying customer motives and derived product properties should serve as an input for the product definition (cloud)

phase of the new product development process (Gassmann & Sutter, 2011). The inner value of the described and shared product properties is that the properties provide stakeholders with a clear guideline of the innovation process concerning the product attributes of interest. The involved stakeholder can assess the potential of third parties' innovation ideas concerning the contribution of defined product properties. So, manufacturers can offer solutions and not only products (Neely, 2009). Suppliers are viewed as network partners who are part of an eco-system. This requires a company-wide aligned relationship management which can potentially be driven, if well-embedded into the innovation process, by a PO (Neely, 2009). This systematic approach helps to avoid a company generating 'reactive energy' due to the investment of resources in innovation potentials that do not contribute to solving the targeted customer issue.

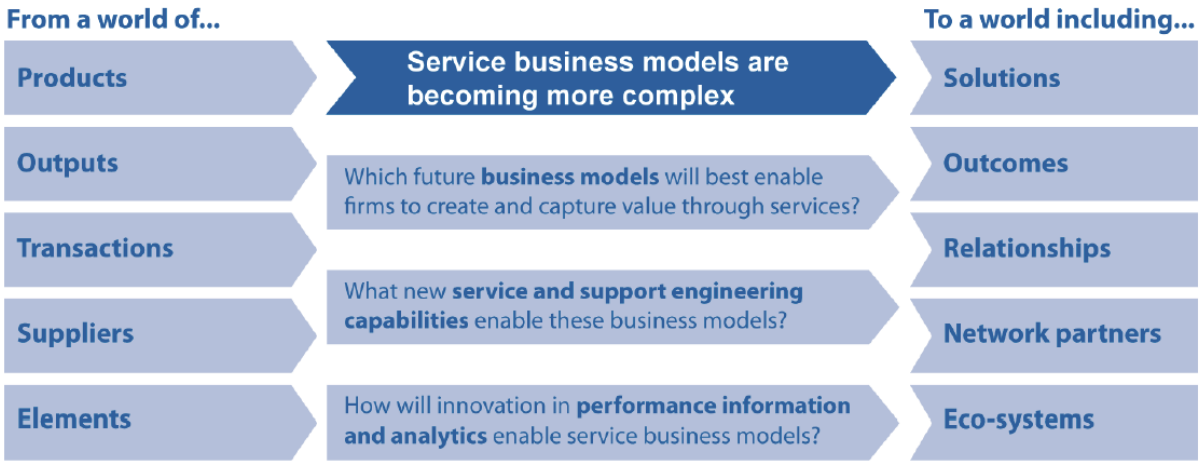



Figure 7: Describing the shift to services. Source: Neely, Benedetinni and Visnjic (2011, p. 3)

### 2.1.4 The development path of the Purchasing Organisation (PO)

The PO has taken significant development steps in the past three decades (Schumacher *et al.*, 2008). Starting as a department which just sends out orders to suppliers previously selected, mainly based on technical criteria, by R&D people, a professionalised PO can become a real leadership organisation which combines profound commercial and technical knowledge. The organisational platform is very often the so-called material-group-organisation or category-management with a purchasing member as team leader of a cross-functional team. A further indicator of the increased importance of the PO is the fact that more and more SIs are going to nominate specific board members responsible for the purchasing and supplier network (see e.g. BMW Press Release, 26th September 2007; Porsche Press Release, 15th March 2011). The increased importance of the PO is further substanti-

ated by the general approach, in the sense of the total cost principle, to have a clear and non-divided responsibility for the entire purchasing and procurement process of a company. This approach requires company management to hand over all necessary resources and powers to the PO in order to achieve the required quality, cost and time targets of the entire purchasing and operative procurement process. Therefore, for example, SIs integrate the Supplier Quality Assurance (SQA) and incoming inspection into the area of the PO's responsibility. It is obvious that the development path to a professionalised PO entails new requirements for the PO members and the purchasing tools and processes utilised. Experience in the field shows that strategic purchasers of a professionalised PO have to offer/fulfill:

a) a consolidated technical know-how concerning the material, goods and services to be procured
b) in-depth knowledge of management disciplines (e.g. cost accounting, procurement marketing)
c) good communication, networking (internal/external) and leadership skills
d) good knowledge regarding quality management, (e) willingness to make worldwide business trips
e) open-mindedness regarding other cultures
f) business-fluency (how to negotiate, knowledge of trade laws)
g) great willingness to learn new things
h) a good command of the English language.

In order to assess the Degree of Professionalism of a PO, Schiele (2007) developed an auditable model with five categories (planning, organisational structure, process organisation, human resources and leading, controlling) and four stages of maturity. Concerning the innovation planning category, the highest stage of maturity of the model requires:
(1) that the PO systematically supports product or technology development (Schiele, 2007, p. 284)
(2) that *"information about technology trends will be used through cross functional partners"* (Schiele, 2007, p. 284) and
(3) the implementation of harmonised product and technology roadmaps with cross functional agreed selected suppliers (Schiele, 2007, p. 285).

In the context of new product development, Schiele (2010) further suggests the formation of an advanced-purchasing department whose main aim is the Early Integration of the PO

into development and technology projects. In the context of the generation of outside-in innovations, it is argued in this thesis that the PO's role should go beyond the requirements of a sole support function. Based on the developed technical, commercial and networking capability of a professionalised PO this supports the opinion that the PO is well prepared to take over the leadership for the SI's outside-in innovation core process. In this connection, it is argued that the PO's development path is still in progress and has the potential to enhance its contribution concerning a firm's sustainable competitiveness.

### 2.1.5 OI and SME perspective

Academics point to the small amount of research in the context of OI and SME, and the fact that most related research concentrates on MNCs (Brunswicker & van de Vrande, 2014; Parida, 2012; van de Vrande, de Jong, Vanhaverbeke & Rochement, 2009). The following sub-chapters place the management theories of the RBV, DCBV and organisational learning discussed above into the context of SME, and further relate them to suggested roles of the PO concerning the co-ordination of outside-in innovations.

#### 2.1.5.1 Innovation capability of SMEs

Academics make reference to the positive effects of OI for SMEs in terms of technology exploitation and exploration from external sources (Brunswicker & van de Vrande, 2014; Parida, 2012; van de Vrande *et al.,* 2009). In terms of outside-in innovation, positive effects are related to the procurement of tested technologies which facilitate innovation speed and the realisation of incremental or disruptive architectural innovations (Henderson & Clark, 1990; Parida *et al.,* 2012). As a consequence of the positive effects on innovation capability, academics found that SMEs increased their Open Innovation activities (e.g. Brunwicker & Vanhaverbeke, 2014).

In the context of OI activities, vertical or horizontal technology collaboration with innovation suppliers and co-operation with external research labs and universities are considered beneficial for SMEs' innovation performance, for example, in terms of more fundamental innovations (Laursen & Salter, 2006; Lichtenthaler, 2008; Parida, 2012). Because of this, the capability to innovate is essential for SMEs to survive and realise competitive advantage (Parida 2012; Pieskä, 2012). In this connection, the management of internal and external network relations plays a crucial role in the context of OI (Brunswicker & van de

Vrande, 2014). Consequently, SMEs have to build up related managerial capabilities (Brunswicker & Vanhaverbeke, 2014). However, because of the liability of smallness (Parida, 2012), SMEs often have to cope with a lack of financial resources and necessarily higher order management capabilities with respect to the co-ordination of main Open Innovation core processes (Brunswicker & Vanhaverbeke, 2014; van de Vrande, de Jong, Vanhaverbeke & de Rochemont, 2009; Parida, 2012; Pieskä, 2012).

As argued by March (1991), organisations which develop more effective instruments for co-ordination perform better in terms of exploration of opportunities and exploitation of certainties. As far as outside-in innovations are concerned, Brunswicker and Vanhaverbeke (2014) argue that, to realise absorptive capacities (Cohen & Levinthal, 1990), external knowledge sourcing requires appropriate internal managerial processes and capabilities that support the efficient and effective organising and processing of OI innovations. To avoid destruction in the short and long term, the ratio between exploitation and exploration needs to be realised in an appropriate, context-dependent proportion (March, 2010). Relating to the RBV, Brunswicker and Vanhaverbeke (2014) argue that OI requires sufficient financial resources to experiment, which, in turn, induces organisational learning processes in SMEs. Dependent upon the creation of SME's innovative capabilities, according to Romijn and Albaladejo (2002), external sources and internal resources are decisive. The authors further argue that external sources can be tapped via networking, proximity to innovation supplier and institutional support (Romijn & Albaladejo, 2002). The utilisation of external resources reflects a basic requirement of the DCBV (Teece, 2007; Teece *et al.*, 1997). Hence, outside-in innovation potential is considered as SME's external resources.

#### 2.1.5.2 Co-ordination of the outside-in core process by the PO

Brunswicker and Vanverbeke (2014) indicate that suitable internal managerial processes are decisive for OI in SMEs. As argued by Nelson and Winter (1982) co-ordination is central to achieving *"productive organisational performance"* (Nelson & Winter, 1982, p. 104). In this process, the management of network relationships is decisive in Open Innovation for SMEs (Brunswicker & van de Vrande, 2014). However, beside a general lack of time and financial resources, especially organisational issues with regard to external networking, participation and outsourcing activities of R&D hamper the application of OI practices by SMEs (Brunswicker & van de Vrande, 2014; van de Vrande *et al.*, 2009). More specifically, van de Vrande *et al.* (2009) point out that main barriers to OI in SMEs are related to organisational and cultural issues which arise when *"SMEs start to interact*

*and collaborate with external partners"* (van de Vrande *et al.*, 2009, p 435). Practical examples are communication problems, balancing of innovation and daily tasks, alignment of partners and the general organisation of the innovation process. In more detail, alignment with partners requires formalised contracts and structured innovation portfolio management (van de Vrande *et al.*, 2009).

With reference to the required co-ordination capability of SMEs, Brunswicker and van de Vrande (2014) suggest that further research should examine in more detail how higher order managerial processes and capabilities can be achieved by SMEs, especially at the firm level. This is important as, because of scarce resources, SMEs in particular need to utilise their resources in the best possible way (Barney, 1991, 1995; Brunswicker & van de Vrande, 2014). Considering the specific context of a German medium sized SI of consumer electronics products, this research builds on the above-mentioned requirements and argues that a professionalised PO of medium sized SIs of consumer electronic products is particularly suitable to co-ordinate and drive the outside-in core process. From the RBV perspective, the utilisation of the PO is concerned with a better exploitation of internal resources in terms of transforming the PO into a VRIO resource (Barney, 1991, 1995, 2007). Thus, there is major interest in exploring EFs, the driver and causal mechanism that potentially turns the PO into a VRIO resource. From the theoretical focus of the DCBV, related EFs enable the PO to co-ordinate the outside-in core process. To foster organisational learning via the integration of external knowledge and participation, related EFs or capabilities have to be considered and embedded into the SMEs business processes (Taylor & Helfat, 2009; Teece *et al.*, 1997). In this way, related co-ordination processes of the PO extend the outside-innovation inventory which is found to increase SMEs' capability for innovation (Ridder, 2011).

Besides SME's technology scanning of the current vertical and horizontal supply base to achieve incremental innovations, more fundamental (radical) innovations can be driven by the PO's structured co-ordination of relationships with universities and research labs (Brunswicker & van de Vrande, 2014). A further aspect is concerned with the attractiveness of SMEs in terms of attracting external parties to cooperate with SMEs especially in terms of co-operation and interplay with MNCs (Brunswicker & van de Vrande, 2014). Via reverse marketing activities, the PO can actively drive forward the SME's attractiveness in order to motivate and engage innovation suppliers (Schiele, Calvi & Gibbert, 2012).

In summary, related co-ordination processes represent a higher or 2nd-order capability which is concerned with the efficient and effective co-ordination of the OI process by a professionalised PO (Brunswicker & van de Vrande, 2014; Taylor & Helfat, 2009; Sammerl, 2006).

## 2.2 Location of the research topic

This chapter locates the research topic within the PSM field and with regard to the relevant theoretical concepts of the above introduced scoping literature (sub-chapter 2.1).

### 2.2.1 Location within the PSM field

Academics recommend manifold research opportunities in the field of purchasing and supply management (PSM), for example, concerning research demand in terms of electronic and global PSM, strategic PSM and financial performance, risk management, network and relationship management (Glock & Hochrein, 2011; Schönherr *et al.,* 2012). This research is located in the PSM domain of relationship management that is mainly concerned with the issue of leveraging the supply base *"for knowledge, capability and innovation"* to maintain and respectively extend a company's competitive advantage (Schönherr *et al.*, 2012, p.18). With regard to this main issue, academic research focuses on (a) early supplier integration (for example, Calvi, Johnsen & Phillips, 2011; Handfield, Ragatz & Petersen, 1999; Johnsen, 2009; Monczka & Petersen, 2012) and (b) purchasing integration into the new product development (NPD) process (for example, Locker, 1997; Luzzini & Ronchi, 2011). Related sub-domains of purchasing integration can be categorised into the (b1) down-streamed orientated product realisation (or block building) phase and the (b2) up-streamed or superimposed product definition (or cloud) phase that is strongly related to strategic innovation/technology management (Boutellier, Gassmann & von Zedtwitz, 2007; Chesbrough, 2006; Gassmann & Sutter, 2011; Wynstra, van Weele & Axelsson, 1999). The product definition or cloud-phase is characterised by creativity concerning product definitions but also uncertainty about the real relevance of a technical feature to solve a customer problem (Gassman & Sutter, 2011). Figure 8 gives an overview of the PSM research field. The location of this research is marked in yellow (PSM field technology/innovation management).

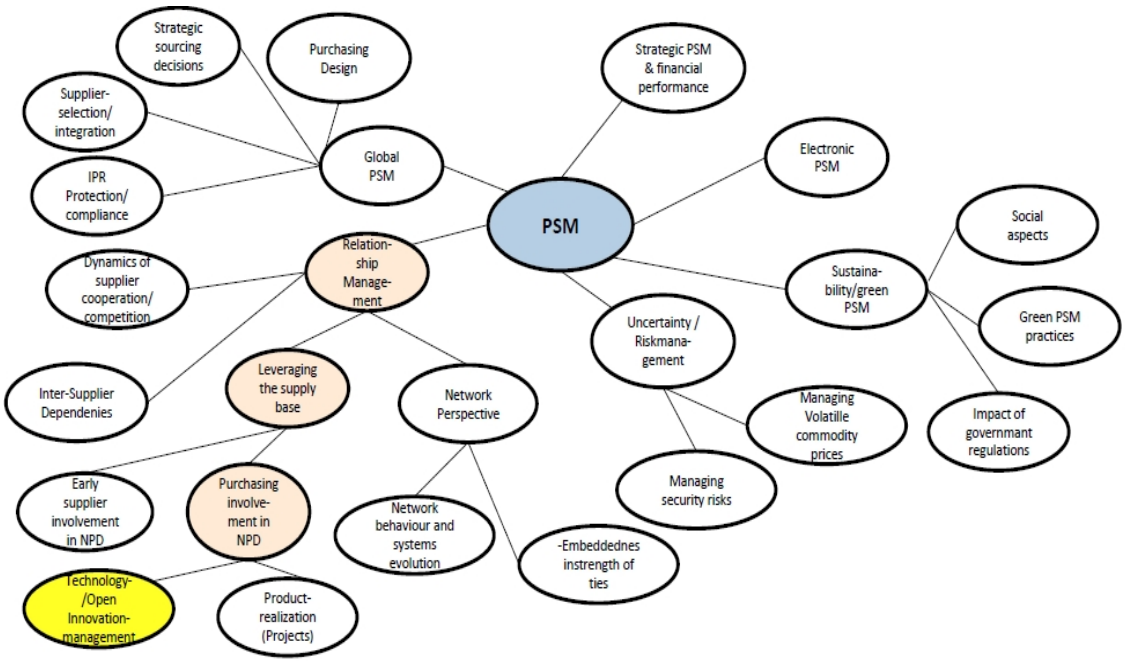



Figure 8: Location of the research topic. Partially adopted from Wynstra (1999), Schönherr *et al.* (2012) and Glock and Hochrein (2011)

### 2.2.2 Location with regard to introduced scoping literature

As described above, the study relates to the PSM field of early purchasing involvement (EPI) into innovation related to the new product development process (NPD). This sub-chapter links the study to major theoretical concepts of the scoping literature introduced above. The figure below visualises the location of the research topic management themes of Open Innovation, organisational learning, respectively the RBV and DCBV.

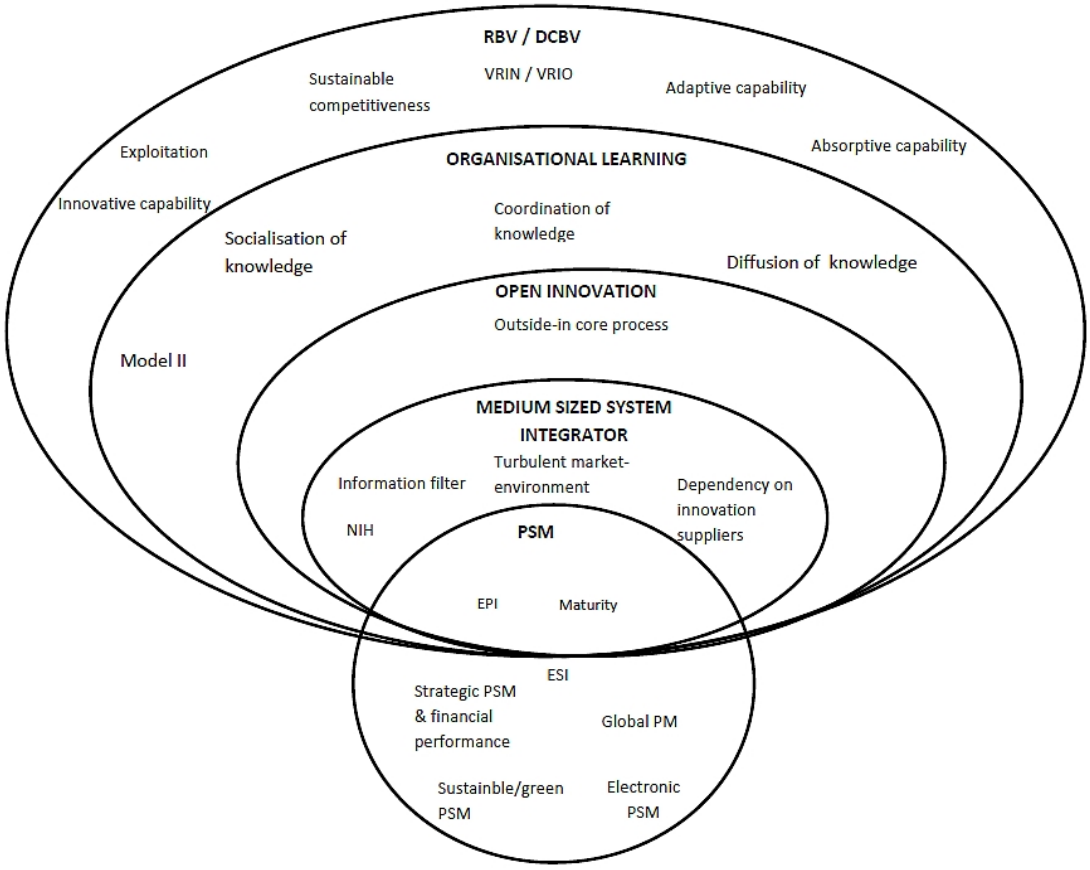



Figure 9: Location of the research topic with regard to management theories

Subject to the theoretical concepts of the purchasing literature, it is supposed that the PO needs to achieve sufficient maturity in order to become an accepted stakeholder of the innovation process. To explore this topic, this study is specifically embedded into the context of a medium-sized SI of the CEI branch which has to cope with high dependency on innovation suppliers and the potential risks of the NIH syndrome or information filters. Specific focus is put on the Open Innovation outside-in core process, which is considered a subdomain of the organisational learning tenet (Chesbrough, 2006; Gassmann & Enkel, 2004). Within the management theory of organisational learning, the study argues that a PO, if well-embedded into the innovation process, can potentially become a driver and coordinator of the innovation outside-in core process. This, in turn, supports the generation of knowledge and knowledge diffusion between internal and external stakeholders of the innovation process. However, as stated by Nonaka and Takeuchi (1995), the socialisation process of tacit knowledge requires that experts are willing to share or demonstrate tacit information. Especially in complex markets, the knowledge socialisation process is expected to be supported by an innovation stakeholder behaviour that is encompassed by the principles of the Model II theory (Argyris & Schön, 1978). Overall, the study is based on the

theoretical concepts of the RBV or the DCBV. To achieve sustainable competitive advantage, organisational learning and the sub-discipline of Open Innovation (OI) are considered as means or levers to exploit the resources of a medium-sized SI more comprehensively. The target to better exploit available resources is two-fold and applies to (a) the effective tapping of external innovation potential and (b) the better exploitation of the PO as company resource. The co-ordination of the outside-in core process by the PO is expected to increase the level of outside-in innovations, a higher level of which is expected to improve the absorptive, adaptive capability and innovative capability that, in turn, should contribute to achieving the target of sustainable competitive advantage (Wang & Ahmed, 2007). In this way, the effective embedding of the PO into the innovation process reflects an approach to meet the VRIO characteristics.

These considerations form the basic understanding applied to the subsequent database search that was specifically concerned with the identification of Enabling Factors.

## 2.3 Analysis of literature with regard to Enabling Factors

The subsequent database search aimed to identify and substantiate the Enabling Factors included in the PO's effective integration into the innovation outside-in process. In this process, the establishment of qualitative criterion for the selection of research papers, as also used in systematic reviews of literature, was applied. The systematic review approach has its roots in the medical and healthcare domain (Davis & Nutley, 1999, as cited in Tranfield *et al.*, 2003) and attempts to accelerate the dissemination process of the latest high quality, evidence-based research. This study applies the idea of a stepwise procedure and principle of continuous corroboration during the research process. However, a fully applied systematic review was beyond the scope of this research for several reasons, such as the cost of a comprehensive review with an expert team, which would have far exceeded the budget available for this research. The objective of the database search was to identify and substantiate academic papers that discussed noteworthy themes (Enabling Factors) which provide insights concerning the PO's effective integration into the innovation outside-in process. In this process, the establishment of qualitative criteria for the selection of research papers, as applied in systematic reviews of literature, was instituted. As argued by Clegg (2005), theoretical evidence is not solely increased by constant accumulation of sifted academic research papers that confirm (or not) certain viewpoints. Rather, evidence should be

gleaned via evidence-based exploration of relevant (enabling) factors, their functioning principle and potential events (Clegg, 2005). To put it another way, and subject to explorative studies, as soon as a researcher has the opinion that no significant increase of evidence can be achieved further via the data collection of academic papers, the identified and noteworthy themes can be considered as sufficiently substantiated (Guest *et al.*, 2012). This mindset can be compared with the economic principle of diminishing marginal returns. In order to keep the literature review verifiable, a stepwise database search was conducted in the following order:

(1) definition of search strategy
(2) conducting the review and quality assessment
(3) overview of search results and
(4) data coding, synthesis and interpretation of results.

### 2.3.1 Search strategy for further academic papers

Subject to the identification of relevant academic papers, there were no restrictions concerning basic research philosophies and the applied research approaches of the strategies of the selected studies. This means that the bandwith of potential academic papers ranged from positivistic to interpretative based studies. Anyway, due to the vast majority of academic papers in the field of innovation management and to ensure that high quality academic papers are considered, the following selection inclusion/exclusion criteria for eligible research studies were defined at the outset of the database search. The following table displays the detailed inclusion/exclusion criteria:

| Parameter | Inclusion Criteria | Exclusion Criteria | Why excluded? |
|---|---|---|---|
| Location | Europe, USA, Australia, Asia | Others | Focus on countries with a mature industrial sector |
| Language | German, English | Other languages | Author of this review has to understand them |
| Timeframe | From 1998 for data base search.<br><br>No limitation for literature which is based on expert information, hand searching. | Before 1998 (data-base search) | Literature must be up-to-date |
| Study type | Quantitative and qualitative research design. Literature reviews | None | - |
| Industrial sector | High tech industry/medium high tech industry | Low tech industry | Low tech industries have rather stable market conditions. This requires lower level of PO professionalism |
| Full Text Availability | Complete journal article / e-book is directly available via the selected databases | Only abstract is available | EBSCO / Emerald are expected to provide full text service for papers considered as principally qualitative |
| Journal paper structure | Clearly defined aim and conclusion that fits the aim | Conclusion does not fit the aim | Indicates low quality of the selected paper |
| Reference list | Substantial body of references | Only a few references | Indicates that the author has not engaged himself in the given research work |
| Further sources | Conference papers from year 2000 on | Conference papers before year 2000 | Contemporary issues/topics will be integrated |

Table 1: Inclusion/exclusion criteria of citations N/A = not applicable, X = applied

### 2.3.2 Review of selected papers and quality assessment

The main aim of this step was to identify academic papers that substantiate (or not) and respectively deliver further insights concerning the hitherto identified Enabling Factors. Where the database search is concerned, a group activity of the author's Munich 7 cohort on 27th July 2012 generated the following keywords: purchasing department, innovation, outside-in innovation, organisational design, organisational setting success factor, new product development, matrix-organisation, change management, customer integration. Furthermore, the search terms 'tacit knowledge' and 'knowledge' were used. As mentioned above, further papers could be identified by studying the reference list of selected academ-

ic papers. Based on the above delineated search strategy and quality criteria, a selective database search was conducted in the next step. Finally, 27 academic publications could be identified via a database search and six academic papers were manually selected. Thus, a total of 33 relevant academic papers were subject to the next step: analysis of selected academic papers. Annex I gives an overview of the selected papers and respective themes (i.e. Enabling Factors).

### 2.3.3 Identification of Enabling Factors

In health education, Enabling Factors are defined as "*factors that make it possible (or easier) for individuals or populations to change their behaviour or their environment. Enabling Factors include resources […], conditions of living, social support and the development of certain skills*" (Open University, LabSpace, 2014). Wynstra, Axelsson and van Weele (2000, p. 130) define Enabling Factors as conditions that affect and facilitate the PO's integration into new product development thus, making it possible for the purchasing function and its members to actively and responsibly co-ordinate and drive the outside-in innovation management process of technology suppliers and/or service providers. In line with Matthyssens, Quintens and Faes (2003), state that the terms 'driver' that represents facilitating conditions and 'inhibitors' that represent impeding conditions are used. As indicated above, drivers and inhibitors, in the sense of this study, represent formative conditions of the Enabling Factors. Deviating from Matthyssens *et al.* (2003), this study views inhibitors as opposite conditions of drivers and not as separate conditions.

As a first step, the project 'purchasing and outside-in innovation' was launched in NVivo 10. Furthermore, one node was created for each of the Enabling Factors. Of the 33 selected papers, 27 were available in digital form, with titles subjected to interpretative thematic analysis (Guest, MacQueen & Namey, 2012). The thematic analysis method is introduced in sub-chapter 3.3.5 and NVivo10 in sub-chapter 3.3.6. Concerning the other 6 titles, attribution of relevant insights was directly incorporated to the subsequent analyses of selected literature (sub-chapter 2.3.4). In the subsequent interpretative coding process (Guest, MacQueen & Namey, 2012), citations of the identified academic papers were attributed to the respective nodes. Within the above delineated substantiation and significance of themes respectively Enabling Factors, the maturity level of 20 references that substantiate (or not) the identified EFwas determined. This means that, as soon as a minimum of 20 academic references were attributed to the respective Enabling Factors, the respective Enabling Factor was considered as sufficiently substantiated and that further references, economically speaking, would deliver negligible marginal revenues for the reasons of data analysis. In this way, the 8 Enabling Factors (1) External Interconnectedness, (2) preferred customer status process, (3) Management Commitment, (4) Internal Interconnectedness, (5) Early Integration into Product Planning, (6) Degree of Professionalisation of the PO, (7) Innovation Management System and (8) Open-minded Relations based on Trust, could be identified. The table below gives an overview.

| Enabling Factor (i.e. themes) | Sources | Reference | Maturity level |
|---|---|---|---|
| Management Commitment | 13 | 33 | >20 |
| Degree of Professionalisation of PO | 17 | 61 | >20 |
| Open-minded Relations based on Trust | 14 | 50 | >20 |
| Internal Interconnectedness | 18 | 51 | >20 |
| External Interconnectedness | 17 | 77 | >20 |
| Innovation Management System | 13 | 41 | >20 |
| Early Integration into Product Planning | 13 | 28 | >20 |
| Preferred Customer Status Process | 8 | 21 | >20 |
| Total | | 362 | |

Table 2: Overview of coding results and maturity level

The following sub-chapters discuss critically the major findings of the references identified for each of the Enabling Factors. Then, a structure of causal explanation (Sayer, 1992) will be devised that further supports the definitions of assumptions subject to decisive Enabling Factors for the effective integration of the PO into the innovation outside-in process.

### 2.3.4 Analyses and description of Enabling Factors

#### 2.3.4.1 EF1: External Interconnectedness (EI)

##### 2.3.4.1.1 Academic references and general considerations

From a total of 27 selected and coded academic sources, 17 sources could be linked to the theme (Enabling Factor) ‘External Interconnectedness’ (EI). The pre-determined maturity level of 20 empirical references was achieved, as a total of 77 references were assigned to the ‘External Interconnectedness’ Enabling Factor, to which different text passages from four sources of the scoping literature could be linked.

The term ‘External Interconnectedness’ covers all actions of the PO which targets implementing a functioning network to existing and prospective 3rd party organisations of selected industrial sectors. External Interconnectedness is the concrete realisation of a SI’s adaptive and absorptive capability (Hurley & Hult, 1998; Wang & Ahmed, 2007) and has foundational links to the managerial tenets of organisational learning and the resource-based or dynamic capability based views. External Interconnectedness comprises not only the absorption of objective and codified knowledge but also the absorption of tacit knowledge (Petersen, Handfield & Ragatz, 2003). In this regard, Nijssen, Biemans and de Kort (2002) highlight the importance of strategic alliances with existing and new external partners and their innovation input. In particular, new suppliers can open up the opportunities for the PO to be involved in the new product development process.

2.3.4.1.2 Networking and absorption of external know-how

Matthyssens, Quintens and Faes (2003) identified the value of global networks based on the supporting activities in the value creating process and further highlight the importance of open and cross-divisional communication (internal/external networks) as a critical success factor for the global purchasing process. Dooley and Sullivan (2007) outline the learning, cost and timing effects implicit in core competence amalgamation of collaborations and further argue that no company has the “*internal capability to scan all areas of innovative opportunity within the sector*” (Dooley & Sullivan, 2007, p. 400). Matthyssens *et al.* (2003) support the positive effects on company learning processes which are embedded in an innovation network. The target of External Interconnectedness is to secure in time the availability of technologies and services which are intended to create sustainable competitive advantage, if integrated into the SI’s products. This is especially important in the case of turbulent technology markets, which are linked to a high level of uncertainty concerning the main features of future products. External Interconnectedness reduces the uncertainty in rapidly changing markets (Petersen, Handfield & Ragatz, 2003) and provides, in turn, certainty concerning new technology trends. This is supported by Glock and Hochrein (2011) who state that complexity induces uncertainty with the decision makers and, therefore, increases the need to tap information from external sources. Phillips *et al.* (2006a, p. 452), outline the concept that especially discontinuous innovation *“is shrouded in uncertainty”*. In order to tackle uncertainty in the context of innovation, entrepreneurial courage has to stimulate the SI’s management to build up and maintain a functioning external network but also the ability, to establish a swift contact management process in case SIs face

emerging disruptive innovations. This context is also outlined by Calvi *et al.* (2011) and Phillips *et al.* (2006a) who state in summary that the ability to cope with disruptive or radical innovations via strategic supplier alliances is rather based on short-term actions and flexible organisational behaviour. In the case of incremental innovations, the focus lies rather on the maintenance of good relationships (Handfield *et al.*, 1999) with the existing and established supplier network and the careful in-time integration of the supplier in the new product development process (Calvi *et al.*, 2011; Petersen *et al.*, 2003). Gassmann and Enkel (2004) point to the positive effects of cross-over innovations. Therefore, related to a SI's ability to build up relations to technology owners in time, careful monitoring of emerging new technologies is decisive. Phillips, Lamming, Bessant and Noke (2006a) found that companies build up networks across industry sectors and with universities in order to cope with discontinuous innovation. Petersen *et al.* (2003, p. 53) further suggest that *"familiarity with a supplier makes it easier to involve their people on NPD teams, as they are more likely to be considered as family members"*. Familiarity within a supplier network, in turn, facilitates the open sharing of cost and technology information (Petersen *et al.*, 2003) also due to the reason that large suppliers play a major role concerning market research activities (Pressey *et al.*, 2009).

#### 2.3.4.1.3 Configuration of the PO

Some authors relate to the topic of uncertainty in the context of innovation management and state "*therefore, we can reasonably conclude that innovation constitutes a relevant source of uncertainty and that successful innovation will require adapting the Purchasing Organization to such an uncertain environment*" (Luzzini & Ronchi, 2011, p. 15).

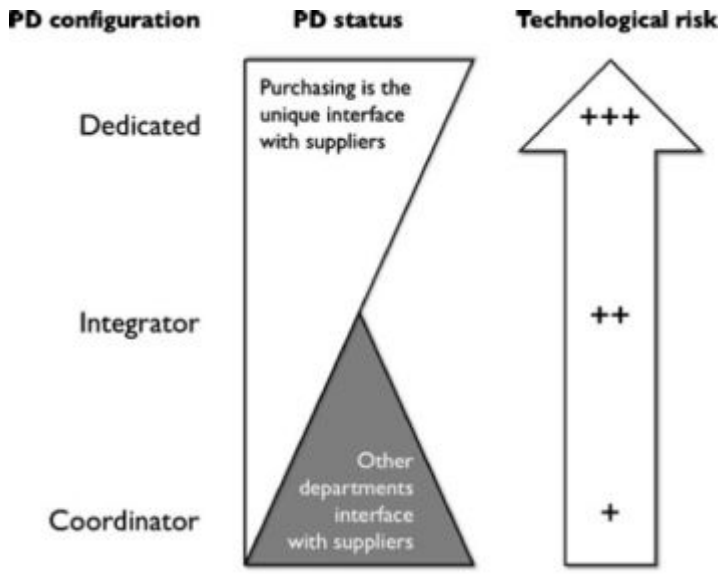



Figure 10: Summary of PO configurations. Source: Luzzini and Ronchi (2011)

The figure above illustrates the possible role of the PO configuration dependent on the technological risk and related uncertainty. Similar to the researcher's experience in the field, Luzzini and Ronchi (2011) emphasise the role of the PO in the context of relationship management and further propose that the PO should act as a unique interface in the case of high technological risks and the related high level of uncertainty. Schiele (2010) states, that the PO can act as a moderator concerning a firm's general openness towards supplier ideas and supplier involvement in the new product development process and further affirms that, as soon as relations are established, other departments can act as an interface. This implies that the PO should obtain authorised ownership to build up and maintain the network to innovation suppliers. Foremost in the context of disruptive innovation management, the PO needs to build up the capability for fast contact and contract management. The capability for fast contact and contract management is especially supportive in the context of disruptive innovations which may require building up and forging relationships to new suppliers at short notice (Nijssen *et al.*, 2002). Schiele *et al.* (2011) further found that, subject to competitive advantage, buyers recognise ever more the importance of close relationships with strategic suppliers and key persons. In this vein, a professionalised PO potentially can take over the entrepreneurial role (Schumpeter, 1934) which implies building up and maintaining a functioning, effective innovation network. This aspect leads to the question of appropriate organisation structures to ensure External Interconnectedness. Boutellier (2007) proposes the implementation of listening posts and matchmakers located within relevant technology clusters. Listening posts and/or the matchmaker have the main

task of recognising and monitoring technology trends and building up relations to key players in time.

#### 2.3.4.1.4 Strategic supplier selection

Bessant, von Stamm, Moeslein and Neyer (2010) dwell on the issue of supplier selection in the context of disruptive innovation strategies and further dwell on the question that innovation practices could remove uncertainty for selected innovation projects *"outside the box of prior experience"* (Bessant *et al*, 2010). Subsequently, the authors identified three clusters of innovation practices which are:

(a) to enable the organisational process, for example, via alternative decision making processes

(b) to engage individuals, for example, via the mobilisation of networks inside and outside the firm and

(c) to experiment, for example, via the probe and learning approach in small steps (Bessant *et al.*, 2003).

Boutellier *et al.* (2007) further depict the importance of social contacts, for example to key people operating in technology clusters. This insight is supported by Seidler-de Alwis and Hartmann (2008), who found that relational governance is strongly associated with knowledge acquisition. Ragatz, Handfield, Petersen (2002, as cited in Schiele & Veldman, 2011) point to the reduced importance of existing supplier relations in the context of disruptive innovations. Concerning the innovation co-operation of German companies with their suppliers, Schiele (2010) noted that innovation suppliers are mostly distributed in a radius of 400 kilometres around companies. In order to realise geographical proximity to worldwide innovation clusters, Bessant *et al.* (2010, p. 350) propose the "*setting up of external ventures where incubation can take place*". This approach can be realised, for example, via international procurement offices or the foundation of legal entities whose principal place of business is in the geographical area of the innovation clusters (Glock & Hochrein, 2011). Geographical proximity is also supported by Huang and Rice (2013) who outline the objective of establishing a *"thick network of knowledge sharing through effective communication"* (Huang & Rice, 2013, p. 106). In order to secure technological access to cutting edge key technologies, the SI can further pursue financial participation in innovation suppliers or even buy the entire companies. However, a hard financial long-term engagement with innovation suppliers only meets the target of securing future incremental innovations of given architectural key technologies. Therefore, in order to cope with dis-

ruptive innovations, SIs should further apply the strategy of embedding themselves, for example, in cross-sectoral learning networks (Phillips, Noke, Bessant & Lamming *et al.*, 2006b). Fuhl (2006) defines this strategic approach with the example of Korean MNCs, which are tightly networked with suppliers and universities. Thus, equipped with knowledge about disruptive innovations, the SI can even enter a new firm's trajectory (Bessant *et al.*, 2010).

#### 2.3.4.1.5 Definition of EF1: External Interconnectedness (EI)

The term '**External Interconnectedness'** reflects how closely a purchaser is connected with a network of relevant innovation suppliers and further summarises all actions conducted by the purchasing function to build up and maintain a functioning network with existing and prospective suppliers selected for the purpose from industrial sectors. External Interconnectedness pursues the best possible barrier to free access to the purchasing function to innovation technologies, for example, via strategic and long-term partnerships to suppliers or the implementation of listening posts that are located within technology clusters.

### 2.3.4.2 EF2: Preferred Customer status Process (PCP)

#### 2.3.4.2.1 Academic references and general considerations

From a total of 27 selected and coded academic sources, eight could be linked to the theme (Enabling Factor) 'Preferred Customer status Process' (PCP). The pre-determined maturity level of 20 empirical references is achieved, as a total of 21 references are assigned to the 'preferred customer status process' Enabling Factor. Furthermore, different text passages from two sources in the scoping literature could be linked to the theme 'Preferred Customer status assessment Process'.

Preferred Customer status is a basic requirement to obtain access to the latest innovations of current and prospective key technology suppliers and, therefore, directly links to the managerial tenets of the resource-based or dynamic capability based views with an objective which is the sustainable exploitation of supplier resources and capabilities. Furthermore, the aim of in-time organisational learning processes can only be realised if the latest technology information (for example, technology roadmaps and specifications) are unveiled to the SI early.

#### 2.3.4.2.2 Early access to external innovation potentials

It is argued in this thesis that the SI's Purchasing Organisation, which depends on a third party's innovation technologies, has to build up an assessment process which identifies the current and prospective customer status from the reflected viewpoint of the respective suppliers. Without such preferred customer status, the SI will not obtain access to the latest innovative technologies of the targeted innovation suppliers. Furthermore, the SI might have disadvantages concerning the commercial conditions offered. Concerning the outside-in core process (Gassman & Enkel, 2004), the assessment process needs to take into account the prospective customer status, as the respective innovation supplier possibly does not belong to the current supplier portfolio, for example in the case of disruptive innovations. In this connection, Schumacher *et al.* (2008) point out that strategic supplier management has to consider the preferred customer aspect. Based on the identified customer status, the PO needs to enter into appropriate measures, such as purchasing marketing which intends to make prospective co-operation with the SI attractive to the respective innovation supplier. This insight is supported by Schiele, Veldman and Hüttinger (2011), who conclude that "*if the buyer is sufficiently interesting to the supplier, the latter will not abuse his position of power*" (Schiele *et al.*, 2011, p.7), further stating that "*a firm has preferred customer status with a supplier, if the supplier offers the buyer preferential resource allocations*" (Schiele *et al.*, 2011, p. 8). Fuhl (2006) supports the importance of the preferred customer status which can be derived from his finding that the suppliers of the Korean MNCs Samsung and LG are proud to be rewarded as suppliers of these corporations. Monczka *et al.* (2010) explicitly named the preferred customer status as a success factor to accelerate the speed of innovation. If an SI has not achieved preferred customer status, it cannot be expected to gain sufficient support concerning the timely access to innovative technologies, as well as services (Chesbrough, 2011). Therefore the PO needs to investigate, at the very outset of a targeted business relation and in line with the principles of the RBV and the DCBV, whether and/or how the SI can achieve preferred customer status from the targeted key supplier and/or other targeted 3$^{rd}$ party organisations. If the Innovation Supplier does not allocate sufficient resources to the SI's innovation projects, the respective SI should, from mid and long-term competitiveness aspects, seriously question whether the co-operation with the respective innovation supplier does in fact make sense. If direct competitors obtain earlier access to innovation technologies and/or achieve a higher resource allocation for their innovation projects, it might be better for the SI to stop its efforts to build up the business relationship and to concentrate on an alternative technology solution with an al-

ternative supplier. This insight matches with Peterson *et al.*'s (2003) conclusion that new product development projects require a detailed formal evaluation and selection of potential suppliers prior to considerations of involvement.

#### 2.3.4.2.3 Categories for evaluation of suppliers

Concerning the preferred customer criteria, Handfield *et al.* (1999) support the need for thorough analyses of the supplier capability analysis. Lakemond *et al.* (2006) advise taking not only short-term but also long-term drivers into account depending on the degree of diverging expectations and long-term collaboration intentions. Calvi *et al.* (2011) refer to the literature review conducted by Johnsen (2009) who identified, in the case of incremental innovations:

(1) supplier selection
(2) supplier relationship and development and
(3) internal customer capabilities

as the three main success factor categories for the involvement of suppliers into the new product development process. These categories can be utilised for the assessment of customer status for prospective innovation suppliers and further set the base for appropriate measurements. Johnsen (2009) detailed the selection criteria for every category of success. The supplier selection category includes early supplier involvement, definition of roles and innovative supplier capability and complementarity (Johnsen, 2009). The supplier relationship and development category includes, for example, the common trust level, shared performance targets, allocated resources such as supplier representatives at the customers' premises, mutual commitment and no abuse of power (Johnsen, 2009). The internal customer capabilities include top Management Commitment to the supplier and the cross-function co-ordination (Johnsen, 2009). Monczka, Scannel and Carter (2010) identified trust as one the most critical success factors, which means, in turn, that an innovation supplier might not really attribute preferred customer status to the SI if a sufficient level of trust cannot be achieved. Concerning allocating resources to the customer, Petersen *et al.* (2003) note that companies find collocation of suppliers and customers extremely effective in the design phase of projects which means in turn, that a SI needs to establish at an early stage whether innovation suppliers will commit themselves to collocate key personnel during the innovation phases for example, at the customer premises.

#### 2.3.4.2.4 Definition and tendency of EF2: Preferred Customer status Process (PCP)

The term '**Preferred Customer status Process'** relates to a purchasing process with which the purchasing functions judge the current and achievable customer status granted by a certain innovation supplier. Furthermore, the Preferred Customer status Process will initiate and monitor proper actions with which the purchasing function attempts to gain and maintain its preferred customer status. The customer status indicates to what extent a supplier is willing to integrate its customer into the development of new technologies. Customers with a high customer status (preferred customers) are regularly integrated earlier into new technologies and enjoy a higher resource allocation for their new product development projects.

### 2.3.4.3 EF3: Management Commitment to the PO (MC)

#### 2.3.4.3.1 Academic references and general considerations

From a total of 27 selected and coded academic sources, 13 sources could be linked to the 'Management Commitment (MC) to the PO' theme (Enabling Factor). The predetermined maturity level of 20 empirical references is achieved as a total of 33 references are assigned to the 'Management Commitment to the PO' Enabling Factor. Furthermore, different text passages of one source of the scoping literature could be linked to the Management Commitment theme (Enabling Factor).

The 'Management Commitment to the PO' Enabling Factor has links to managerial tenets of the RBV and DCBV. Management Commitment to the PO stimulates the PO's entrepreneurial responsibility in the context of outside-in innovation management (Schumpeter, 1934; Phillips *et al.*, 2006b) and describes the degree of top management real intention and conviction to integrate the PO in the innovation-management process. This includes, for example:

(1) the top management's willingness to integrate the PO into the SI's strategy planning process

(2) to allocate sufficient resources to the PO

(3) the formal description of the PO's tasks, mission and responsibility in the innovation-management process, as well as exemplifying top management's commitment to the PO through everyday business life (Petersen *et al.*, 2003, Phillips *et al.*, 2006b, Schiele, 2007, 2010; Seidler-de Alwis & Hartmann, 2008, Schumacher *et al.*, 2008).

#### 2.3.4.3.2 Hierarchical position of the PO

Matthyssens *et al.* (2003) consider Management Commitment as a critical parameter for international sourcing, which can be viewed as a parent category of the innovation outside-in sourcing. Matthyssen *et al.* (2003) further allude to the importance of the PO being placed at a high level of the structure of the SI's organisation. The hierarchical localisation of the SI's organisational diagram indicates the status of the PO within the SI's organisation and further reflects the level of Management Commitment to the PO (Matthyssens *et al.*, 2003; Luzzini & Ronchi, 2011). A direct reporting line to the top management indicates the PO's high status within the SI's organisation. It can be further recognised, that more and more SIs establish dedicated Chief Purchasing Officers (CPOs) as board members. This can be regarded as a sign of the highest level of Management Commitment to the PO and the PO's role in the innovation process (Luzzini & Ronchi, 2010; Glock & Hochrein, 2011). The latter summarise the PO's hierarchical position under the term PO 'configuration' and find that "*many authors agree that the position of an organisational unit helps to assess the status this unit enjoys in the organisation and the degree this unit may influence decisions on the strategic and tactical level*" (Glock & Hochrein, 2011, p. 156). Schiele (2007) views a direct reporting line of the purchasing function to the executive board as the highest maturity level for the strategic integration of the PO. This means, in turn, that if the PO of a SI is just visible at the lowest organisation level, it is obvious that the PO does not have high priority/acceptance granted by the top management. This insight is further supported by Matthyssens *et al.* (2003) who found that POs with top management support for the implementation and follow-up of global sourcing activities generate better results.

#### 2.3.4.3.3 Process description and responsibilities

Seidler-de Alwis and Hartman (2008) refer to the necessity of an organisational fit between reward systems, structures and organisational roles along with socio-cultural factors such as power relations. This means that it is not enough that the SI's management just attributes the outside-in innovation management role to the PO. It is very important to align:

(1) resource allocation
(2) expected responsibility and
(3) the delegation of powers and responsibilities to the PO.

It has to be assessed whether top management has given a formal task description to its PO, which clearly describes the PO's role as the major responsible interface to the SI's external environment of interest, especially in the case of uncertainty resulting from a high technological risk (Luzzini & Ronchi, 2011). In more detail, management should make clear that the PO has the main responsibility for professional supplier relationship management. This includes, as indicated by the comfort level, the target of creating familiarity between supplier and customer team members. A high comfort level facilitates early technology sharing in the innovation process (Petersen *et al.*, 2003) who further propose managing strategic supplier relations in a way that key people of strategic innovation suppliers develop the feeling of being a kind of family member. In the light of past experience, this thesis entirely agrees with Petersen's (2003) proposal.

It is further argued that PO leaders have to recognise professional relationship management, in the context of outside-in innovation management, as one of the PO's important tasks in the future. This requires a systematic approach and includes the sub-task of identifying cultural practices before entering into deeper business talks. To give a practical example, for co-operation with Asian innovation suppliers the utilisation of a well-accepted intermediary plays an important role. Without the SI's management's formal nomination of the PO for the outside-in innovation process, the engagement of the PO in the SI's innovation process rather depends on the individual engagement of PO members. For this reason, the SI's management has to grant formal management authorisation to the PO in order to clearly inform other functions and departments involved in the innovation management process about the PO's responsibilities and powers for the outside-in innovation process. Along these lines, Matthyssens *et al.* (2003) advise that the strategic vision of global purchasing has to be written in the company's strategy.

The formal nomination of the PO should also encourage other departments, like R&D and marketing, to actively involve the PO in the active creation, sharing and use of knowledge between product developing departments and the respective employees of these departments (Seidler-de Alwis & Hartmann, 2008). Unclear objectives and responsibilities decrease the collaborative willingness of departments to manage the necessary innovation knowledge exchange together (Dooley & Sullivan, 2007), and as other departments might always question the PO's responsibility as a driver organisation for the outside-in innovation management process, might hamper the exchange of tacit knowledge with the PO (Seidler-de Alwis & Hartmann, 2008).This would lead, in turn, to demotivation processes

in the PO. This insight is confirmed by Kotteaku *et al.* (1995, as cited in Glock & Hochrein, 2011) who recommend that in order to handle complex products effectively, purchasing managers have to devise a concept that describes communication channels, authority, status and workflow within a purchasing process. A formal assignment of the outside-in innovation responsibility of the PO grants the necessary legitimation to the PO to obtain access to other specialist departments in the context of outside-in innovations.

Nijssen *et al.* (2002) point out that a company's management demonstrates support to the PO by emphasising the PO's contribution to the value creation process and a higher organisational placement, thus stimulating the interaction with other business functions. Management Commitment is also identified by Ragatz, Handfield and Scannel (1997) and Johnson (2009) as a success factor for purchasing integration into the innovation process and early supplier integration (Johnsen, 2009, as cited in Calvi *et al.*, 2011; Ragatz, Handfield & Scannel, 1997). Nijssen *et al.* (2002) identified top management support as a major driver for involvement into the new product development process, which indicates similar importance for the PO's involvement in the outside-in innovation process.

##### 2.3.4.3.4 Definition of EF3: Management Commitment (MC)

The term '**Management Commitment** to the purchasing function' expresses the degree to which management holds the purchasing function responsible as the key driver and co-ordinator for the strategic supplier and outside-in innovation/technology management. Depending on a company's dependency on external technology sources, the responsibility of the purchasing function can be scaled by the management from just being responsible for operational procurement up to an organisational unit, which co-ordinates and drives the advanced technology/innovation supplier management.

### 2.3.4.4 EF4: Internal Interconnectedness (II)

#### 2.3.4.4.1 Academic references and general considerations

From a total of 27 selected and coded academic sources, eighteen could be linked to the theme (Enabling Factor) 'Internal Interconnectedness'. The pre-determined maturity level of 20 empirical references is achieved, as a total of 51 references are assigned to the Enabling Factor affecting Internal Interconnectedness. Furthermore, different text passages from four sources in the scoping literature could be linked to this theme.

The term Internal Interconnectedness subsumes the possibility of the PO to exchange, in terms of teamwork, information with the SI's specialty departments responsible for the creation of the product specifications, for example, to product marketing and R&D. Internal Interconnectedness is linked to the managerial tenet of organisation learning and the organisation's absorptive capabilities which depend on the transfer of knowledge across and within sub-units (Cohen & Levinthal, 1990). A high level of in-house competences facilitates the learning effects from the environment (Cohen & Levinthal, 1990). In this context, scholars refer to team structures as an appropriate organisational form (e.g. Bessant *et al.*, 2010, Bresman, 2002, Phillips *et al.*, 2006b).

#### 2.3.4.4.2 Teamwork and learning

Team structures can work successfully if sufficiently endowed with resources, decision-making authority and effective team leadership (Glock & Hochrein, 2011; Yeow & Edler, 2012). Gonzales-Padron, Hult and Calantone (2008) identified the significant relation between teamwork and learning orientation and entrepreneurial innovation and further state that *"many scholars support the link between teamwork, learning, and entrepreneurial innovation"* (Gonzales-Padron *et al.*, 2008, p. 72). Process-based team structures facilitate cross-functional communication or knowledge-sharing processes, flexible decision making (Argote & Ren, 2012; Bresman, 2002; Calvi *et al.*, 2011), creativity (Seidler-de Alwis & Hartman, 2008) and unfold "*strong positive effects on the relationship between organisational learning and purchasing information processing*" (Hult *et al.*, 2000, p. 317). Hurley and Hult (1998) further suggest that "*when members of a group are encouraged to learn and develop and able to influence group decisions, the group has more innovativeness*" (Hurley & Hult, 1998, p. 51). Innovativeness signifies that relevant tacit knowledge can be identified in organisations (Seidler-de Alwis & Hartmann, 2008). Furthermore, a wide lateral involvement of different specialist departments and the vertical involvement of hierarchical levels (Glock & Hochrein, 2011) is supposed to reduce uncertainty, which is a main characteristic of the early innovation phase (Gassmann & Sutter, 2011). Schiele (2006) further found that "*cross-functional collaboration is one of the key issues in our [the PO's] maturity profile*" (Schiele, 2006, p. 282). Senge (1990) points out that teamwork leads to a shared vision and fosters team learning. This is in line with Monczka *et al.* (2010), who propose that a company-wide innovation strategy and integrated supply innovation strategy accelerates the innovation process.

The realisation of a shared vision and team-learning processes are antecedents of organisational learning (Senge, 1990). Seidler-de Alwis and Hartmann (2008) further point out that unclear goals inhibit tacit knowledge transfer. In this vein, Boutellier and Wagner (2009) recommend that it is the task of strategic procurement to formulate the selection of appropriate sourcing concepts. Bresman (2002) concludes that the extensive search for complex core technologies is coupled with successful teams with intensive communication and flexible decision-making. In the context of out-side-in innovations, the learning effects sharpen the purchaser's intuition concerning interesting technical features which might contribute and fit a company-wide shared brand vi-sion and mission. Finally, Internal Interconnectedness ensures that the PO can continuously exchange cost information with suppliers and vice versa (Petersen *et al.*, 2003).

2.3.4.4.3 Absorption of supplier know-how

Nijssen *et al.* (2002) suggest that the involvement of the PO into the new product development process relates to the integration of PO members into the new product development team. Similarly, Locker (1999) alludes that the absorption of supplier know-how can only be successful if the collaboration of R&D and procurement functions smoothly. Integrated into teamwork, the PO can take over ownership for internal co-ordination and processing of critical innovation knowledge (Bresman, 2002; Calvi *et al.*, 2011, Matthyssens *et al.*, 2003). Luzzini and Ronchi (2010) point out the need to integrate the PO with other functions and further describe the PO's role as integrator, whose peculiar characteristics are:

(a) that the PO is the main interface to suppliers which foster a clear, transparent, and trustworthy relationship, and
(b) the PO's role to co-ordinate other departments.

This is in line with Crozier and Friedberg (1977, as cited in Calvi *et al.*, 2011) who allude to the PO's boundary-spanning role, i.e. the exchange of information regarding a shared vision, customer buying motives, value propositions, targeted USP's and derived product features form the basic input to promote entrepreneurial innovation (Schumpeter, 1934; Gonzalez-Padron, 2008). Based on this basic input, the PO can develop criteria for the selection and assessment of innovation options which, in turn, enable the PO members to evaluate and categorise the value of innovation information gathered and subsequently utilise outside knowledge (Cohen & Levinthal, 1990). Thus, the PO can act as facilitator for the ESI (Calvi *et al.*, 2011, Petersen *et al.*, 2003) and contributes efficiently and effectively

to the SI's absorptive capabilities (Wang & Ahmed, 2007). As basic categories, to ensure that potentially disruptive innovations are included right from the beginning, the author proposes to distinguish between incremental and disruptive innovations. In this context, Phillips *et al.* (2006b) describe a reflective four-stage process for innovation management (scanning, selecting, resources to option, implementation). As an outcome, a technology roadmap for outside-in innovations can be employed by the PO, which serves as a linking element between innovation and sourcing strategies (Schiele, 2010).

#### 2.3.4.4.4 Definition of EF4: Internal Interconnectedness

The term **Internal Interconnectedness** subsumes the degree of integration of the purchasing function into the formal and informal exchange of information with the company's innovation stakeholder and contributor (R&D, Marketing). Internal Interconnectedness aims to realise, as best as possible, the bi-directional and project independent free flow of innovation and technology information/s with other specialist departments within or after the official working hours.

### 2.3.4.5 EF5: Early Integration into product-planning

#### 2.3.4.5.1 Academic references and general considerations

From a total of 27 selected and coded academic sources, 13 sources could be linked to theme (Enabling Factor) 'Early Integration into Product Planning'. The pre-determined maturity level of 20 empirical references is achieved, as a total of 28 references are assigned to the Enabling Factor 'Early Integration into Product Planning'. Furthermore, several text passages of the scoping literature could be linked to this theme (Enabling Factor).

The term 'Early Integration into Product Planning' refers to the timely integration of the PO into the product planning process in order to set the basis for the efficient and effective integration of the current and prospective supplier network. For example, if integrated early into the product planning process, the PO can recognise the long-term plan for products and services to be offered and thus can derive and launch purchasing activities properly on time.

#### 2.3.4.5.2 PO integration, risk and uncertainty

Schumacher, Schiele, Contzen and Zachau (2008) point out that strategic supplier selection has to be based on supplier product features which are decisive for consumer buying deci-

sions. Calvi *et al.* (2011), referring to studies by Handfield *et al.* (1999) and Nijssen *et al.* (2002), find empirical evidence in academic papers concerning the positive impact induced by the PO's Early Integration into new product development. In this respect, Nijssen *et al.* (2002) conclude that "*the more the firm is focused on developing innovative products the greater the likelihood that purchasing is part of the NPD process*" (Nijssen *et al.*, 2002, p. 286). In high-tech sectors with turbulent technology markets, like the consumer electronics industry, the cloud phase is characterised by uncertainty (Gassman & Sutter, 2011) as the market relevance of upcoming technology innovations (incremental, architectural or even disruptive innovation) often cannot be predicted precisely at the advent of a certain strategic product planning period. In the context of disruptive innovations, Phillips *et al.* (2006a) and Bessant *et al.* (2010) further point to the risk of rationally justified rejection of signals emitted by disruptive innovations which are outside the familiar reference frame. In order to avoid SI's 'blindness' to disruptive innovation potentials, it is argued in this thesis that a PO, if integrated early into the product planning process, can take on the role as facilitator for incremental but even for potentially disruptive innovation potentials. In this connection, Luzzini and Ronchi (2011) allude that "*when the technological risk related to the product complexity and environmental uncertainty is relatively higher, we found that the PO is in charge of managing any activity involving suppliers,...*" (Luzzini & Ronchi, 2011, p. 18). The positive relational effect between the degree of novelty and complexity and the centralisation of the buying centre is also confirmed by Glock and Hochrein (2011) and Petersen *et al.* (2003) who indicate that companies rather share information with suppliers in the case of uncertainty.

#### 2.3.4.5.3 Exchange of information with third parties

The information-exchange with third parties in the early innovation phase needs to be organised efficiently and effectively by the PO (Schumacher *et al.*, 2008) in order to expand systematically the technological capability (Phillips *et al.* 2006a) of the SI. Phillips *et al.* (2006a) further point out that disruptive innovations call for the "*creation and exploitation of new relationships that go beyond the current supply network*" (Phillips *et al.*, 2006a, p. 451). In this context, the PO further needs to take over the responsibility for the thorough market scanning and selection process for innovation potentials. This also includes ideas which are beyond the SI's current knowledge boundaries (Phillips *et al.*, 2006b). In order to handle the ambidextrous challenge of the PO concerning (1) cost-reduction management and (2) the outside-in innovation task, Schiele (2010) proposes structural organisational

measurements such as the implementation of an advanced sourcing department, innovation meetings with suppliers and the employment of technology roadmaps to link a company's innovation and sourcing strategies. A closely co-ordinated user and buyer analysis leads to a strong positive effect between organisational learning and purchasing information processing (Hult *et al.*, 2000). The subsequent information processing might further lead to supplier relations which go beyond the current supplier network (Phillips *et al.*, 2006a). This insight is substantiated by Nijssen *et al.* (2002, p. 287) who point out that the involvement of purchasing in NPD has a "significant effect on the success of new products in terms of sales and profits". Furthermore, the learning effects diminish the uncertainty induced by a complex purchasing process (Glock & Hochrein, 2011). If integrated early, the PO can actively participate, based on shared understanding of decisive consumer buying motives, in the identification of future product features of interest and derived applications, materials, surface treatments and services. Equipped with the SI's product roadmap and the targeted product USP's, the PO is able to formalise an integrated supply innovation strategy (Monczka *et al.*, 2010) and further to proceed with a gap analysis which highlights, based on the consumer relevant product features, a categorised innovation sourcing demand. In a subsequent step, the PO can take over, concerning third parties' innovations, an active market scanning role for the SI in order to get access to necessary resources (technologies, material, software, services) detected as gap-technology and services. Schiele (2010) substantiates this move and points out that a formulated innovation strategy, which delineates knowledge boundaries and demanded technologies, is one major differentiating factor for the success of a new product development process. Seidler-de Alwis and Hartman (2008, p. 143) also state that "*unclear goals and incentives can inhibit the tacit knowledge transfer*".

In the context of disruptive innovations, Phillips *et al.* (2006a) coined the term 'strategic dalliances' which indicate the necessity to forge short termed alliances with new suppliers not known so far. Monczka *et al.* (2010) propose that the defined strategy and actions shall be codified in an innovation strategy for suppliers and concrete actions shall be defined and executed under full responsibility of the PO. An efficient and effective innovation purchasing strategy can only be realised if a SI establishes a process which identifies the consumer relevant technological needs (Yeow & Edler, 2012) in time. Monckza and Petersen (2012) affirm that an effective supplier collaboration requires an aligned company innovation and supply innovation strategy. Based on this insight, it is suggested in this thesis that an effi-

cient and effective innovation purchasing strategy can only be formulated if the PO is integrated early into the product planning process of the SI.

#### 2.3.4.5.4 Definition of EF5: Early Integration into Product Planning

The term **Early Integration into Product Planning** refers to the early and timely integration of the purchasing function into the strategic product planning process. Based on the early availability of knowledge concerning targeted product characteristics, the purchasing function can efficiently and effectively build up and maintain the related supplier network.

### 2.3.4.6 EF6: Degree of Professionalisation of the PO

#### 2.3.4.6.1 Academic references and general considerations

From a total of 27 selected and coded academic sources, 17 sources could be linked to the theme (Enabling Factor) 'Degree of Professionalisation of the PO' (PDP). The predetermined maturity level of 20 empirical references was achieved, as a total of 61 references were assigned to the Enabling Factor 'Early Integration into Product Planning'. Furthermore, different text passages of 3 sources of the scoping literature could be linked to the theme (Enabling Factor) 'Degree of Professionalisation of the PO' (PDP).

The Degree of Professionalisation of the PO links to the managerial tenets of the RBV, the DCBV and the organisational learning and reflects the PO's basic capability concerning the active and accountable contributions to the SI's innovation management. In the context of discontinuous innovations, Bessant *et al.* (2010) point to the lack of entrepreneurial spirit in companies and the author of this thesis argues, that a professionalised PO can fill the entrepreneurial role as an outside-in innovation driver for the SI. Sammerl (2006) and Gonzalez-Padron *et al.* (2008) point to the significant effects of learning orientation on a company's capability to innovate.

#### 2.3.4.6.2 Indicators for PO's Degree of Professionalisation

With respect to the Degree of Professionalisation, academic research identified manifold indicators which can be derived from the hierarchical placement of the PO within the SI's structural organisation, individual purchasing targets and performance indicators, as well from the methods and concepts utilised by the SI's PO (Glock & Hochrein, 2011; Schumacher *et al.*, 2008; Schiele, 2007). In more detail, related indicators of a high Degree of

Professionalisation are:

1. The utilisation of international purchasing offices (Glock & Hochrein, 2011) within a global purchasing approach (Matthyssens *et al.*, 2003)
2. Clear co-ordination and communication modes, the development of partnerships (Matthyssens *et al.* 2003)
3. A systematic process for out and insourcing decisions (Handfield *et al.*, 1999)

PO objectives which are based on corporate priorities (Luzzini & Ronchi, 2011),

4. A PO configuration which considers the technological risk in the context of outside-in innovations (Luzzini and Ronchi, 2011)
5. A supplier assessment system (Petersen *et al.*, 2003) which includes prospective suppliers under strategic aspects (Schiele *et al.*, 2011)
6. A commodity management under the lead of the PO (Schiele, 2007), and

early involvement into the SI's innovation management (Schiele, 2007; Yeow and Edler, 2012).

Referring to Johnson *et al.* (1998), Glock and Hochrein (2011) further suggest that organisations with a CPO utilise more sophisticated purchasing techniques. Moreover, PO members with higher education work more efficiently and effectively together with other departments and suppliers involved in the new product development process (Nijssen *et al.*, 2002). Glock and Hochrein (2011), referring to different academic comparative studies, state that the CPO education level is an indicator for the level of responsibility transferred to the PO. Nijssen *et al.* (2002) affirm that companies need to add the PO's skills and understanding concerning the PO's contribution to the new product development process. Nijssen *et al.* (2002) further identified the purchasing manager level of experience and education as a major driver for involvement in new product development.

A PO commitment to learning is decisive for understanding the competitive environment, customer buying motives and the market situation (Ussahawanitchakit, 2011). Hult *et al.* (2000) state that purchasing leaders who are able to build up confidence achieve effective response from their organisational environment and this leads to an enhanced learning performance. Therefore, a considerable Degree of Professionalisation of the PO indicates a high learning orientation of the organisation (Hult *et al.*, 2000). Learning orientation is especially important for companies which operate in a technologically turbulent environment (Gonzalez-Padron *et al.*, 2008) and depend significantly on the exchange of tacit knowledge (Seidler-de Alwis and Hartmann, 2008). Hurley and Hult (1998) further con-

clude that participative decision-making and learning directly relates to a company's innovativeness. This is substantiated by Sammerl (2006) and Ussahawanitchakit (2011), who point out that organisational learning is decisive for a company's innovativeness, whereas Boutellier and Wagner (2009) suggest that a company's competitiveness can be strengthened if the purchasing management optimally supports the innovation process. Glock and Hochrein (2011), referring to a study by Trent and Monczka (2002), refer to the importance of an effective leadership in the context of cross-functional team performance.

#### 2.3.4.6.3 Organisational structure of the PO

In order to cope with the ambi-dextrous role of the PO (Gibson & Birkingshaw, 2004; Schiele, 2010), academic authors (for example, Calvi *et al.*, 2011; Petersen *et al.*, 2003, Schiele, 2010) propose, as a structural measure, establishing an advanced sourcing team. In contrast, Gibson and Birkingshaw (2004) advocate the concept of conceptual ambidexterity to be achieved by stretch, discipline, support and trust within the business unit to avoid loss of resources mainly caused due to the isolation mechanism of separated business units. Experience in the past suggests that an exclusive focus on the conceptual ambidexterity is critical as operative tasks very often require the quick action of the individuals and therefore tend to prevail over advanced purchasing tasks, which are linked rather to mid and long-term objectives in the context of new product development and outside-in innovations. In contrast to Calvi *et al.* (2011) this thesis puts forward the argument that there is no conflict in the two notions as the selection of an appropriate organisational solution is clearly context-related. In this respect, a complementary approach between structural and conceptions ambidexterity is advocated in this thesis, for example, realised by a balanced matrix organisation which ensures effectiveness via Internal/External Interconnectedness and efficiency by a professional PO equipped with efficient procurement tools. Anyway, based on moderate relativism, context dependency is emphasised, which means that different SIs might realise different organisational solutions which are the most efficient and effective at a given point in time. Independently of the solution realised for a specific SI, a separate task package for the PO's role for continuous cost reduction and the early involvement in innovation projects is a feature of a high Degree of Professionalisation of the PO. The clearly defined responsibility of the PO for outside-in innovation process management is a further step forwards in the PO's maturity and Degree of Professionalisation.

The items mentioned have substantial implications for the selection criteria of PO members who are in charge of innovation sourcing, as well for the structural formation of the PO to gain a higher level of professionalisation. Schiele (2007) confirmed the highly significant relationship between the PO's maturity level and cost reductions achieved. Considering his findings, it is propounded in this thesis that the degree of the purchaser's capability and willingness to meet increasing requirements concerning commercial and technical education, communication skills, technical know-how, leadership skills, and the capacity to negotiate and culturally empathise with foreign suppliers (Matthyssens *et al.*, 2003) induce related powers and mechanisms which directly impact upon the Degree of Professionalisation of the PO. Furthermore, a high Degree of Professionalisation indicates the autonomy of the PO gained and autonomy *"has a greater effect on the relationship quality in organisations operating in a high technological turbulent environment"* (Gonzalez-Padron *et al.*, 2008, p. 77). Moreover, it is argued in this thesis that a high Degree of Professionalisation of the PO ensures the *"shrewd co-ordination of the company resources in order to deal with this complex environment"* (Matthyssens *et al.*, 2003, p. 3) as well as the effective management and co-ordination of supplier contributions within new product development projects (Lakemond *et al.*, 2006). This point of view is supported by Luzzini and Ronchi (2011) who found that, where there is a high technological risk, the PO is responsible for the management of any supplier involvement activity starting with the initial sharing of technology and the definitions of project objectives together with suppliers (Petersen *et al.*, 2003).

On this point, Schumacher *et al.* (2008) propose conducting an audit in order to determine status and the Degree of Professionalisation of the PO achieved, correlating to the buyer's basic ability to take part, as an accepted team member, in the innovation process. Schiele (2007) compiled a catalogue of criteria, which reflects four different stages of a PO's maturity and can be utilised for audits. Schumacher *et al.* (2008) conclude that today's best practice organisations leave organisational constraints behind them and transfer best practice management ideas and concepts to the purchasing department. Additionally, best practice organisations question and reflect on their strategic orientation and action. This characteristic is a strong indicator of an organisational learning approach as described in subchapter 2.1.3. Among further topics are: the integral redesign of the supply chain, strategic benchmarking and professional category management accompanied by the measurement of the purchasing department's added value via scorecards. The above-mentioned requirements are supported by Luzzini and Ronchi (2010) who imply that higher organisational

learning is linked to purchasing employees who possess commercial, technological knowledge and managerial skills. On this point, Nijssen *et al.* (2002) further recommend training PO members in fields like cross-functional communication, teamwork and/or exchanging PO members with more skilled personnel.

From examining the above findings, this thesis argues that the gained degree of the PO's professionalisation is decisive for the PO's capability to generate valuable outside-in innovations.

#### 2.3.4.6.4 Definition of EF6: Degree of Professionalisation of purchasing

The term **Degree of Professionalisation of the purchasing function** subsumes the capability and willingness of the purchasing function/members to take over the strategic outside-in innovation/technology management process. A high Degree of Professionalisation of the purchasing function is in line with the utilisation of advanced purchasing tools (e.g. material group management), sufficiently qualified purchasing members who have good leadership skills and the general willingness to learn.

### 2.3.4.7 EF7: Innovation Management System (IMS)

#### 2.3.4.7.1 Academic references and general considerations

From a total of 27 selected and coded academic sources, 13 sources could be linked to the theme (Enabling Factor) 'Innovation Management System' (IMS). The pre-determined maturity level of 20 empirical references was achieved, as a total of 41 references were assigned to the Enabling Factor 'Availability of a Practiced Innovation Management System'. Furthermore, different text passages of one source of the scoping literature could be linked to the theme (Enabling Factor) 'Innovation Management System'.

#### 2.3.4.7.2 IMS as central portal of the innovation process

A company's capabilities are linked to a set of aligned core-processes which are in turn linked to customer needs (Stalk *et al.*, 1992). On these grounds, it is important to remember that the PO's capability to generate valuable outside-in innovations is not a stand-alone solution but rather a subset of a company's capabilities which can unfold its full effectiveness only if linked and aligned with the further capabilities necessary to address customer

needs perfectly. Furthermore, in order to establish the base for the company wide acceptance and application, an Innovation Management System needs to integrate:

(1) vertical and horizontal organisational structure and innovation stakeholders
(2) the SI's innovation strategy and derived technology roadmap and respectively objectives
(3) needs to ensure responsiveness concerning the sharing of innovation information concerning the process status of innovation ideas and approved projects.

Thus, a practiced Innovation Management System becomes, like a communication network in the context of simultaneous engineering (Boutellier & Wagner, 2009), the main platform which fosters adaptive, absorptive capabilities (Cohen & Levinthal, 1990; Wang & Ahmed, 2007) and contributes to the organisational learning processes of the SI. Anyway, experience in the field shows that many companies have systems for continuous improvement or a corporate proposal system in place, but these systems are often not really practiced efficiently and effectively in companies. One reason might be that these kinds of systems do not generate short-term profits or cost reductions and require perseverance and patience. These requirements are in contrast to a fast-moving environment and the need to generate improved business results at short notice. Therefore, this thesis contends that a practised Innovation Management System needs to be based on a management mindset which provides sustainability and supports the systematic innovation management process. In this regard, Dooley and Sullivan (2007) state that poor innovation management leads to poor morale and stagnation within organisations whereas effective innovation management can lead to world leadership.

Dooley and Sullivan (2007) further stress the need for the establishment of appropriate tools and structures which facilitate the exchange of information across a network of collaborating firms. Seidler-de Alwis and Hartmann (2008) point out that a precondition for the activation of tacit knowledge are organisational processes which ensure that valuable tacit knowledge is identified and shared between stakeholders of innovation management processes. Furthermore, Petersen *et al.* (2003, 2005) stipulate that early and close information sharing about emerging technologies with suppliers mitigates technological uncertainty and can lead to creative solutions, suggesting that innovation approaches be formally registered and quickly processed within the SI. Moreover, an Innovation Management Sys-

tem has to make sure that the status of innovation proposals and projects can be easily monitored by the innovation provider and further stakeholders.

Monczka *et al.* (2010) and Schiele (2010) refer to the importance of an innovation strategy, which is aligned inside the company and further transferred into functional objectives (Luzzini & Ronchi, 2011). Schiele (2010) alludes that the innovation strategy sets the base for required core technologies and competences. Summarising the above aspects, an Innovation Management System needs to integrate the innovation strategy respectively to align functional objectives and required core technologies, thus setting an innovation framework with clear boundaries but without filtering out disruptive innovation potentials which are outside the current framework (Bessant *et al.*, 2010; Calvi *et al.*, 2011; Phillips *et al.*, 2006a). Furthermore, Bessant *et al*. (2010) refers to the necessity of a significant budget endowment for the reasons of discontinuous innovation activities. In this respect, Monczka *et al.* (2010) believe that management needs to commit resources and processes which support the innovation strategy, for example, via the establishment of an innovation portal (Dooley & Sullivan, 2007; Monczka *et al.*, 2010). Thus, an Innovation Management System links generated innovative capabilities to the SI's further subset of core processes previously defined and built up by top management in order to perfectly address customer needs (Stalk *et al.*, 1992). In this sense, the Innovation Management System has to ensure that information (for example, know how or innovation ideas) will be (1) collected and (2) processed effectively and efficiently within the SI's organisation.

#### 2.3.4.7.3 Organisational aspects of an IMS

In the context of the external sourcing of core technologies, Bresman (2002) concluded that "*team search and co-ordination were enabled and constrained in important ways by factors in the organisational context, such as structures and processes were designed, and by knowledge handed down to them by previous teams*" (Bresman, 2002, p. 4). Therefore organisational structures and processes need to be implemented to foster effectiveness and efficiency of the outside-in process (Glock & Hochrein, 2011), for example, by means of utilisation of project management techniques (Yeow & Edler, 2012) and the establishment of clear internal and external communication channels (Glock & Hochrein, 2011) for the acquisition and dissemination of technology information (Hult, Hurley, Giunipero & Nichols, 2000) thus mitigating uncertainty (Petersen *et al.*, 2003). To give a practical example, the in-time feedback to a supplier's proposal is one item to be ensured. Otherwise the supplier might be discouraged to further participate in the SI's innovation management pro-

cess. Monczka *et al.* (2010) outline that supplier innovation e-systems enable innovation suppliers to introduce innovations via a company portal, company open houses and face-to-face contacts. In the context of tacit knowledge management, Seidler-de Alwis and Hartmann (2008) propose to remove all barriers and to focus on human-related factors such as motivation, commitment, hopes and rewards - a combination of an intrinsic and extrinsic value system. The removal of barriers requires the active integration of the SI's horizontal and vertical structure.

A possible organisation formed to assess and process outside-in innovations efficiently and effectively can be the formation of dedicated cross functional scouting teams provided with clear targets and resources given by an internal jury of senior managers (Calvi *et al.*, 2011). In order to efficiently and effectively pursue innovation ideas, Yeow and Edler (2012) suggest the nomination of innovation champions who secure the success of approved innovation projects. In this vein, Bessant *et al.* (2010) found that innovative companies have dedicated supporting functions like innovation angels who assess innovation approaches in the early phase and help to prepare presentations for management. Clear targets given to, and undertaken by, the scouting teams serve as a mainspring to incite team members to generate actively outside-in innovations and to find creative solutions (Petersen *et al.*, 2003). Innovation Management Systems need to involve also the vertical organisational structure and Schiele (2010) found that best practice organisations established cross-functional innovation councils who decide whether to pursue innovation approaches. The internal jury of senior managers takes responsibility for the in-time evaluation and selection of innovation (Bessant *et al.*, 2010) as well the monitoring and controlling of subsequent processes. As a rule of thumb, the organisation structure and the process organisation should easily apply for external sources of ideas/innovations in order not to provoke demotivation effects. Dooley and Sullivan (2007) recognised the necessity to structure the relationship of co-operation partners and propose to introduce web-based IT systems to foster knowledge exchange of innovations. Thus the cognitive distance of co-operation partners will be reduced considerably.

#### 2.3.4.7.4 Definition of EF7: Innovation Management System (IMS)

The term **Availability of an Innovation Management System** (IMS) subsumes the company-wide implementation and, by internal innovation stakeholders and suppliers, actually applied tools, methods and "lived" processes targeted to efficiently and effectively collect,

prioritise and process the innovation/technology approaches offered and provided by third parties.

#### 2.3.4.8 EF8: Open-minded Relations based on Trust

##### 2.3.4.8.1 Academic references and general considerations

From a total of 27 selected and coded academic sources, 14 sources could be linked to the theme (Enabling Factor) 'Open-minded Relations based on Trust' (ORT). The predetermined maturity level of 20 empirical references is achieved, as a total of 50 references are assigned to this Enabling Factor. Furthermore, different passages of text in two sources of the scoping literature could be linked to the theme (Enabling Factor) 'degree of Open-minded Relations based on Trust'.

SIs depend on the exchange of technology information in the early phase of innovation projects and related new product developments. Besides the relationships with external innovative organisations, the exchange of innovation related information within the SI's organisation is very important for the success of innovation and new product development projects.

##### 2.3.4.8.2 Trust and innovation culture

In the context of innovation management, academics often refer to the term corporate or innovation culture in companies (for example, Sammerl, 2006; Gonzales-Padron *et al.*, 2008; Seidler-de Alwis & Hartmann, 2008, Schiele *et al.*, 2010), which is a pool of soft factor indicators like trust, open-mindedness, cognitive proximity, a company's general emphasis on innovation in early new product development phases, shared norms, values and beliefs. However, in the context of this study, this thesis uses the term 'Open-minded Relations based on Trust' as this description is viewed as rather tangible and more concrete for the reader. The degree of Open-minded Relations based on Trust describes the manner in which the PO members can openly talk and work with other stakeholders in the SI's innovation process, like other departments, suppliers, the SI's management. This is reasoned by the insight that innovation success requires "*a smooth interplay between tacit knowledge and innovation management*" (Seidler-de Alwis & Hartmann, 2008, p.133). Ussahawanitchakit (2011) identified open-mindedness as a key driver for organisational learning and business innovation and this includes the ability to proactively question established beliefs and assumptions. This is only possible in the case that no defensive routines are in place (Argyris & Schön, 1978).

2.3.4.8.3 Trust as facilitator for exchange of information

From the viewpoint of the RBV and the DCBV, trusting and open-minded relations shall lead to a better exploitation of internal and external resources, like hidden tacit knowledge. A more efficient and effective exploitation of external resources is reflected, for example, by a preferred customer status and the supplier's preferential resource allocation to the buyer (Schumacher *et al.*, 2008; Schiele *et al.*, 2011).The author assumes that relations which are characterised by cool/aloofness and sole task orientation do rather inhibit the innovation process whereas target orientated, trusting and open-minded relationships rather facilitate the free flow of innovation related information between stakeholders. This assumption is based on the insights gained of organisational learning theory and the model II mechanism devised by Argyris and Schön (1978). Related to this, Seidler-de Alwis and Hartmann (2008, p. 142) state that *"there is a widespread consensus in the literature that the failure to share information and to implement knowledge transfer processes is often the neglect of human factors and an over-emphasis on information and communication technology solutions"* (Seidler-de Alwis & Hartmann, 2008, p. 142), and further state that the use and transfer of tacit knowledge depends on the management's behaviour which serves as a role model for their employees. Nonaka and Takeuchi (1995) visualised the socialisation process of tacit knowledge via the knowledge spiral and the author of this thesis argues that the knowledge spiral process can be more easily induced if there is a sufficient level of trust and open-mindedness between people. This insight is again supported by Seidler-de Alwis and Hartmann (2008) who conclude that an open culture and trust are conditions for the sharing and utilisation of tacit knowledge within the innovation process and that a firm's management should support the creation and sharing of knowledge between its employees. Calvi *et al.* (2011), referring to Johnsen (2009), refer to supplier relationship development and adaptation as a success category for supplier involvement in the incremental product development process. Johnsen (2009) further identifies:

(1) mutual trust

(2) shared training and target measures, and

(3) no opportunistic abuse of power as success factors of this category.

In connection with this, Dooley and Sullivan (2007) describe trust between individuals as a key determinant for the success of collaborations especially in phases characterised by uncertainty and vulnerability of collaborating parties (Dirks & Ferrin, 2001). Monczka *et al.*

(2010) identified trust as a critical factor for the acceleration of innovations through effective supplier collaborations and propose, for the reasons of trust enhancement
(1) to treat supplier intellectual property rights as confidential
(2) to realise an appropriate information sharing
(3) to promise only what can be done
(4) to consider the equity of the risk and reward equation, and
(5) a general supportive mindset.

Colombo *et al.* (2011) suggest that trust is a co-ordination mechanism to administer collaborations which are characterised by uncertainty and complexity, like early new product development activities. Dooley and Sullivan (2007) identified trust as a key determinant for success of collaborations whereas Gonzales-Padron *et al.* (2008) found that a climate which values ethical behavior has positive effects on shared trust and commitment. Trust sets the basis for the removal of barriers such as physical and cognitive distances according to Dooley and Sullivan, (2007), who go on to suggest that trust cannot be realised from a standing start but rather requires that organisations commit and pursue a long-term focus which provides a high level of basic confidence between the individual members of participating organisations in innovation networks. They further point out that, over time, a shared social context possibly leads to greater levels of trust between personnel, thus leading to cognitive proximity. This insight is supported by Hult *et al.* (2000) who found that buyers value openness as an inducing factor for organisational learning processes within the PO. Matthyssens *et al.* (2003) point out that good communication is a critical success factor of the global purchasing process, whereas Petersen *et al.* (2003, 2005) identified a positive effect on decision making and project outcomes induced by knowledge exchange via informational channels between suppliers and customers.

From examining the selected literature, subject to the Enabling Factor, Open-minded Relations based on Trust, the tendency (8) ‘If there is a high degree of Open-minded Relations based on Trust among the stakeholders of the innovation process, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations’ is proposed.

#### 2.3.4.8.4 Definition of EF8: Open-minded Relations based on Trust

The term **Open-minded Relations based on Trust** refers to the manner in which the company’s innovation stakeholders socially interact with each other, for example, cool and

aloof **or** open-minded/approachable, timely **or** someday, courteous nature **or** noncommittal.

### 2.3.5 Abstraction and tendencies

#### 2.3.5.1 Structure of causal explanation

Subject to the analyses and abstraction of social research issues, Sayer (1992) proposes to devise a "s*tructure of causal explanation"* (Sayer, 1992, p. 109). Based on the structural analyses of social research issues, resulting suggestions subject to causal relations and subsequent tendencies can be well devised and explained to the audience. Sayer's (1992) proposed structure of causal explanation refers to the structured ontology of critical realism and the ontological approach that a real world exists independent from human thought and that the meaning of knowledge is always a human construction (Bhaskar, 1975; Easterby-Smith, Thorpe & Jackson, 2012; Sayer, 1992, 2000). Sayer's (1992) proposed structure of causal explanation reflects this philosophical standpoint and gives, from the viewpoint of critical realism (Bhaskar, 1975), an abstract overview of the research problem and related social structures with inherent causal powers, liabilities and an underlying mechanism that are activated under certain conditions. Potential events depend on the interaction of activated or non-activated causal powers respectively as liabilities, and as well potential or hitherto unknown causal powers and a related underlying mechanism. In a different context, certain events can be caused by different causal powers. This is the reason why critical realists accept the existence of competitive models according to Sayer, (1992, 2000), who states that with this in mind, social structures are objects or processes (Sayer, 1992). For example, in the context of this study, the structure of the research issue consists of stakeholders in the innovation process (management, other internal and external stakeholders), the kind of relations (interconnectedness between stakeholders, kind of relations, e.g. cool and aloof or open-minded and trusting), innovation process (Innovation Management System, integration of PO into product planning).

#### 2.3.5.2 Devised structure of causal explanation

This study utilises some elements of Sayer's (1992) suggested structure of causal explanation. The main reason is that the researcher finds the way of abstraction as particularly suitable for explorative research issues. Tendencies can be well-devised and communicated to the audience. As this study is based on moderate relativism and as the understanding of specific critical realist's terms like causal powers or liabilities necessitates dealing with the

philosophy of critical realism, this study uses, in line with other research work in the PSM field (for example, Wynstra *et al.*, 2003), the terms Enabling Factors (instead of causal powers) and drivers/inhibitors instead of conditions. However, in the figure below, drivers/inhibitors are not displayed as they were identified in the course of the data collection and analysis process (Chapter 4). Instead, the more general term condition, as proposed by Sayer (1992) is used. The figure below displays the devised structure of causal explanation. Subject to interpretation, for example concerning EF1: External Interconnectedness, the structure of causal explanation shows that the 'high' condition has a positive effect on the tendency subject to the PO's capability to generate valuable outside-in innovations. In turn, the 'low' condition has a negative consequence on the PO's capability to generate valuable outside-in innovation. As the 'high' or 'low' conditions respectively are general terms that give no concrete insights, the further research process aimed to explore concrete and tangible data subject to drivers respectively inhibiters. Subject to the further research process and in line with Wynstra *et al.* (2000), the term 'driver' was defined as a subcategory of the more general term condition. Furthermore, as people, for example in an interview situation, potentially can recall negative experiences they made in the past better, the term inhibitor was defined. Therefore, an inhibitor reflects the opposite condition of a specific driver. Both, driver and inhibitor detail the condition so that executive management can rate the current status and targets on the said concrete and tangible level.

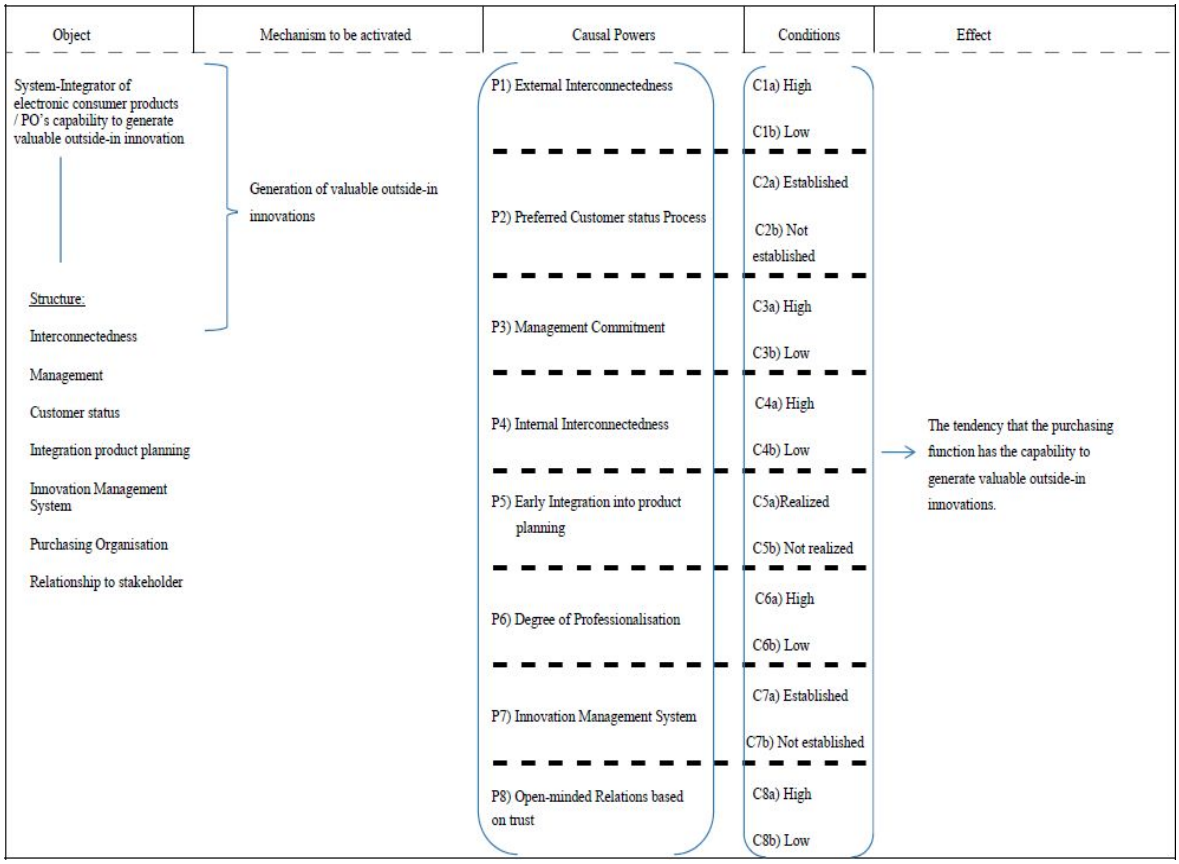



Figure 11: Structure of causal explanation

#### 2.3.5.3 Suggested tendencies

Based on the findings of this literature review, the following tendencies are proposed:

(1) If there is a high level of External Interconnectedness, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

(2) If the purchasing function establishes an assessment process concerning the actual and prospective preferred customer status granted by the supplier, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

(3) If there is a high level of Management Commitment to the purchasing function, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

(4) If a high level of Internal Interconnectedness is achieved by the purchasing function, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

(5) If the purchasing function is integrated early into the product planning process, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

(6) If the purchasing function has gained a high Degree of Professionalisation, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

(7) If there is a companywide accepted and practiced Innovation Management System in place, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

(8) If there is a high degree of Open-minded Relations based on Trust among the stakeholders of the innovation process, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

The suggested tendencies set the basis for the further data collection and analysis process (Chapter 4).

## 2.4 **Research gap**

Given the role of the Purchasing Organisation as (1) a major interface to third parties and (2) the importance of third party innovations to leverage a SI's capability to innovate, it is surprising that previous academic research has neglected to identify Enabling Factors that are decisive for the effective embedding of the PO into the outside-in innovation process. In the context of managing Open Innovation in SMEs, academics point to low research comparing to MNC (Brunwicker & van de Vrande, 2014; Lichtenthaler, 2008; Parida, 2012). With reference to the collected and selected academic papers of this study, previous research was rather conducted on a broad base and includes cross sector perspectives of (often) multinational companies from the mechanical engineering, chemical, automobile manufacturer, electronic and electrical engineering industries (for example, Petersen, Handfield & Ragatz 2003, Schiele, 2010; Luzzini & Ronchi, 2011). No research could be found which was specifically concerned with the requirement of a German medium-sized manufacturer of consumer electronics products with high dependency on innovation suppliers. None of the selected academic papers considered all 8 Enabling Factors which emerged in the course of the literature review. Furthermore, relevant themes (Enabling Factors) with regard to the integration of the PO into the outside-in innovation process were only partially discussed. For example, the criterion of management support is widely described in the academic literature (for example, Schiele, 2010). However, the application of managerial models into management practice requires the identification of concrete conditions that are formative to management support. Furthermore, the given research neglects direct relationship/dependencies between the EF, related formative drivers and causal mechanism that are relevant for the function principle of the EF and related tendencies with regard to the POs capability to drive and co-ordinate the outside-in innovation process.

This research builds on the research gap and aims to identify Enabling Factors concerning the effective embedding of the PO into the outside-in innovation process that subsequently enables the PO of the selected medium-sized SI of consumer electronics products to generate valuable outside-in innovations (Gassmann & Enkel, 2004). In this way, the study adds the perspective of a medium-sized consumer electronic product manufacturer that is highly dependent on innovation suppliers to the given literature. Therefore, this study aimed to identify concrete conditions that facilitate or impede the capability of the purchasing function to co-ordinate and drive the innovation outside-in process. In this way, identified Ena-

bling Factors were described in the usual way of finding appropriate (a) 'definitions' and (b) related concrete conditions that can be used in a practical context. Thus the study contributes to given academic and practitioner knowledge in the field of EPI into the new product development process (NPD).

## 2.5 Conceptual framework

Jabareen (2009) defines a conceptual framework as a network of linked concepts which belong to different and distinct disciplines. These interlinked concepts contribute to understand a phenomenon of interests (Jabareen, 2009). Subject to qualitative research, Maxell (2013) suggests that a conceptual framework refers to a researcher's actual ideas and beliefs about what is going on with regard to phenomenon of interest. In this thesis, the phenomenon of interest is concerned with the PO's effective integration into the innovation process of a medium-sized SI. Maxwell (2013) further argues that (a) prior theory and research but also (b) experiential knowledge of the researcher are major key components of a conceptual framework. With regard to qualitative research problems, Imenda (2014, p. 192) adds that conceptual frameworks synthesize, via an inductive approach, "*relevant concepts from variant sources*". On the basis of the selected literature, Chapter 2, literature review, was concerned with the identification of relevant EFs. The basic conceptual disciplines or concepts are based on the above introduced scoping literature with regard to the (a) innovation process and special risks of SIs, (b) the resource based respectively dynamic capability based view, (c) the organisational learning theory and its (d) sub discipline of Open Innovation. Subject to the analysis of selected literature, conceptual labels (names and definitions) were, based on interpretation and experiential knowledge, attributed to noteworthy themes and subsumed under the term 'Enabling Factors'. In this way, 8 Enabling Factors were identified and substantiated. It is further suggested, that, if activated, the Enabling Factors cause a positive tendency subject to the PO's capability to coordinate the innovation outside-in process whereas inhibitors cause a negative tendency. However, it is argued that the activation of an Enabling Factor (EF) depends on certain conditions (= driver or inhibitor) which needs to be viewed as formative to the Enabling Factor. These conditions are subject to the intensive phase of this study.

Based on the philosophy of moderate relativism which is explained in Chapter 3, research design and methodology, relevant drivers and inhibitors were identified in the certain context of a medium-sized manufacturer of electronic consumer products, the Television set manufacturer Loewe. In this context, the dependency structure between the Enabling Fac-

tors was of specific interest as knowledge about the dependency or relationship structure between the EF is considered as important to set appropriate priorities in a certain context. As to the generalisability of findings, it is further suggested that the identified Enabling Factor, conditions and relations are also relevant for other small or medium-sized SIs which are dependent on innovation/technology suppliers. To get early indications as to the generalisability of the findings, the context of this study was carefully extended to other SIs with high dependency on innovation suppliers. This was realised through the integration of External purchasing Experts who have working experience with other SIs with high dependency on innovation suppliers. Depending on the degree of intersection between the results at Loewe and other SIs, early indications as to the generalisability of the findings can be drawn. The results serve as input for the definition of a strategic agenda for Loewe's PO.

Figure 12 reflects the conceptual framework.

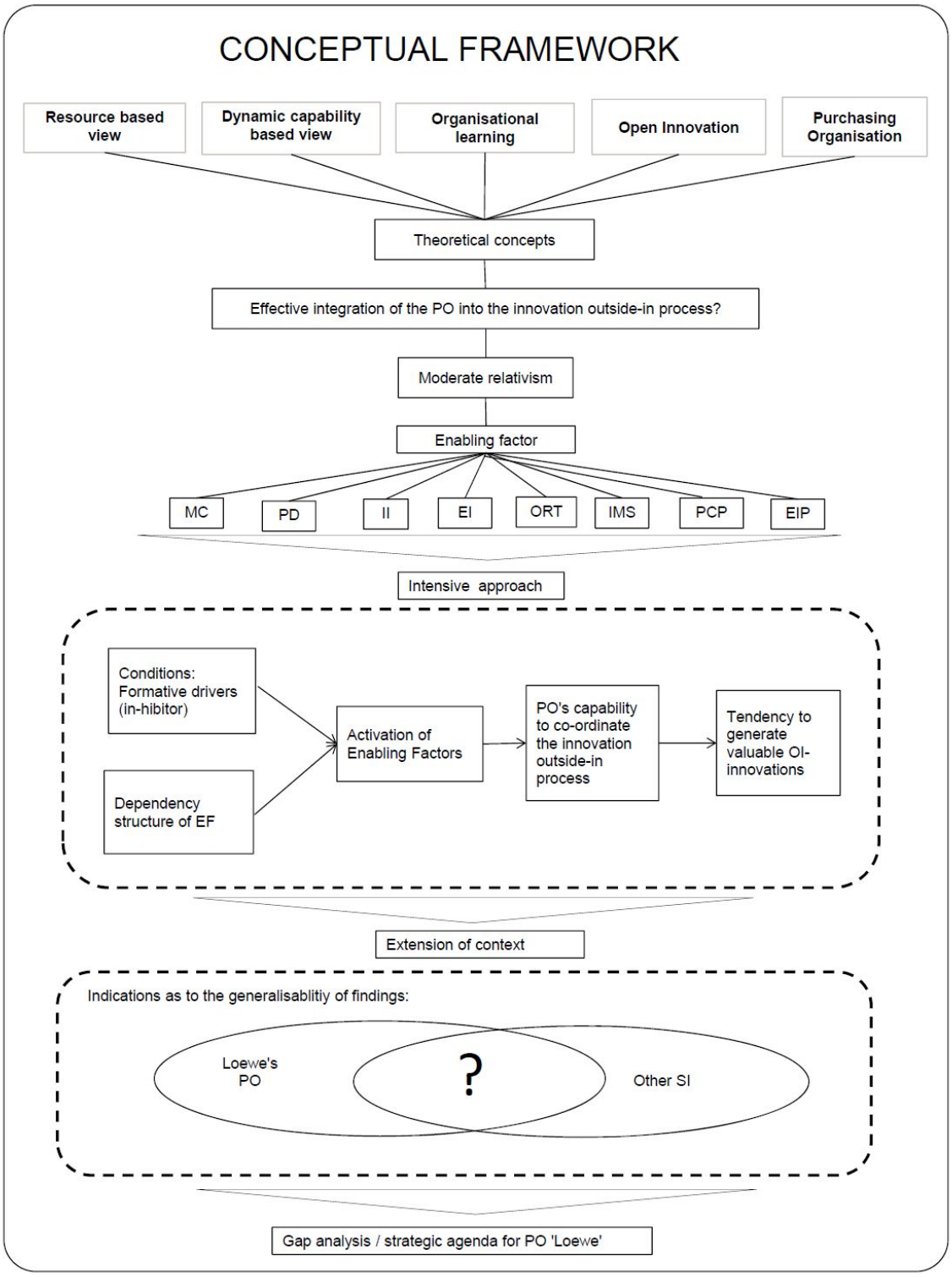



Figure 12: Conceptual framework

## 2.6 Summary and limitations of the Literature Review

### 2.6.1 Summary of major findings

The aim of the literature review was to explore and substantiate Enabling Factors subject to the effective integration of PO's into the innovation outside-in process. The literature review confirmed that there is a manifold further research demand in the context of new product development and the involvement of the PO in general and especially along with the questions of necessary organisational design to build up the PO's capability to generate valuable outside-in innovations. Enabling Factors make it possible for the purchasing function and its members to actively and responsibly co-ordinate and drive the outside-in innovation management process of technology suppliers and/or service providers while drivers are considered as formative conditions of the Enabling Factors. In this context, the NIH-syndrome and dependency on innovation/technology suppliers were introduced as potential barriers to the innovation process of SIs. This is especially relevant for SIs highly dependent on innovation suppliers. Organisational structures which are based on mature system architectures can lead to the implementation of information filters. In consequence, relevant information subject to incremental or disruptive innovations of system architectures are potentially filtered out and can jeopardize the continued existence of the respective SI. Furthermore, the dependency on innovation suppliers requires co-ordinated strategic and tactical actions of SI's which can be potentially driven by a mature PO. In this process, organisational learning is considered as a necessary pre-condition for the realisation of innovation processes whereas the Open Innovation tenet (Chesbrough, 2006, 2011) is considered as a sub-discipline of the organisational learning tenet.

Subject to complex company tasks like innovation processes, major insight was that defensive routines (Argyris & Schön, 1978) hinder efficient and effective learning processes in organisations. Due to this reason, it is argued in this thesis that SIs should apply model II theory to accelerate knowledge diffusion processes in companies (Argyris & Schön, 1978; Nonaka & Takeuchi, 1995; Thomas, 2000). The RBV is concerned with the exploitation of company resources which should be turned into a VRIN respectively VRIO resource (Barney, 1995). In the context of this study, the (a) PO of a SI and (b) external innovation potentials are considered as company resources which can contribute to achievement of competitive advantage. In connection with this, the DCBV is concerned with the question how sustainable competitive advantage can be achieved and it is argued, that mature POs are highly prepared to take over leadership for the outside-in innovation process.

Some 8 relevant Enabling Factors could be identified via thematic analysis (Guest et al., 2012). Contradictory citations concerning the identified Enabling Factors could not be identified. Based on the findings, a structure of causal explanation was devised.

### 2.6.2 Limitations

The limitations of the literature review arise from the fact that the introduced scoping literature could be only partially discussed. This is reasoned in the fact that the complete discussion of the organisational learning, Open Innovation, the RBV respectively the DCBV would be far beyond the word limitations of the thesis. In order to mitigate this fact, the introduced topics of the scoping literature were based on a previous discussion with a management professor who undertakes research in the field of innovation management. In this way and in line with the inductive approach of this research, it was aimed to identify and discuss the most relevant underlying theoretical concepts. The limitations of the subsequent database search to identify Enabling Factors arise from the possibility that the databases used for article search might not contain all relevant articles. Furthermore, only English and German written articles were selected. Considering these facts, it cannot be excluded that further relevant articles appeared elsewhere. A further discussion item might be the defined number of 20 references on which was based a certain Enabling Factor which was considered as sufficiently substantiated. It is evident that this pre-defined level might be contestable by other researchers. On the other hand, based on the researcher's position as a moderate relativist and considering the law of diminishing marginal returns, the aim of this literature review was to obtain an understanding of relevant themes and to locate the research topic into the wider management context. This aim could be achieved and the foregoing findings set the base for the subsequent data collection and analysis phase (Chapter 4). In order to collect and analyse the empirical data in a suitable way, the next chapter describes the research design and methodology involving the basic philosophical research considerations; the rationale for the qualitative research design; and the overview of primary data collection and analysis.

# 3 Research design and methodology

Saunders *et al.* (2012, p. 680), define research design as a research study's *"framework for the collection and analysis of data to answer research questions and meet research objectives providing reasoned justification for choice of data sources, collection methods and analysis techniques"*. Creswell (2008) states that research can be conducted on the basis of quantitative, qualitative and mixed methods design which includes quantitative and qualitative elements. In the same work, he further relates the mixed method design to the worldview of pragmatism, quantitative research design to positivism and qualitative research design to social constructivism. However, there are many positions between these three ontological poles (Easterby-Smith *et al.,* 2012; Saunders *et al.,* 2012).

The following sub-chapter 3.1 dwells on determinants of the research design and goes on to furnish a rationale for using qualitative research, while sub-chapter 3.2 introduces the research context. Then, sub-chapter 3.3 introduces the methods used for primary data collection and analysis. This chapter closes with a summary, which displays an overview of the research design in tabular form (sub-chapter 3.4).

## 3.1 Determinants of research design

As determinants for the definition of research design, Creswell (2008) suggests considering:
(a) the research philosophy
(b) the nature of the research problem and
(c) ethical considerations.

The following sub-chapter dwells on these topics and gives a rationale for applying a qualitative approach which uses a case study as the strategy of inquiry. Furthermore, sub-chapter 3.1.4 gives an overview of previous research and research methods used. Subsequently, the selected research design is justified.

### 3.1.1 Research philosophy

The topic of research philosophy is concerned with the sub-themes of ontology and epistemology. Ontology deals, at the extreme poles of a continuum, with the question whether

external reality exists independently from the social actor's perceptions and actions (objectivism) or whether reality is constructed out of the individual viewpoint of social actors (subjectivism). Epistemology is concerned with the question of how acceptable knowledge can be best generated in a field of study (Saunders *et al.,* 2012). Easterby-Smith *et al.* (2012) point out the importance of having awareness and knowledge of different philosophical standpoints, as knowledge helps the researcher:

(1) to clarify the research design

(2) to assess which research design best answers the research question and

(3) supports the researcher to define a research design which is outside "*his or her past experience"* (Easterby-Smith *et al.*, 2012, p. 17).

Therefore, awareness of, and understanding of different research philosophies and dedicated research strategies, methods and techniques, is the basis for an informed choice concerning the best way to approach the research questions and objectives raised. The research question, philosophy, strategy, methods and techniques need to fit with each other in order to generate a coherent research design. The following sub-chapter focuses on the researcher's shift from positivism to moderate relativism. With regard to philosophical research convictions, shifts are not that unusual for experienced philosophers. For example, according to Soywer (2012), even strong relativists like Feyerabend (1962, 1991) or Kuhn (1962; 1970) positioned themselves among more moderate and nuanced forms of relativism over time. In this researcher's case, the initial philosophical considerations regarding research started from the left of the continuum (Easterby-Smith *et al.*, 2012; Saunders *et al.*, 2012). This movement was triggered by insights gained during the DBA taught phase, professional experience in the past and by critical realism. The sub-chapters below briefly outline the related thought process.

#### 3.1.1.1 Insights gained during the DBA taught phase

Creswell (2008) points out that research philosophical considerations influence the choice of research design. For example, it is said that a quantitative-deductive research approach ensures:

(1) a detached researcher position and thus

(2) researcher bias is removed or at least reduced to the lowest possible level (Easterby-Smith *et al.*, 2012; Saunders *et al.* 2012).

Following Comte's (1853) ontological view *"that there can be no real knowledge but that which is based on observed facts*" (Comte, 1853, as cited in Easterby-Smith *et al.*, 2012) and in the light of evidence gained in the past, a positivist mindset in social science was dominant during the researcher's education in Germany. Easterby-Smith *et al.* (2012) recognised the educational path-effects and argue *"more often they (author's note: they = the researcher) simply follow the tradition passed on by those who trained them"*. Therefore, at the outset of the DBA research journey, it was not open to question that this research would be conducted on the grounds of a positivistic approach and related methods. However, in the course of the DBA taught phase, the initial idea of pursuing this study solely on the grounds of a positivist grounded research design became an increasingly important issue. The consciousness of the ontological poles of subjectivism (constructivism) and objectivism (positivism), but as well, during the DBA taught phase, the in-depth discussion of dedicated epistemological approaches to generate academic knowledge offered new perspectives concerning suitable research design for the given research study and research work that is concerned with open social systems in general (Nelson & Winter, 1982).

Besides the insights gained through the curriculum of the DBA taught phase, the drift from a positivist mindset to constructivism was supported by a number of surveys with structured questionnaires completed by the researcher during this period. In particular, a sizeable government-supported research survey conducted by a German University illustrated the weaknesses of sole data collection through structured questionnaires. For example, other participants of the structured survey confirmed that the meaning of the questions in the online questionnaire was partially not clear, but impersonal, thus leaving a large margin for interpretation, a fact that undermines the positivist's ultimate objectives of reliability and validity. These past experiences certainly give no indication of the quality of large surveys in general. However, researchers of social systems who believe only in reductionist research approaches need to be aware that their bias might lie in an assumption that weaknesses in the data gathering process can be traded off via a sophisticated system of statistical key-figures and data analysis methods. Therefore, as suggested by Saunders *et al.* (2012), research designs should also link questionnaires to other methods. For example, in a multi-method research design should be a firm part of the definition process subject to a specific research design. In the case of explorative research topics, a real-life example, which can serve as a benchmark for other companies, should be the starting point to generate practical and theoretical knowledge.

#### 3.1.1.2 Insights gained by professional experience in the past

As well as personal experience with large-scale surveys, experience with some business consultants in the context of restructuring projects further encouraged the move towards relativism. It was observed that if there is only one promising restructuring approach valid for all companies, the respective business consultants proposed very similar restructuring approaches but neglected to sufficiently evaluate the company situation from a different key person's point of view. In this connection, personal experience in the past suggests that the application of standardised restructuring of change processes in business, without sufficient review of the specific context, potentially results in erroneous priorities concerning the realisation of short and long term measures and staff placement. In a concrete case, organisational changes were realised on the basis of popular management ideas but the specific circumstances of the company in question and the opinions and views of important key people from the lower management levels and specialists were simply not considered at all. The result was that a new (imposed) organisation structure caused considerable tensions inside the organisation and finally failed. Much worse, the setting of wrong restructuring priorities forced the company, due to the said organisational measures, to solve upcoming in-house problems instead of focusing the rare resources on the dynamic market environment and the development of appropriate products. This management approach is clearly rooted in the underlying positivistic mindset that there exists only one reality and that, to create success, business concepts just need to be applied in companies. However, realities in a different context are at best similar and not identical. Therefore, in a social context, research needs to have a solid interest in the individual context and circumstances to generate beneficial results.

#### 3.1.1.3 Inspiration by, and differentiation from, critical realism

When progressing from the left side of the research philosophical pathway to the inner right side of the philosophical continuum, critical realism was an intermediate station of ontological and epistemological considerations. It is said that critical realism (Bhaskar, 1975; Sayer, 1992, 2000) provides a compromise position between the extreme poles of positivism and constructionism (Bhaskar, 1975; Sayer, 1992, 2000; Easterby-Smith *et al.*, (2012). As the writings of Bhaskar (1975), who initially moved critical realism forward, proved to be difficult to access, the academic papers by Sayer (1992, 2000), Fleetwood and Hesketh (2006), Easton (2010) and Zachariadis, Scott, and Barrett (2013) gave initial in-

sight to the foundations of critical realism. Focusing on the main difference between critical realism and relativism, Easton (2010) points out that critical realist's believe in the existence of one single reality that cannot be proved or disproved. This mindset is based on a critical realist's belief in a structured ontology which differentiates between an empirical, actual and real domain that cannot be observed respectively or directly detected. The basic assumption of one single reality is in contrast to the viewpoint of relativism. As concluded above, past experience suggests that realities are context-dependent. In this vein, the researcher shares the opinion of Schwandt (2000) that research, especially in the social science context, is interpretative. Therefore, the best offer that can be submitted to critical realists is that similarities can be found in a different context. From this point of view, preference in social science should be given to an underlying approach of continuous corroboration and an attitude of gaining a shared understanding (Sayer, 1992, 2000). With this in mind, the limits of a pre-defined elementary social system can be gradually extended to a wider context. A further distinguishing point is a critical realist's belief that causal mechanisms cannot be observed or detected directly. One can agree that causality in open social systems can hardly be observed. However, it is argued in this thesis that causality can be directly detected, for example via well-prepared expert discussion. Besides these positions incompatible with critical realism, the use of:

(a) underpinned or reasoned causal language

(b) the approach to explain certain events via causal powers (or liabilities) and events that depend on activated conditions

(c) the rejection of predictive cause and effect models, as promoted by strong positivism

(d) the suggestion to apply an intensive research approach

(e) the acceptance that competitive theories can also explain certain events (Sayer, 2000)

and the (f) acceptance of descriptive statistical methods as subordinated tools to substantiated findings from epistemological commonalities, gave inspiration to the definition of this study's research design.

For example, Sayer's (1992) proposed structure of causal explanation forms the basis for the abstraction model of Enabling Factors, subsequent devised propositions and also inspired the focus on the deeper levels and layers of drivers (inhibitors) and causal mechanisms. Furthermore, considering that certain events are dependent on certain conditions that are potentially not known in a certain context, suggestions concerning the causal effects of explored Enabling Factors are based on the mindset of tendential predictions (Fleetwood & Hesketh, 2006). This research applied, as outlined by Sayer (2000), an in-

tensive research approach. Related expert interviews were conducted based on findings of a previous literature review that generated different themes (Enabling Factors). However, the thinking mode of underlying mechanisms led to a deeper understanding of this topic and in-depth interviews delivered substantial insights subject to related drivers (inhibitors) and causal mechanisms (Bhaskar, 1975; Sayer, 1992, 2000). As soon as the results were sufficiently substantiated via the literature review and the findings at the research unit, Loewe's PO, the borderlines of the pre-defined elementary context were gradually extended by involving External Experts who have working experience in companies that are dependent on innovation suppliers.

### 3.1.2 Nature of the research the problem

Concerning the given research problem, leading academics in the field of purchasing and supply chain management point out that there is a substantial need for research in the domain of purchasing involvement into the innovation process (Schiele, 2010; Glock & Hochrein, 2011). This study specifically adds the viewpoint of the PO of a medium-sized manufacturer of consumer electronics to the given knowledge of academic research. Where the research demand is concerned, details were delineated in sub-chapter 1 Introduction and Chapter 2, the Literature Review. Creswell (2008, p. 18) suggests explorative qualitative inquiry in cases *"when the researcher does not know the important variables to examine"*. This explorative character is expressed by RQ1, which is concerned with the exploration of Enabling Factors for the PO of a medium-sized SI, while RQ2 is concerned with definition (exploration) of a strategic agenda for the PO of the selected medium-sized SI 'Loewe'. However, RQ3 are there indications that the identified Enabling Factors are relevant for other system integrators?  has an explanatory character as the devised EF, driver, mechanism and relationships, are verified by using a purposive sample of purchasing experts of other SIs with dependency on innovation/technology suppliers. For this reason, this study has an explorative and, even if subordinate, explanatory character. Furthermore, the study is embedded in a certain context that is reflected by the PO of a medium-sized system integrator of consumer electronics.

### 3.1.3 Ethical considerations

This research study conforms to the Handbook of Research Ethics of the University of Gloucestershire. In general, this study poses no serious ethical problems. Anyway, the first priority of this study is to keep the risk of embarrassment, harm or any other disadvantage away from research participants (Saunders *et al.* 2012). This general mindset needs to be a permanent companion of the researcher through all research stages and starts with the definition of research questions and the subsequent research design (Saunders *et al.*, 2012; Maxwell, 2013). For the researcher, as an employee of Loewe, physical access was not an issue (Saunders *et al.*, 2012). Therefore, this sub-chapter dwells on the issue of cognitive access. Saunders *et al.* (2012) point out that cognitive access is the main condition, besides physical access, to gain access to research data of interest, shared by research participants.

A good strategy to gain cognitive access starts with honest, transparent communication about the research (Bell & Bryman, 2007). Saunders *et al.* (2012) further suggest that the trust and acceptance granted by the research participants to the researcher are major components to achieve cognitive access. In the case of a company researcher who is a colleague of the research participants, the researcher's colleagues might have some reservations concerning the confidentiality of the data and what will evolve from the data. Even if confidentially is confirmed, there still might be the remains of mistrust due to the executives' management board interest in the study results and direct talks between the company researcher and the executive management. Furthermore, there might be concerns subject to possible implications to Loewe's Purchasing Organisation caused due to the research data gathered and conclusions. Moreover, there might be some feeling of jealousy or reservations towards an internal researcher who is a direct colleague, as it is known that Loewe supported this doctorate research. It is very important to recognise that these said aspects potentially lead to distorted data which could jeopardise the reliability of the data collection process and validity of the research results. Therefore, it was important to take on the perspective of the PO members in order to anticipate their potential feelings, anxieties and interests. Based on these considerations, the aim was to create an atmosphere of trust without disturbance during the interviews. For this reason, an appropriate room at the Loewe development building was selected and booked.

In order to obtain consent to participate in the study, in an initial step, the background, aim, questions and objectives of the study were briefly explained (Easterby-Smith, *et al.* 2012). Furthermore, the interview survey methods applied, and related data analysis methods,

were introduced. The accuracy of the data collection was explained as the reason for audio recording the interviews. As an alternative technique, interactive note taking was offered. Subsequently, it was also pointed out that it is the interviewees' free choice to select a data collection technique. Additionally, the research participants were informed that it is, during all research phases, their free choice to join the research or to withdraw from it, also in later research phases. All data concerning research participants will remain anonymous and the recorded interviews were deleted after transcription and data analysis. Easterby-Smith *et al.* (2012, p. 158) point out that *"in any event, researchers should be able to recognise and capitalise on these situations and offer them as benefits or advantages to interviewees in exchange for participation".*

As Loewe was in a deep restructuring process at this time, the prospective research participants were keen to be involved in the future organisation and future fields of responsibility of Loewe's PO. Furthermore, the research participants and the researcher had known each other for several years and had a relaxed relationship, and all purchasing members agreed to participate in the study. Open discussion of the ethical aspects made the research participants confident during the interview survey meetings. This was reflected also by the fact that spontaneous consent was given by all purchasing members to participate in the study, also to the audio recording of the interviews.

### 3.1.4 Research methods used by previous research within the PSM field

Subject to the applied research design, analysis of the relevant identified literature (Chapter 2 Literature Review) showed that 17 studies were based on a qualitative research design, 2 on a mixed method research design and 13 on a quantitative research design (Creswell, 2008).

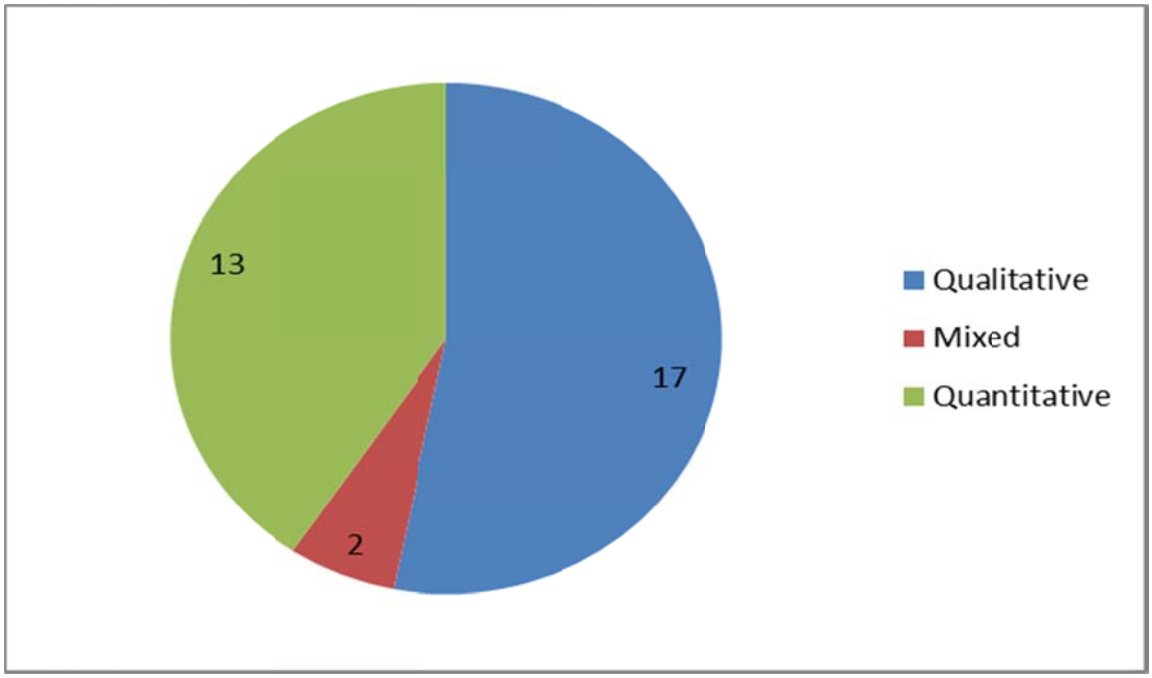



Figure 13: Research design of identified academic papers Source: author's research, 2014

The quantitative approaches were realised on the basis of the survey strategy while the qualitative based research designs were devised in the context of case studies (14 studies) and an archival research strategy (3 studies). At first glance, the mixed method approach plays a subordinate role in PSM research, as only 2 of the academic papers identified used this approach. Both studies were based on a sequential qualitative → quantitative approach (Creswell, 2003). However, a closer look at the quantitative studies reveals that they were based on findings of a preceding qualitative case study inquiry (for example Handfield, Ragatz, Petersen & Monckza, 1999; Schiele, 2010).

### 3.1.5 Qualitative research approach

By analogy to the four cardinal points of a compass, relativism reflects the major direction and basis for this research. Foremost, however, Sayer's (1992, 2000) interpretation of critical realism and proposed abstraction methods provided valuable hints subject to the final co-ordinates the researcher's position in the philosophical research continuum, which can be, at this point in time, best explained as that of a moderate relativist inspired by some ideas of critical realists (Bhaskar, 1975; Sayer, 1992, 2000). Subject to realities, considering the insights gained from sub-chapter 3.1.1, Research Philosophy, realities in social systems are viewed, at best, as similar but not identical. Similarity forms the basis for generat-

ing knowledge that can be applied to a pre-defined context. From the researcher's viewpoint, similarities can be identified via the careful extension of the research limits of a given research context combined with an approach to achieve a level of shared understanding between social actors on which to base sound appropriate, defined measures. This rejects the idea of extreme relativism that everything is relative to everything else (Swoyer, 2012). Even so, moderate relativism accepts alternative explanations but rejects an 'everything goes' idea, as promoted by strong constructivsm (Swoyer, 2012). Linked to the generation of knowledge, moderate relativism relates to epistemology of constructionism which provides a middle position in the ontological continuum (Easterby-Smith *et al.*, 2012). Constructionism has the aim to achieve convergence of findings and uses different data sources (words and numbers). This means that the related ontology of moderated relativism is open to the utilisation of qualitative and quantitative elements. However, quantitative elements are viewed as supportive to achieve shared understanding between social actors, for example, through validation steps of previous qualitative findings that intend to achieve a level of shared understanding. Schwandt (2000) supports this approach and points out that the traditional way of selecting only methods which are considered as options concerning a specific worldview is not useful. In this regard, measures that are concerned with validity and reliability should be interwoven throughout the research process (Yin, 2009). This reflects the realists' principle of corroboration that considers that multiple stakeholder perspectives can be well utilised throughout the research process to advance knowledge (Chakravartty, 2014).

### 3.1.6 Inquiry via case study research

With reference to qualitative research designs, Creswell (2008) suggests narrative research, phenomenology, ethnographic research and grounded theory studies as strategies for inquiry besides case study research. However, these research strategies apply rather to strong constructionism which generates theories via a solely inductive and interpretative approach (Easterby-Smith *et al.*, 2012; Saunders *et al.*, 2012). In contrast but in line with moderate relativism, case study inquiry is open to the utilisation of qualitative and quantitative methods for reasons of data collection and analysis (Yin, 2009). In other words, case study research can be applied where a certain phenomenon is subject to exploration and explanation (Creswell, 2008; Yin, 2009). The related phenomenon of interest is described by the research questions (Yin, 2009). Case study research relates to a certain context in which

one or more cases are analysed (Yin, 2009; Easterby-Smith *et al.* 2012). The certain context of this study is characterised by the high dependency of a medium-sized SI of electronic consumer products on technology/innovation suppliers who have considerable market power. This condition applies to the television set market (which is introduced in subchapter 3.2. Research Context). To achieve the research objectives, the PO of the medium-sized German television set manufacturer Loewe represents the typical or critical case to explore the Enabling Factors (Yin, 2009). Loewe's PO members are considered as units of analysis. Therefore, the PO members' statements and opinions are collected and analysed (Yin, 2009). Based on the triangulation of qualitative and quantitative findings, conclusions are drawn for the context of Loewe's PO, and via the integration of other External purchasing Experts, for the expanded context of other SIs with high dependency on the innovation supplier. In order to gain insights as to the generalisability of the findings, the context of the study was expanded via the integration of further purchasing experts who have working experience with other SIs which also depend greatly on innovation suppliers. In this way, multiple perspectives of experts could be considered. In this process, for the reasons of face validity and external validity, qualitative findings were transformed into quantitative codes (Creswell, 2008). This approach to inquiry can be best described as a multiple embedded case study that applied sequential transformative qualitative → quantitative methods for data collection and analysis. The figures below illustrate the selected units of inquiry (= units of analysis) (Yin, 2009).

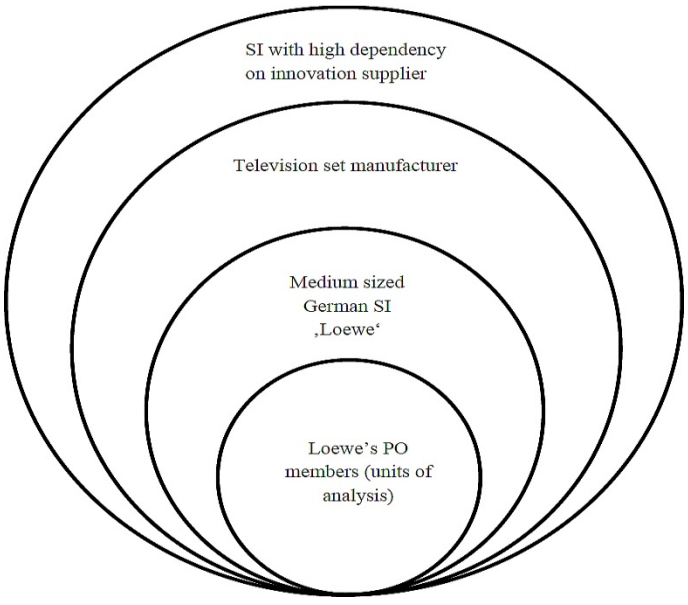



Figure 14: Selected units of inquiry

The figure below illustrates the approach to expanding the context from the critical or typical case, Loewe's PO, to the wider context that refers to POs of other SIs with high dependency on innovation suppliers. Face validity is achieved with regard to the findings at Loewe's PO while external validity of the study's findings is achieved via the integration of External purchasing Experts with respective working experience.

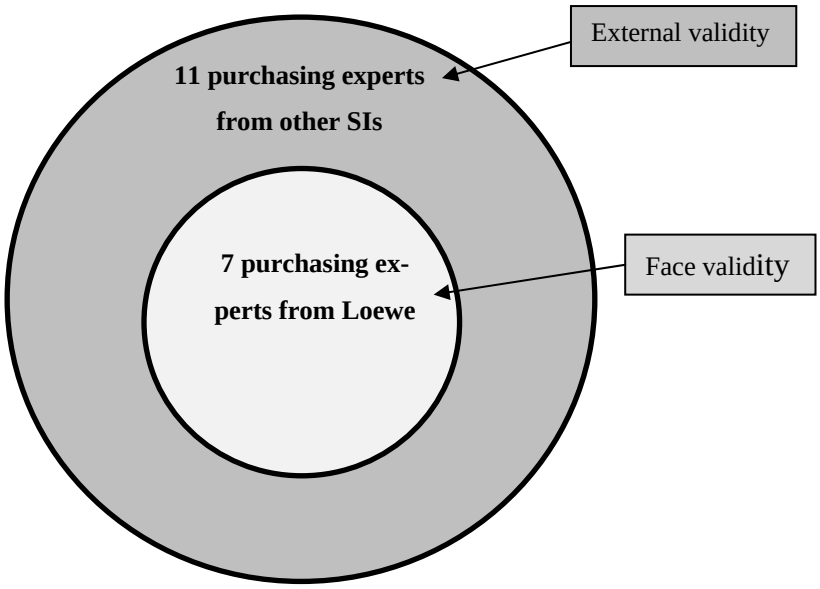



Figure 15: Expansion of context from Loewe's PO to POs of other SIs

## 3.2 Research context

This chapter introduces the specific context of this case study inquiry. At first, the television set market and the German manufacturer Loewe are introduced. Then, the sub-chapter introduces Loewe's PO members who participated in the study. Concerned with the aim of obtaining initial insights as to the generalisability of findings, statistical characteristics of the 11 external participants who participated in the study are identified.

### 3.2.1 Market overview television sets

The worldwide sales number of television sets was 226.7 million units in 2013. The figure below shows that the global market is not a growth market. Since the year 2011, the total number of worldwide television set sales contracted by approximately 12%. For the year 2014, a slight increase to 229 million sets is forecast, driven by new display technologies such as Ultra High Definition (UHD) and connected TV set applications.


Figure 16: Global Television Market. Source: IHS. Retrieved from www.ihs.com

Five television set brands (Samsung, LG, TCL, Sony, Hisense) combine to form a market share of approximately 50% of global flat television set demand. Samsung is in the lead with a market share of 20% in 2013 (Strategy Analytics, 2014a). One fifth of television sets worldwide are sold in Western and Eastern Europe. Besides the United Kingdom, Germany is one of the biggest European single markets; each has an annual sales totalling approximately 7-9 million sets. The German market for Consumer Electronics (entertainment electronics, information technology and telephone communication technology) is a growth market, with an increase in sales volume of 40% between 2001 and 2012. In 2012, German consumers spent 28.7 billion EUR on consumer products (Source: GfU, 2013). The growth is driven by smartphones and tablet PCs, which have overtaken the television set market as the largest single market segment. In contrast with the market development of smartphones and tablet-PCs, global television set sales in Germany have stagnated since 2009. In this market environment, TV set manufacturers have to cope with the five market forces (Porter, 1980, 1998). For example, (1) new entrants such as Chinese consumer electronics manufacturers venturing into the television set market. Furthermore, (2) substitute products like smartphones and tablet PCs taking the place of TV sets as the most important single consumer electronic product. The procurement market for TV chip suppliers and LCD TV panel suppliers is characterised by a process of concentration as the development and manufacturing of major television set components, like panel modules or semiconductor processors, require big investments into R&D and manufacturing capabilities.

Therefore, medium-sized companies struggle to obtain access to these technologies. Hence, these major component suppliers have (3) a strong bargaining power and TV set manufacturers have to offer a sufficiently high level of prospective turnover in order to obtain competitive procurement prices and to have appropriate development support from the major suppliers. Moreover, the total decline in demand for TV sets since 2009 led to overcapacities ehich, in turn, induced: (4) a strong bargaining power by dealers and consumers. These conditions in a mature and stagnating TV set market have led to: (5) strong rivalry among existing firms.

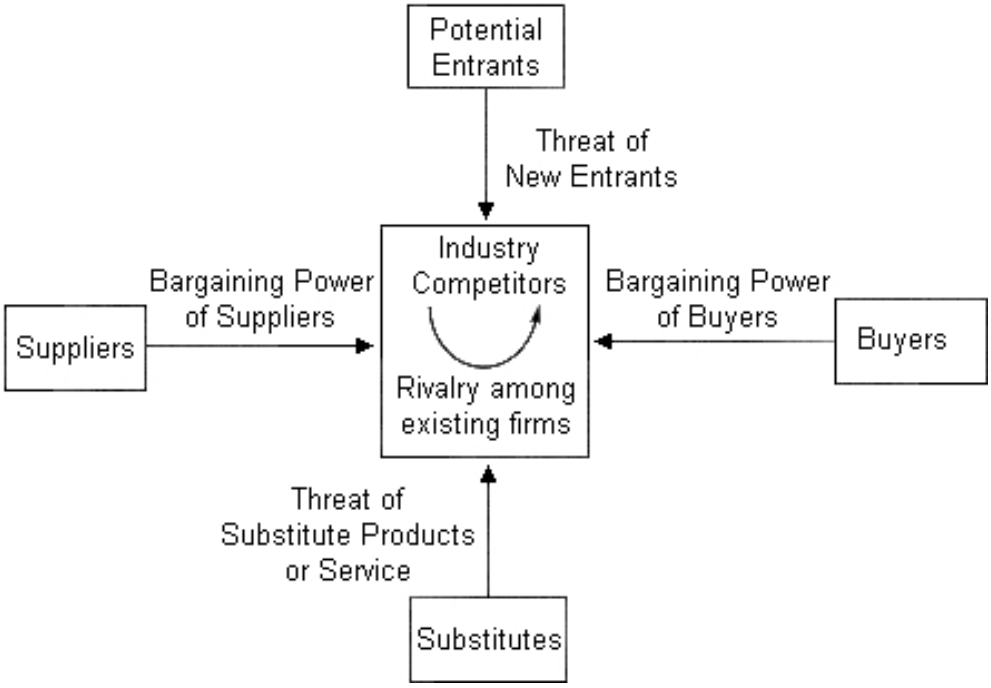



Figure 17: The five market forces (Porter, 1980, 1998**).** Retrieved from http://www.brs-inc.com/porter.asp

Aggressive displacement competition and extreme cost pressure resulted in heavy losses for some TV set manufacturers (Yoshida, 2012). In order to cope with the extreme cost pressure, some TV set manufacturers changed their strategy and concentrated on brand management, service and product specification whereas the development and manufacturing of TV sets is undertaken by original design manufacturers (ODMs), who combine massive purchasing power and production capacities. Thus, they can generate economics of scale. In contrast with an outsourcing strategy, the market leaders pursued a vertical integration strategy in order to have control of the total supply chain. As a further major strategy, TV set manufacturers aggressively pursue innovation strategies and in consequence, most of the products offered have a life cycle of only 12-18 months. Major innovations in

the past 10 years include the change to flat panels and LCD-TV technology, 3D technology, Full High Definition (FHD) resolution or the development of connected TV sets (Smart TV). The current innovation technology trends are Ultra High Definition (UHD) resolution, organic light-emitting displays (OLEDs), curved display technology, internet-based TV (IP-TV), intelligent home automation and networks combined with easy interconnectivity with other sources such as smartphones, tablets PCs or cameras (Source: GfU, the market for Consumer Electronics, 2013). The technical heart of a TV set is the so-called main unit, which is responsible for its complete signal processing. Investment in the development of a main unit is expensive, the largest share of the cost arising from software development. Further important components for TV sets are speakers, power supply units, electro-mechanical parts, mechanical elements and cosmetic parts.

### 3.2.2 Loewe, television set manufacturer

During the German TV set manufacturer Loewe's long history of 90 years, the company introduced major innovations into the TV set market. According to Loewe records, the company presented the first electronic TV set in 1931. Twenty years later, the company presented the first video recorder to the public. In 1995, Loewe introduced fully recyclable TV sets and in the year 2007 was one of the first companies to utilise TV sets as a media hub for connected TV sets. Nowadays, the company sustains a strong presence in the premium market for TV sets. Therefore, the company concentrates on brand core features design, innovative technology and individuality for the development of high-end TV sets. This strategy seems to work well and the company achieved its highest profit ever in 2008. During this period, Loewe's value-based market share was approximately 10% in Europe. Besides TV sets, Loewe has related products such as Blu-ray players, loudspeaker systems and accessories such as wall-mount systems and TV set furniture in its sales portfolio. However, market stagnation and worldwide overcapacities led to heavy cost pressure and falling market prices. Furthermore, Loewe's competitors started to copy Loewe's brand features, for example outstanding cosmetic design, thus venturing into Loewe's niche market. Due to the cost position and concentration on the static European market, Loewe was not able to make good the loss of turnover and suffered a 29.8 EUR million loss in the fiscal year 2012 (Loewe AG, 2013). In 2013, the company was finally forced to file for insolvency and the workforce was reduced by 50% to a total of 550. Since the 1st February 2014, the company has belonged to a group of investors and has entered into long-term technical co-operation with one of the leading Chinese electronic goods manufacturers,

Hisense. As one of the few television set brands, Loewe owns its own software stack subsequently further developed during the restructuring process of the company. Considering the technology trends mentioned above, such as home automation and networks, this strategic investment into its own software stack potentially enables the company to integrate further household appliances that communicate perfectly which each other into its sales portfolio. However, as a medium-sized manufacturer, Loewe will remain highly dependent on innovation suppliers. The figure below displays Loewe's innovation network. As major technologies cannot be sourced in Europe, Loewe needs to create and maintain a worldwide sourcing network. Furthermore, for the market of connected television sets, service providers for software applications are becoming increasingly important.

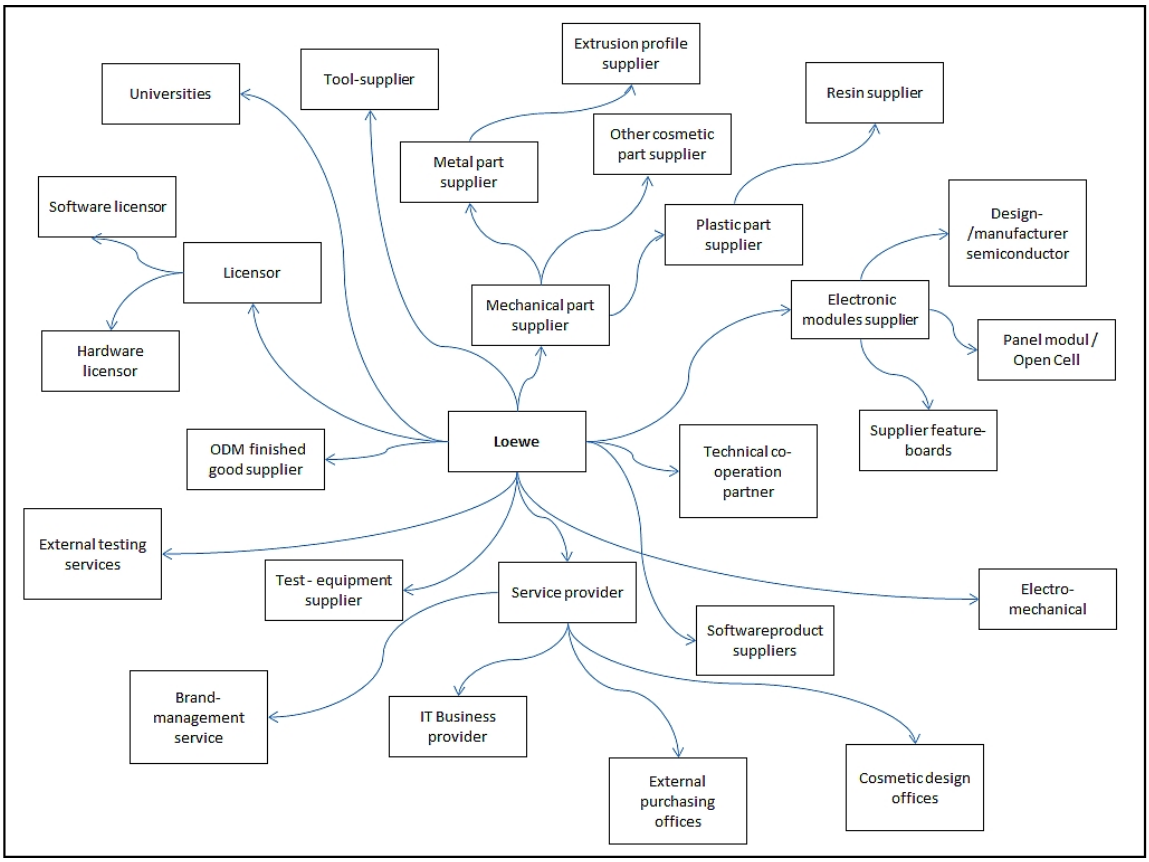



Figure 18: Loewe's innovation network

Due to high dependency on innovation suppliers, short life-time cycles and innovation pressure, together with limited company resources compared with the market leaders, from the resource-based and dynamic capability based viewpoints, Loewe needs to utilise its available resources efficiently and effectively so that the company can build up and maintain a functioning eco-system of innovation suppliers which ensures early access to decisive technologies. In this process, Loewe's Purchasing Organisation (PO) plays a crucial

role. For this very reason, it was selected as a critical unit of analysis for this study (Yin, 2009).

### 3.2.3 Research participants (= units of analysis)

In line with the embedded multiple case study approach, the following sub-chapter defines and introduces the television set manufacturer Loewe with headquarter at Kronach/Germany, Loewe's PO (internal research participants) and purchasing experts from other SIs. The internal and external research participants represent, in Yin's terms (2009), the 'units of analysis'. While Loewe's PO members (internal research participants) are connected with the specific context of a medium-sized SI of consumer electronic products, the integration of External purchasing Experts with working experience in other SIs with high dependency on innovation/technology suppliers reflects the approach of carefully extending the context to other companies. In this way, early indications as to the generalisability of findings at Loewe's PO can be detected.

#### 3.2.3.1 Loewe's Purchasing Organisation (PO)

Reflected in Schiele's (2007) maturity profile overview, Loewe's PO has achieved a high level of maturity level, characterised by the division into operational and strategic purchasing, and the realisation of commodity management under the leadership of the PO members. In addition, features include active risk management, highly educated members, continuous training activities, and active participation in new product development projects. Further factors are: utilisation of external purchasing offices in Asian countries, responsibility for contract management, supplier selection and price negotiations, and controlling of total company spends via the implementation of a lead buyer concept. During Loewe's ongoing restructuring process, the PO is in the process of reviewing and redefining its task package in order to increase its added value for Loewe. The associated efforts reflect the managerial tenets of the resource-based and the dynamic capability resource-based views provided above that are concerned with the question of how to achieve sustained competitiveness. Connecting with this viewpoint and considering the PO as a direct interface with the relevant procurement market, the PO's capability to generate valuable outside-in innovations for Loewe has become a major topic of interest. Subject to the 'innovation planning' management function (Schiele, 2007), purchasing responsibility is extended from pro-active teamwork to a systematic support function of new product development via in-

formation about technology trends, for example via the preparation of technology roadmaps. However, first of all, this strategic approach requires achieving an understanding of the related Enabling Factors of the PO's integration into Loewe's innovation process. The exploration of this research topic implies the building of almost laboratory conditions for investigation of the above delineated dynamic market environment of the television set sector with displacement competition, short innovation cycles, the specific company situation of Loewe characterised by limited resources compared to market leaders, and high dependency on innovation suppliers combined with the compact size of medium-sized SIs of electronic consumer products. Aside from the researcher, six senior managers and one junior manager are responsible for strategic purchasing activities at Loewe, i.e. a total of seven strategic purchasers represented the 100% sample at the beginning of the study. At this point it has to be mentioned that 2 purchasers left the company in the course of this study, so that the face validity test of Phase I of the data collection and analysis process was continued with the remaining 5 purchasing members.

#### 3.2.3.2 External purchasing Experts (EEs)

Relating to RQ3 -Are there indications that the Enabling Factors identified are relevant for other system integrators? A purposive sample of further purchasing experts of other SIs with dependency on innovation was selected. Eisenhardt (1989) suggests a sample of 4 to 10. For this reason, a minimum of 10 further External purchasing Experts with working experience in SIs with high dependency was defined as the sample size. Subject to the search process of appropriate external research participants, prospective companies highly dependent on innovation suppliers were selected. At this point, physical access to suitable research participants was the major issue (Saunders *et al.*, 2012). To solve this issue different contact strategies were applied. For example, direct personal contacts were approached subject to their potential relationship with purchasers of companies that are, like Loewe, highly dependent on innovation suppliers. In these cases, the direct contacts in the researcher's professional network served as intermediaries to prospective research participants, thus turning a 'cold' acquisition approach into a 'warm' one. As soon as a prospective participant showed interest in participating in the study, a customised e-mail was sent to him/her, explaining the background of the study and the expected time required to complete the questionnaire. Alongside this, a direct approach strategy was applied. For example, due to the very similar size and dependency profile of a direct competitor of Loewe, the participation of the purchasing director was targeted. Due to potential reservations re-

garding competition-sensitive data, the background of the research topic, related questions and expected time demands were explained in detail so that this research participant recognised the benefits that can be gained through participation (Saunders *et al.*, 2012). As the researcher intends to write a journal article about the research findings, the participants were promised a copy of the article. The same acquisition principle was applied to all other prospective research participants. As soon as the prospective participants gave their final consent to participate in the study, a customised e-mail invitation was sent to them containing the link to the questionnaire and the access code. From a total of 25 pre-selected prospective research participants, 13 agreed to participate in the study. However, two did not complete the questionnaire so that finally 11 completed questionnaires were available for data analysis, thus representing a participation rate of 44%. Thus, the target of 10 research participants was achieved so that initial insights to the generalisability of the Enabling Factors, drivers (inhibitors) causal mechanism and relation between the Enabling Factors can be expected after data analysis. The interview survey started on 3rd September and ended on 30th November 2014. The project data were downloaded from the web-based platform SoSci Survey on 2nd December 2014. For the sake of clarity, external research participants are described as External Experts (EEs) in the data analysis section.

The table below displays the characteristics of the External Experts (research participants):

| RP | Job-position | Branch | Working experience |
|---|---|---|---|
| EE01 | Senior manager purchasing | Medical and healthcare | ➢ 5 -10 years |
| EE02 | Senior manager purchasing | Consumer electronics | ➢ 10 years |
| EE03 | Consultant purchasing | Purchasing consultancy | ➢ 10 years |
| EE04 | Consultant purchasing | Purchasing consultancy | ➢ 10 years |
| EE05 | Senior manager purchasing | Automotive supplier | ➢ 10 years |
| EE06 | Senior manager purchasing | Medical and healthcare | ➢ 10 years |
| EE07 | Consultant purchasing | Purchasing consultancy | ➢ 5-10 years |
| EE08 | Senior manager purchasing | Child safety seats | ➢ 10 years |
| EE09 | Director purchasing | Automobile manufacturer | ➢ 5-10 years |
| EE10 | Director purchasing | Elevators | ➢ 10 years |
| EE11 | Director purchasing | Consumer electronics | ➢ 10 years |

Table 3: Characteristics of External Experts (EE) Source: researcher's original material, 2014

## 3.3 Primary data collection and analysis

### 3.3.1 Overview of the data collection and analysis process

Equipped with the insights gained from the literature review, because of primary data collection and analysis, an intensive research approach was adopted. As a typical method for an intensive research approach, academic authors (Sayer, 2000; Saunders *et al.*, 2012: Easterby-Smith *et al.*, 2012) propose the study of individual agents, for example, by means of interactive interviews and qualitative data analysis. The overall data collection and analysis process was divided into the three phases:

(a) primary data collection and data analysis at Loewe's PO (Phase I  interview survey)

(b) external validation with External purchasing Experts of other SIs with dependency on innovation/technology suppliers (Phase II  external validation) and

(c) writing up the results (phase III).

Based on the explorative character of the study, data collection was organised in a multiple sequential qualitative → quantitative approach (Creswell, 2008). This reflects a continuous corroboration approach as outlined by Miller and Tsang (2010). With regard to RQ1 and in line with RO1, the objective of Phase I, Interview Survey, was to collect, review and understand practitioner knowledge relating to the effective integration of Loewe's PO into the innovation process. Based on the above empirical approach, interviews were conducted with Loewe's PO members. In this process, the general conditions (drivers) and underlying mechanisms were explored in detail on the basis of the hitherto devised structure of causal explanation and related assumptions (see Chapter 2, Literature Review). After data analysis, RQ1 What are the Enabling Factors for the effective integration of purchasing into the outside-in innovation process?  could be answered. In line with RO3, Phase II  external validation of the data collection and analysis process aimed at investigating whether the identified Enabling Factors are confirmed (or not) by purchasers of other system integrators (RO3). In this way, the answer as to whether identified Enabling Factors are only relevant for the specific context of Loewe's PO or whether there are initial indications that the Enabling Factors apply also to POs of other SIs with a high dependency on innovation suppliers could be found. This led to a questionnaire being forwarded via a web-based platform to a purposive selected sample of  purchasing experts who have working experience in other companies with high dependency on innovation/technology suppliers. Based on the results of external validation, Phase II was further concerned with RO2, to devise a strategic agenda and measures for the effective purchasing integration into the innovation

process of the selected medium-sized system integrator (RO2). In this process, the insights gained during Phase I – Interview Survey, about the dependency relationship between the Enabling Factors proved to become an important input relating to the definition of a strategic agenda for Loewe's PO (note: the exploration of relationships between the EF was elaborated during an expert talk with Professor Dr. Schiele, who conducts research in the PSM field of buyer supplier relations and innovation management, personal communication and e-mail on 14th February 2014). In this regard, appropriate measures were worked out during Phase II together with Loewe's PO members. For this purpose, a focus group method was utilised during a half-day workshop. Finally (Phase III), the findings of the data collection and analysis were written up. Figure 19 displays the data collection and analysis process.

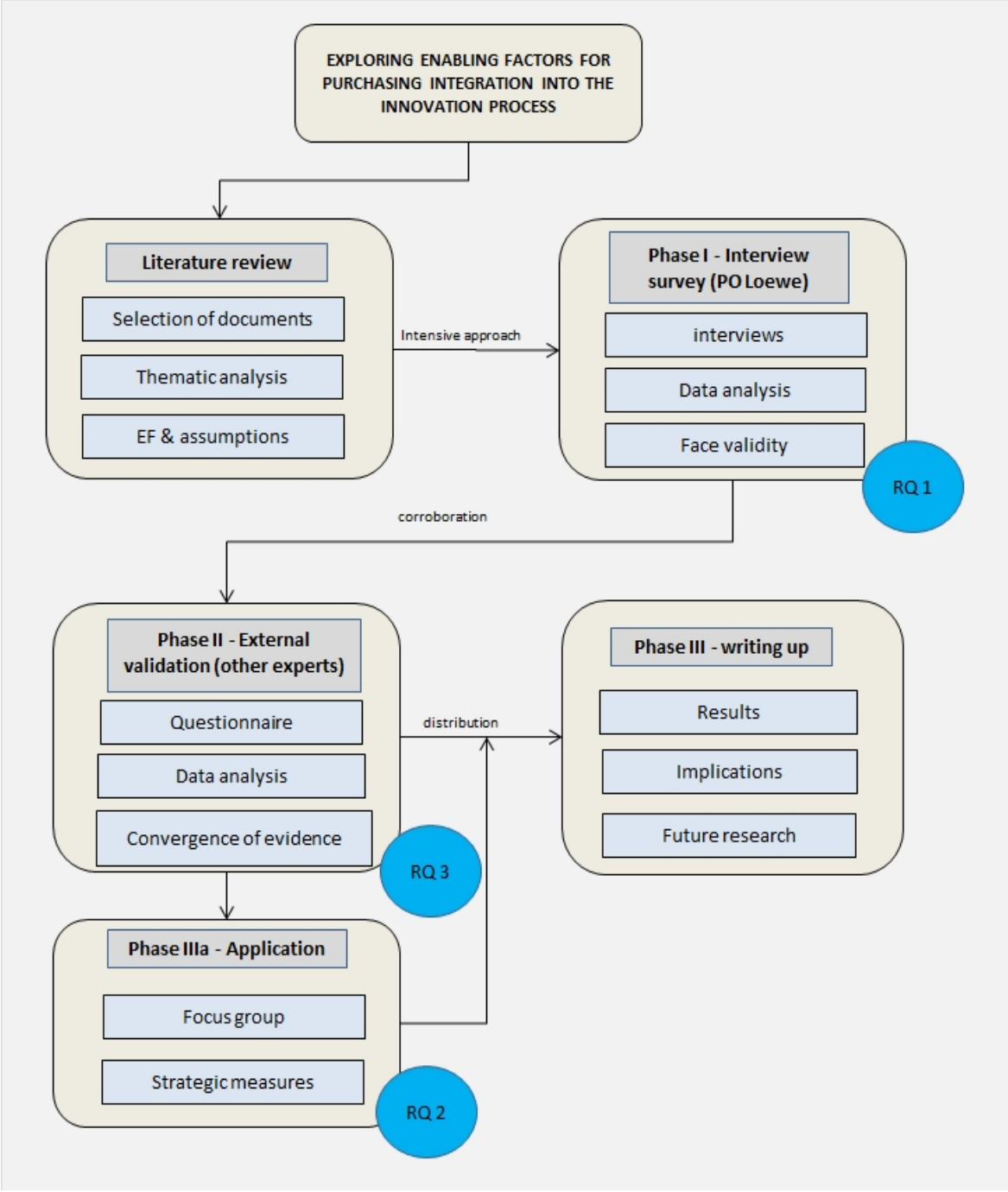



Figure 19: Overview data collection and analysis process

Together with the knowledge generated during the research phases, the literature review resulted in the achievement of 'independent knowledge' whereas the achievement of shared contextual knowledge was the focus of Phases I and II of the data collection and analysis process (Baxter Magolda, 1992). To explain this more clearly, Phase I aims to achieve a shared understanding with Loewe's PO members while the target of Phase II is to gain a shared understanding with purchasing representatives who have working experience in other SIs with high dependency on innovation suppliers. This approach is in line

with Baxter Magolda (1992), who points out that contextual knowledge needs to be evidence-based to a certain context. Moreover, the process of gaining a shared understanding is an important element of the knowledge socialisation process within the knowledge spiral of organisations (Nonaka & Takeuchi, 1995).

### 3.3.2 Quality criteria, reliability and validity

#### 3.3.2.1 Quality criteria in case study inquiry

The constructivist's research work is often criticised by positivists for the potential lack of quality criteria and transparency in connection with the research process, the generation of findings, the identification of causal relations and respective regularities and the subsequent generalisability of research findings to a wider population (Valsa, 2005; Easton, 2010, Easterby-Smith *et al.*, 2012, Saunders *et al.*, 2012). For example, Easton (2010) states that: *"In general interpretivists deny the possibility of knowing what is real and reject the possibility of discerning causality. They can only provide their own interpretation."* (Easton, 2010, p. 118). Considering this weaknesses, constructivists like Yin (1994, 2009) proposed reasonable measures in order to increase objectivity, validity and reliability. Considering these quality criteria of a case study research design, for example, Yin (1994, 2009) proposes to utilise a linear but iterative research process, which is based on positivistic quality concepts/criteria of the concept and triangulation.

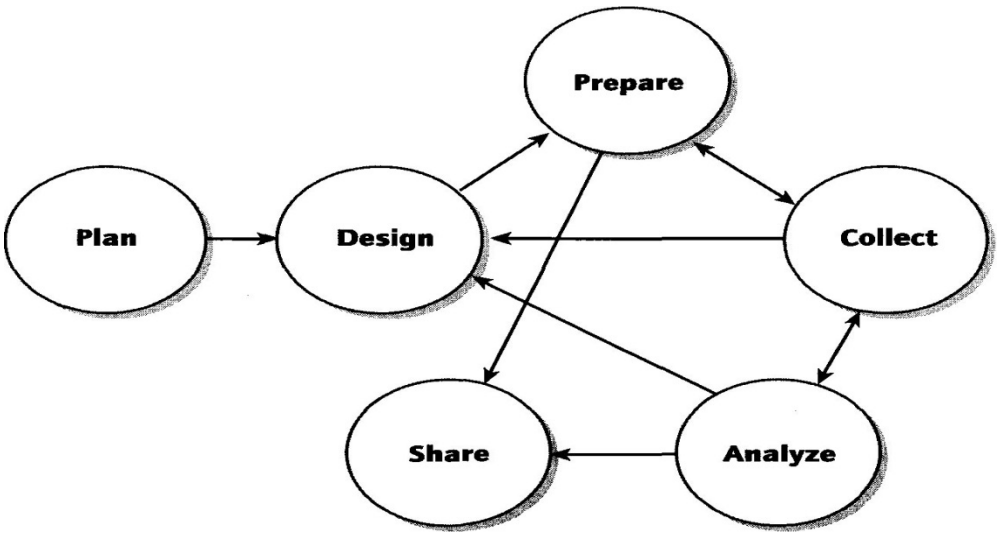



Figure 20: Doing Case Study Research: A linear but iterative process. Source Yin (2009, p. 2)

To achieve convergence of evidence, Yin (1994, 2009) proposes to follow three principles: First, to use multiple sources of evidence. Yin (2009, p 115) points out the "*most important advantage presented by using multiple sources of evidence is the development of*

*converging lines of inquiry, a process of triangulation and corroboration"*. The figure below illustrates the data sources used in the context of this study.

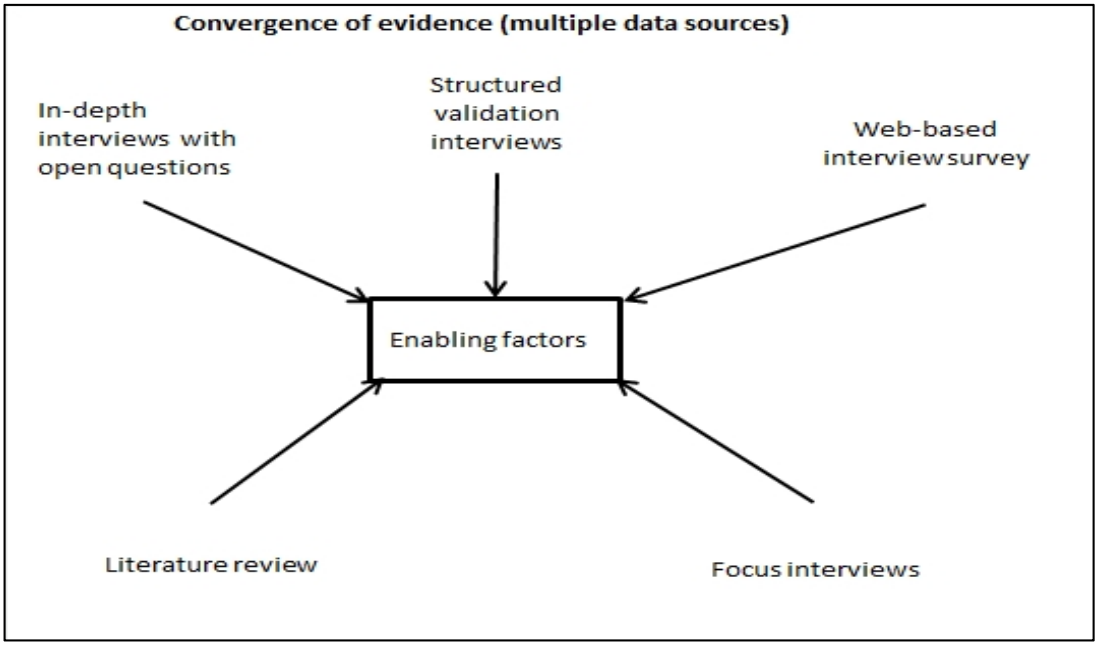



Figure 21: Convergence of evidence via multiple sources of evidence (based on Yin, 2009, p 117)

Secondly, to create a case study database in which evidentiary data and reports can be stored by the investigator. For this reason, a project was created in NVivo10. All major product documents were stored in this project. Thirdly, in order to further increase reliability, to maintain a chain of evidence which enables the reader to "*follow the derivation of any evidence from initial research questions to ultimate case study conclusions*" and "*to trace the steps in either direction*" (Yin, 2009, p.122). For this reason, a flow chart of the data collection and analysis process was devised (sub-chapter 3.3). These requirements are basically in line with the realist's corroboration approach (Chakravartty, 2014). Along these lines, Creswell and Plano Clark (2011) point out that validity is realised by a transparent analysis procedure that can be reviewed by an external reviewer. Transparency of the research process is also required by Miles and Huberman (2002) and Guest, MacQueen and Namey (2012) point out that face validity and external validity are applicable to most qualitative research. They further propose, subject to validity, concrete measures that can be interwoven in the research design and throughout the data collection and analysis process. In recognition of the suitability of the constructivist research approach, especially at early research stages of a research topic and regardless of the reductionist's critics, a number of concrete advantages of constructivist research strategies have become increasingly accepted in the researchers' community. This might be one of the reasons that case study

research has become a widely accepted and independent research approach even in countries like Germany and Switzerland which traditionally prefer positivistic-based research methods (see Doctoral Seminar, ETH Zurich and University of St. Gallen, 2008).

#### 3.3.2.2 Realised quality criteria for this study

In general, reliability refers to the requirement that the selected data collection and analysis techniques generate stable and consistent results (Saunders *et al.*, 2012) if repeated at another location or by a different researcher. As argued by Guest *et al.* (2012), validity cannot be achieved without reliability. Threats to reliability can be caused by the participant or the researcher. Participant errors refer to factors which lead to an adverse alteration of the research participants' performance, for example, in case the interviewee is under time pressure (Saunders *et al.*, 2012). Participation bias leads also to negative performance and can be caused by external factors, for example if the interviews are not conducted in a confidential atmosphere (Saunders *et al.*, 2012). The term researcher error describes factors which influence the researcher's interpretation, for example, due to insufficient preparation or a general lack of knowledge about the respective research domain (Saunders *et al.*, 2012). Researcher bias is caused, for example, when the researcher elicits responses from participants which are influenced by the researcher's own subjective opinion (Saunders *et al.*, 2012). In a quantitative data orientated research design, construct validity indicates whether the data measured actually reflect what the researcher really wants to assess. Internal validity indicates whether there is a relationship between different variables respectively between variables and factors beyond statistical variance. External validity is concerned with the questions whether the research findings can be generalised, based on inferential statistics, to the entire population (Saunders *et al.*, 2012). A positivist's research design utilises statistical key figures that are computed in a separate, clearly defined testing/analysis step. Often supported by statistical software such as SPSS, the computed mathematical values indicate the extent to which the criteria of reliability and validity are realised. There are many statistical textbooks available and, therefore, this chapter will not treat the positivist calculation of coefficients for reliability and validity further. In qualitative data-focused research designs, key figures for reliability and variability are in all probability not a subject of testing in clearly defined testing steps. Interpretation is based on collected words and meanings and not on computed figures. However, as described in subchapter 3.1.1, moderate forms of relativism or constructivism take into account the idea behind the positivist quality criterion (Creswell, 2003; Guest *et al.* 2012; Yin, 2009).

Therefore, as mentioned above, the criteria of validity and reliability are interwoven into the entire research process and concentrate on validating the explored meaning of research participants' expressed opinions. Zachariadis *et al.* (2013) point out that validation is crucial for research designs to develop common knowledge. In other words, valid research findings are reflected by a shared understanding of the research participants. In this process, descriptive statistical analysis is used as a subordinated technique that has the objective of supporting the findings of the preceding analysis process of qualitative data. The table below gives an overview of the interwoven quality criteria, related definitions, aims and concrete measures that were applied throughout the research process.

| | Type | Definition | Aim | Measures |
|---|---|---|---|---|
| **Corroboration approach over the research process** | Reliability | To achieve the collection of non distorted data that are accurate. | Accuracy of the data collection process is reflected via reliability. | - Semi-structured interviews and audio recording.<br>- Interviews are conducted by the researcher, no other interviewers.<br>- Transcription of interviews is done by the researcher.<br>- Selection of appropriate interview rooms.<br>- Early planning of interview dates.<br>- Clear definition of terms for explored Enabling Factors. |
| | Face validity | Face validity is determined by the degree of consensus with experts. | To gain a level of shared understanding among research participants. | - Traceable literature review, with wider scoping literature as starting point.<br>- Definition of minimum maturity level (20) subject to sufficient substantiation of Enabling Factors.<br>- Traceable data collection and data analyses (multiple steps, NVivo10) - no inter-coder effect as coding is only done by researcher.<br>- The validation step is, as the subsequent step, directly connected to the collection and analysis of qualitative data.<br>- Interviews are conducted in German.<br>- Interim results were presented to and discussed with the supervisor during the data collection and analysis process.<br>- Use of 7-point Likert scale for collection of opinion data, combined with simple statistical analyses and the majority principle.<br>- Checking of questionnaires by supervisor.<br>- Representative interview quotes are summarised in a matrix form table (transparency).<br>- Use of basic English. |
| | External validity | The degree to which study findings are relevant to other populations. | To get initial insights as to the generalisability of the identified Enabling Factor and related driver (inhibitor), causal mechanism. | In addition to measures of face validity:<br>- Previous research findings were transferred into a structured questionnaire.<br>- Web-based platform allowed easy access and efficient completion of the questionnaire.<br>- Systematic identification of suitable research participants and individually (customised) contact procedure.<br>- The use of a traceable simple statistical analysis technique based on the majority principle.<br>- Comparison of findings (phase I and phase II). |

Table 4: Quality criterion for this study. (Source: Guest et al., 2012 and author's research, 2014)

In line with Yin (2009), since quality criteria are integrated throughout the complete research process, the author prefers to use the term quality tactics.

### 3.3.3 Methods and techniques for primary data collection

Interviews were the primary and indispensable form of the primary data collection. For this reason, in-depth interviews, supported by semi-structured questionnaires with a mix of open and closed questions, were conducted. To achieve face validity (Guest *et al.*, 2012), subsequent (validation) interviews were conducted with Loewe's PO members, but this time using structured questionnaires and closed questions. Resulting from the identification of relationships between the EF, again a structured questionnaire form was devised which was completed by Loewe's PO members during the validation interviews. For reasons of external validity (Guest *et al.*, 2012; Yin, 2009), to gain initial insights as to the generalisability of the findings, an interview survey on the basis of the web-based tool SoSciSurvey and a structured questionnaire was conducted. Document analysis was not considered due to the explorative nature of this study. Consequently, no documents were available which could contribute to the objectives of this study. Furthermore, observation was not considered, as this method is more suitable to an ethnographic approach which intends, for example, to consider the behaviour of social actors (Saunders *et al.* 2012; Easterby-Smith *et al.*, 2012). The following sub-chapter explains in more detail the related interviews and questionnaires.

#### 3.3.3.1 In-depth interviews

Subject to the empirical approach, primary data were collected via an interview method (Easterby-Smith *et al.*, 2012; Saunders *et al.,* 2012). It was important that the interviews were conducted in an atmosphere of trust and without disturbance. In order to avoid interviewee error or bias, attention was paid to the fact that interviewees were not in a hurry. For this reason, an appropriate meeting room at the development building of Loewe was booked in time. Individual interview appointments were agreed via Microsoft Outlook with at least two weeks' notice and on days on which the participants had only a few meetings. Thus, it was ensured that the interviews were not conducted under time pressure (Saunders et al. 2012; Easterby-Smith *et al.*, 2012). The planned duration of the interviews was 90 minutes. For the audio recording, a BlackBerry device was used. With the consent of the interviewee, the interviews were audio recorded and afterwards transcribed. Afterwards, the transcribed interviews were forwarded to the research participants, giving them the

possibility to read the document. Every research participant gave consent to audio recording of the in-depth interview. The recorded interviews were subsequently deleted. As an alternative to audio recording, interactive note taking was offered to the interviewee. Therefore, an interview room was selected that was equipped with a monitor and PC-input interface. To validate data reliability, interactive note taking ensures that interviewees can directly verify notes taken by the interviewer.

Subject to the data collection, a semi-structured questionnaire was devised. The questionnaire structure reflected the literature review which had hitherto identified eight Enabling Factors, described as topic areas in the interview form. The first question of a topic area asked the participant about his/her general opinion concerning the connection between the Enabling Factor and the PO's capability to generate valuable outside-in innovations. In what concerns experience in the field, human beings can recall and describe their thoughts often better on the example of negative experiences, the research participants were further asked about conditions and events which hinder the PO's capability to generate valuable outside-in innovations in relation to the respective Enabling Factor. This approach is also expressed in the devised structure of causal explanation, that shows, subject to the Enabling Factors (a) a positive path condition (i.e. drivers) and (b) the negative path condition (i.e. inhibitors). This basic questionnaire structure aimed to stimulate research participants so that as much information as possible concerning research participants' opinions and experiences could be collected. Following the interwoven principle of continuous corroboration and face validity throughout the research process (Guest *et al.* 2012; Yin, 1994, 2009), a validation question based on the devised eight proposed tendencies closed the respective topic area of the questionnaire.

To achieve face validity subject to the proposed tendency (Guest *et al.*, 2012), the research participants were asked to rate the proposed tendencies concerning the PO's capability to generate valuable outside-in innovations for the SI. To obtain the opinion data, a 7-point Likert scale was used (Saunders *et al.*, 2012). The reason to apply the 7-point Likert scale was that research participants might tend, due to the complexity of open social systems, to take on a moderate position and therefore avoid to rate the extreme poles of an opinion scale (Easterby-Smith *et al.*, 2012; Saunders *et al.*, 2012). In this way, rich information could be collected from the research participants. In the light of the explorative character of the study, topic area 9 of the questionnaire was defined as an open question that asked for further comments that were potentially not covered by the eight previous topic areas

(Enabling Factor). To check suitability of the question wording, the checklist proposed by Saunders et al. (2012, p. 441) was used. For example, particular attention was paid to simple English with ordinary words so that it could be expected that research participants were familiar with the words used and formulations of the individual question. Furthermore, to ensure reliability of data collection, the definitions of the Enabling Factors (see sub-chapter 2.3) were briefly discussed at the outset of each topic area. Further important criteria were that question wording was unambiguous and did not contain a potential bias that influences the research participant's response. In this process semi-structured and, for the reason of face validity (Guest, MacQueen & Namey, 2012), structured questionnaires were used (Saunders et al., 2012). The questionnaire wording was verified for the use of unambiguous words, potentially leading or biasing questions and the use of basic English (Easterby-Smith *et al.*, 2012; Saunders *et al.*, 2012). Subsequently, the questionnaire was checked by the researcher's first supervisor, Dr Brychan Thomas. Beside some typographical and formal proposals, no substantial amendments of the questionnaire were necessary. The questionnaire form is added as annex II -semi structured interview form  to this thesis. As all purchasers of Loewe have a good command of English, the meaning of the Enabling Factors and subsequent questions was well understood. To ensure reliability, all interviews were conducted and transcribed by the researcher. However, it proved that research participants felt more comfortable to express their thoughts and opinions in German. Therefore, to meet the criterion of reliability, the response was given in German.

#### 3.3.3.2 Structured interviews

##### 3.3.3.2.1 For the reasons of face validity

As delineated above, the validity criterion was subject to the subsequent validation interviews that aimed to obtain face validity with the research participants Loewe's PO members (Guest *et al*., 2012). In order to collect opinion data subject to the identified drivers, inhibitor and causal mechanism, the 7-point Likert scale was applied again. Again, questionnaire wording was verified for the use of unambiguous words, potentially leading or biasing questions and the use of basic English (Easterly-Smith *et al.*, 2012; Saunders *et al.*, 2012).  Subject to questionnaire structure, clarity and potential bias, the questionnaire was again checked by the first supervisor, Dr Brychan Thomas. Based on the feedback, typographical errors were corrected and the questionnaire structure was slightly refined. For example, the validation interview form was displayed on the cover page and a list of abbreviations was used. The validation interview meetings were arranged in time for the in-

terviews. As a connecting point to the results of the previous in-depth interview step, the research participant's rating, subject to the proposed tendency, was shown and briefly discussed. In this way, research participants could recall the preceding in-depth interview situation. Then, the analysis/coding procedure was explained so that the research participant could gain insight subject to the generation of identified drivers/inhibitors and causal mechanism. Furthermore, (a) the theoretical background of face validity and (b) the target to get a shared understanding concerning the identified themes and chosen terms for the driver (inhibitor) respectively the causal mechanism was explained at the outset of the validation interviews. Again, this approach reflects the applied principle and goal of achieving (a) a shared understanding with research participants via (b) continuous corroboration throughout the research process. For the validation interviews, as inhibitors reflect just the opposite condition of drivers, only the identified drivers and terms used were validated. As the research participants P02 and P03 left the company at the time of the validation interviews, this data collection step was conducted with the remaining five research participants. However, as the five purchasers reflected 71% of the initial sample, the results of the validation interview step were considered as valid in the context of this study. The validation interview questionnaire form is attached as annex IV (phase a) to this thesis.

#### 3.3.3.2.2 Subject to identification of relations between the EF

With regard to RQ2 of this thesis: Which strategic agenda and measures can be derived for the selected medium-sized system integrator by using the Enabling Factors? the identification of relationships between the Enabling Factors explored was a matter of interest. With regard to analysis of relationships between identified themes in qualitative data, relatively little useful hints could be identified. Yin (2009) points out that *"the analyses of case study evidence is one of the least developed and most difficult aspects of doing case studies"* (Yin, 2009, p. 127) and that *"unlike statistical analyses, there are few fixed formulas or cookbook recipes to guide the novice"* (Yin, 2009, p. 127). For this reason, an analysis method was devised which is based on a questionnaire that was completed during the phase b of the face validity interviews (Saunders *et al.*, 2012). The questionnaire is attached as annex IV (phase b).

### 3.3.3.3 Self-completed questionnaire

At the outset of Phase II, the researcher programmed a structured questionnaire in the web-based platform SoSciSurvey (https://www.soscisurvey.de/). This survey platform is used by German Universities for social research surveys. The structured questionnaire was pro-

grammed based on the semi-structured questionnaire and the structured validation interview form used for Phase II data collection and analysis. At the start page of the questionnaire, the background of the study and relevant definitions were briefly delineated. Then, general data subject to the research participant's working-experience, current job position and as an employee were asked. The subsequent questionnaire sections were sub-divided into 9 topic areas (8 topic areas subject the Enabling Factors and 1 topic with regard to the relations between the EF). Each of the eight topic areas covered the hitherto identified EF, drivers and causal mechanism. Subject to the proposed 12 relations between the EF identified at Loewe's PO, as later delineated in sub-chapter 4.3.10 (direct relations between EFs) opinion related questions were programmed that reflect the 12 causal relations of the relationship model (Saunders *et al.*, 2012). A 7-point Likert-style rating scale was used again for the questionnaire. Because of the expected time limitations of external interviewees, it was assumed that most of them would decide to complete the questionnaire alone and not contribute in an interactive way together with the interviewer. Because of this, the question wording and formulation was, again, thoroughly checked and subjected to the criterion of simple English and unambiguous question formulation. Furthermore, the pre-test option of SoSciSurvey was used and the first supervisor, Dr. Brychan Thomas, again agreed to take over the testing role. Besides Dr. Thomas, a non-native English speaking person with basic English language skills, not engaged in this study at this time, agreed to check the questionnaire for its use of basic English wording and unambiguous formulation of questions. Based on the results, the wording, as well as the description of some drivers and causal mechanism, were refined. In total, the questionnaire contained 40 questions (4 questions relating to general research participant data, 24 questions subject to the 8 Enabling Factors, 12 questions regarding the relations between the EFs). The planned time to complete the questionnaire was within the range of 25-35 minutes and the results of the pre-test proved that this was a realistic assumption. The structured questionnaire is attached as annex VI – Structured Questionnaire (external validation).

#### 3.3.3.4 Focus groups interview

According to Saunders *et al.* (2012), a focus group interview is a collaborative data collection technique which refers to group interviews. Focus groups have a pre-defined topic and focus on enabling a discussion between participants. For this purpose, a half-day workshop was organised. After a brief presentation of the interim research results, the workshop participants judged, based on the explored formative drivers, the realised maturity degree (sta-

tus quo) of Loewe's PO for each of the Enabling Factors. With regard to RQ2, to devise a strategic agenda and measures for the effective purchasing integration into the innovation process of the selected medium-sized system integrator, appropriate strategic measures were worked out together with Loewe's purchasing members (= focus group). Then, the workshop results were summarised in a strategic agenda and integrated, as a sub-chapter 4.4.2 into the thesis.

### 3.3.4 Analysis methods related to moderate relativism

With regard to qualitative data analysis of meanings, Easterby-Smith *et al. (*2012) describe content analysis and grounded analysis as the start (= content analysis) and endpoint (= grounded analysis) of the code based analysis methods of social constructionism. Because of the structured and stepwise analysis approach, both analysis methods belong to the group of hybrid analysis methods (Easterby-Smith *et al.,* 2012). Easterby-Smith et al. (2012) define content analysis as a "*relatively deductive method of analysis where codes (or constructs) are almost all predetermined and where they are systematically searched for within the data collected*" (Easterby-Smith *et al.,* 2012, p. 340). Grounded analysis is linked to the methodology of grounded theory and applies an approach where structure or categories emerges out of the interpretation of words and meanings (Saunders *et al.,* 2012). While content analysis is a relative deductive approach that is concerned with testing of propositions and counting of frequencies based on a priori categorisation (Sinkovics, Penz & Ghauri, 2005), grounded analysis is an inductive analysis approach subject to interpretation and subsequent understanding of meaning and context (Strauss & Corbin, 1998; Easterby-Smith *et al.,* 2012). Sinkovics *et al.* (2005) describe this as posteriori categorisation because "*empirical indicator are obtained directly from the data and henceforth coded"* (Sinkovics *et al.,* 2005, p. 27). In contrast to analysis methods related to strong social constructionism, for example, narrative analysis, content analysis and grounded analysis follow a rather rigid and structured analysis process (Easterby-Smith *et al.,* 2012; Saunders *et al.,* 2012).

Thematic analysis is located at the interface of content analysis respectively grounded analysis and is flexible concerning the priori and posteriori categorisation of data (Guest *et al.,* 2012). Based on the realisable degree of freedom subject in the analysis process and -techniques, Braun and Clarke (2006) point out that thematic analysis can provide rich and structured account of data. During the analysis process, transcribed texts passages are analysed subject to emerging themes. Themes represent ideas, phrases or concepts that contain

the core meaning of relevant text passages or interviewee responses (Guest *et al.*, 2012). The researcher will focus on critically interpreting and analyzing the significant features of the occurrence. Thematic analysis requires a cyclic process in order refine and narrow down emerged themes. As soon as a sufficient maturity and saturation with regard to data mining is achieved, identified themes are transformed into quantifiable codes. In this way, theoretical models can be devised and propositions respectively substantiated themes can be validated in a further step. Like content analysis and grounded analysis, thematic analysis applies a structured process and opens the possibility for quantifaction of data. However, generated data (findings) can be less nuanced compared to grounded analysis or analysis methods related to strong constructionism (Guest *et al.*, 2012). The following table gives an overview of the discussed structured (= hybrid data) analysis approaches which are relevant for research work of moderate relativism. In this context, it needs to be pointed out that there are further sub-categories of text analysis-methods (Easterby-Smith *et al.*, 2012; Saunders *et al.*, 2012). However, the in depth discussion of all sub-categories is out of the scope of this thesis.

| Ontology/Epistemology | Moderate relativism/constructionism | | |
|---|---|---|---|
| Approach | Structured analysis steps (hybrid) | | |
| Analysis method | Content analysis | Thematic analysis | Grounded analysis |
| Data analysis Process | More deductive / frequency based | Combines deductive/inductive elements | More inductive / holistic |
| | Positivist/interpretative | Realist/interpretative | No pre-defined structure |
| | Pre-defined structure (priori) | Predefined / emergent structure (priori/posteriori) | Structure emerges during coding (posteriori) |
| | Quantification | Flexible | No quantification |

Table 5: Overview hybrid approaches data analysis

### 3.3.5 Application of thematic analysis

In this study, thematic analysis was applied due to its flexibility concerning the priori and posteriori data analysis approaches and related quantification techniques. Based on the

structured approach for data mining and -analysis, thematic analysis supported the sequential qualitative → quantitative approach of this case study in a good way. A structure of EF could be pre-defined (priori) on the base of the conceptual framework (Chapter 2) which set the base for the further research process. As preferred by Yin for case studies (Yin, 2009), the definition of a predefined structure reflects the deductive procedure prior to data analysis. This includes also the utilisation of special analysis methods like pattern matching, logic models and gap-analysis techniques could be applied (Yin, 2009). Thus, data could be reduced which supported the subsequent validation. In contrast, the posteriori (inductive) procedure was concerned with the identification of themes about drivers and causal mechanism. However, it needs to be pointed out the interpretation of data was always based on meanings and at no point on the sole interpretation of statistical key figures or frequency counting of words. About the research philosophy, thematic analysis fits with the moderate relativism on which foundations the study was conducted.

### 3.3.6 NVivo10

The coding process was supported by the software NVivo10. The software is user-friendly and flexible with regard to the creation and reorganisation of codes for which NVivo10 uses the term node. A further advantage is that training material and -videos can be easily accessed via the internet. Analysed documents (literature, interviews) can be stored under one project which meets Yin's (2009) requirement to create a database for the case study. However, it needs to be mentioned that not all data analysis procedure were conducted via NVivo10. The reason was that specific analysis like the pattern matching or logic models could be more easily analysed via Microsoft Excel. Therefore, NVivo10 was primarily used for the coding process and on data storage for literature and interviews.

### 3.3.7 Specific analysis procedures applied during thematic analysis

#### 3.3.7.1 Statistical analysis methods

Subject to the evaluation of the research participants' opinion concerning the proposed tendencies, simple descriptive statistical analyses were conducted. For this reason, a table was prepared, for each of the Enabling Factors. In the table, the vertical column displays the research participants' code number and the vertical line shows the rating of the Likert scale used. For the ratings 'I strongly agree, I agree and I somewhat agree' the proposed tendency was considered accepted whereas the proposed tendency was considered as not accepted for the ratings 'I neither agree nor disagree, I somewhat disagree, I disagree and I

strongly disagree'. The interview ratings were coded in NVivo10. As soon as the ratings were transferred from NVivo10 into the table, the table line results were added together. Subject to the research participants' confirmation (or not) of proposed tendencies, drivers (inhibitors) and causal mechanism, the simple majority principle was applied. For better illustration, if a research participant, subject to a proposed tendency, driver (inhibitor) or causal mechanism, rated either with 'I strongly agree, I agree or I somewhat agree' the proposed tendency respectively wording (term) was considered accepted. In case the research participant rated with 'I neither agree nor disagree (neutral), I somewhat disagree, I disagree or I strongly disagree' the proposed tendency respectively wording (term) was considered as not accepted. In the subsequent step, based on the said majority principle, the confirmed/not confirmed proposed tendencies, drivers (inhibitors) and causal mechanism were added up. Based on the majority, the tendency was considered accepted or not. Subject to the identified drivers, conditions and causal mechanism, as proposed by Guest *et al.* (2012), the results of the coding process are displayed in table form that gives an overview of the Enabling Factor, the identified driver and two related quotes.

#### 3.3.7.2 Pattern matching and logic models

Concerning analyses of relationships between identified themes in qualitative data, relatively little useful hints could be identified. Yin (2009) points out that *"the analyses of case study evidence is one of the least developed and most difficult aspects of doing case studies"* (Yin, 2009, p. 127) and that *"unlike statistical analyses, there are few fixed formulas or cookbook recipes to guide the novice"* (Yin, 2009, p. 127). With regard to the analyses of relations, Yin (2009) proposes the approach of pattern matching and logic models. In this vein, Guest *et al.* (2012) argue that visualisation is useful, "*although it is an underutilised technique in social science research*" (Guest *et al.*, 2012, p 166). Akkermans, Bogerd and Vos (1999) explored a causal model of goals, barriers and enablers via explorative brainstorming workshops with experts. Beside the exploration of barriers and enablers, causal interrelations between barriers and enablers were identified via brainstorming and subsequent discussion and conclusions gained between the experts (Akkermans *et al*, 1999). In a similar approach to identify direct relations between the EFs, and based on the identified Enabling Factor, a data collection and analysis technique was devised that was a mix of simple statistical analyses and analysis.

The figure below displays the respective analyses form (relationship table).

| EF1: External Interconnectedness is linked to: | no direct linkage | as pre-condition of → | interaction with ↔ | dependent from ← |
|---|---|---|---|---|
| External Interconnectedness | | | | |
| Preferred Customer status Process | | | | |
| Management Commitment | | | | |
| Internal Interconnectedness | | | | |
| Early Integration into Product Planning | | | | |
| Degree of Pofessionalisation of the PO | | | | |
| Innovation Management System | | | | |
| Open-minded Relations based on Trust | | | | |
| Sum per column: | | | | |
| direct dependency | | | | |

Table 6: EF-relationships table and analysis form

The relationship table has the categories (a) 'no direct linkage 'between the Enabling Factors EF[x] and EF[y], (b) EF[x] is a 'pre-condition' of EF[y], EF[x] has an 'interaction with' EF[y], EF[x] is 'dependent from' EF [y]. As mentioned above, the respective ratings were given by the research participants during phase b of the validation interviews. Concerning the subsequent data analysis step, deviations between the rated categories were checked at first. For example, in case that Management Commitment was rated as a 'precondition of the Degree of Professionalisation of the PO' in the Management Commitment table, but subject to the Degree of Professionalisation table, Management Commitment was rated as 'interaction with' the Degree of Professionalisation of, the related deviation was clarified with the research participant right after the interview. As soon as all data deviations between the relationship tables were cleaned, the related columns were added up for each of the EF relationship tables. For the reasons of data analysis, the majority principle was used again which means that, as soon as a minimum 3 of the remaining 5 research participants rated the relationship between the EF as 'precondition' or 'dependent from', the relation was interpreted as a direct dependency respectively cause-effect relationship. The 'interaction' ratings were not further analysed, as, subject to RQ2, only direct dependent cause effect relationships were of interest. Based on the direct dependencies analysed, a relationship model (=logic model) was devised that displayed the direct dependencies between independent and dependent EF (= variables) respectively moderating EF.

#### 3.3.7.3 Gap analysis technique

Beside the contribution to theoretical knowledge, the generation of practical managerial knowledge is in the focus of the DBA programme. The generation of practical managerial knowledge is context related and, therefore, this study had the objective (RO2) to devise a strategic agenda and measures for the effective integration of the selected medium-sized SI of electronic consumer products into the innovation process. The definition of a strategic

agenda was supported by a gap analysis procedure. Janetti (2012, p. 2) defines this *"as the determination of the difference between current knowledge/practices (what we are doing) and current Evidence Based Practices (what we should be doing). Gaps can occur in knowledge, skills or practice"*. The online dictionary BusinessDictionary.com (2015) which defines a gap analysis as *"a technique that businesses use to determine what steps need to be taken in order to move from its current state to its desired, future state"* gives a similar definition. As briefly delineated above, findings of phase I and II of the data collection and analysis process were presented to the purchasing members of Loewe during a half day workshop. To support the discussion and to make the results more easily communicable, a data collection form was prepared for every Enabling Factor in Excel. The data collection form contains, subject to the realised maturity degree (status quo) and proposed strategic actions, strategic measures that were further discussed and concluded with Loewe's purchasing members. The target was reflected by the number of identified drivers for each of the Enabling Factors. For example, if 6 drivers are formative to an Enabling Factor, the number 6 represents the target value. On the other hand, the status quo reflects the performance value that represents the gained maturity degree. If, for example, the workshop participants concluded that only 4 driver conditions are sufficiently realised by Loewe's PO, then a gap of 2 drivers is visualised by the Excel bar chart. Based on the status quo and target value, appropriate strategic actions can be defined via a gap-analysis technique. In the case of Loewe, the workshop results were summarised in a strategic agenda. Respective results are delineated in sub-chapter 4.4.2 of this thesis. Subsequently, the PO members can define appropriate measures and timing respectively, responsibilities. In line with the principles of organisational learning theory, the measurements and realisation phases are tracked with a cyclic Plan =(P), Do (D), Check (C), Act (A) process (Lewin, 1948; Kolb, 1984; Deming, 1984). The figure below shows the template which was devised in this study for the gap analysis step.

**Topic: Effective integration or Purchasing into the innovation process**

**Organisation:** Loewe Purchasing

**EF5: Early Integration into Product Planning (EIP)**

**A) Target performance comparison**

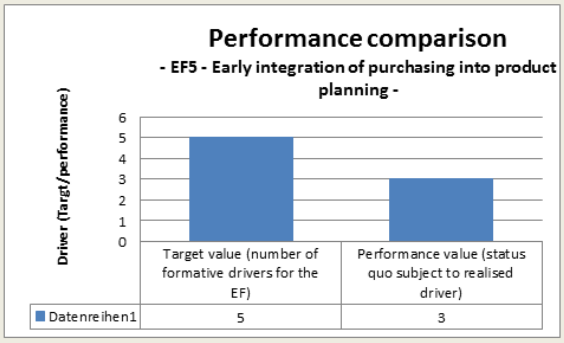
| Driver | Improvement potential | Strategic action: |
|---|---|---|
| C5a1 - Early Purchasing integration is a common living practice | Yes | To take over the ownership for the co-ordination of the outside-in innovation process (e.g. via definition / update of the outside-in technology roadmap). |
| C5a2 - Detailed product descriptions (characteristics, functions) are available | Yes | To actively contribute and participate in early product planning meetings. |
| C5a3 - Ideas from purchasing members are desired | No | |
| C5a4 - Purchasing members have a detailed knowledge about supplier capabilities | No | |
| C5a5 - Living systematic and value-based supplier selection process | No | |
| | | |

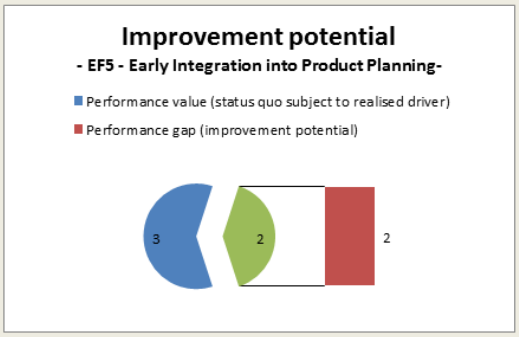
Comment:

Frequently, purchasing is still too late involved into the process.

**B) Bar-chart**

| | |
|---|---|
| Target value (number of formative drivers for the EF) | 5 |
| Performance value (status quo subject to realised driver) | 3 |
| **Performance gap (improvement potential)** | **2** |




| Assesment by: | Status: | Approved: |
|---|---|---|
| Loewe Purchasing | January 2015 | 1st of February 2015 |

Figure 22: Performance comparison sheet. Source: Loewe Purchasing

## 3.4 Summary of the chapter

This chapter was concerned with the justification of a qualitative approach. The chapter dwelled on the research design and methodology which have been considered involving the basic philosophical research considerations; the rationale for the qualitative research

design including the nature of the research and research questions, data collection and analysis; and the overview of the research question, objectives and design components. Case study method was introduced as suitable method to meet the research objectives. Furthermore, the research context with the television set manufacturer Loewe as a critical case was introduced. Seven purchasing members of Loewe and 11 External purchasing Experts of other SI participated in this study. The chapter further introduced different interview techniques and related questionnaires. Finally, thematic analysis and specific procedures for data analysis were introduced. The table below summarises the research aim, questions, objectives and elements of the research design.

<table>
<tr><th>Research aim</th><th>Research questions</th><th>Research objectives</th><th>Research design</th></tr>
<tr><td rowspan="3">To explore a comprehensive set of factors that enable the Purchasing Organisation (PO) of a medium-sized system integrator (SI) [specifically, in this study, of electronic consumer products] to generate valuable outside-in innovations.</td><td>RQ1: What are the Enabling Factors for the effective integration of purchasing into the outside-in innovation process?</td><td>RO1: To understand the Enabling Factors by reviewing academic and practitioner knowledge.</td><td rowspan="3">Philosophy: Moderate relativism<br><br>Character of the study: Explorative with explanatory elements<br><br>Qualitative approach<br><br>Strategy of inquiry:<br><br>Case study / interview survey<br><br>Data collection/analysis: Sequential qualitative →subordinated quantitative (validation) via collection and analysis of opinion data.<br><br>Techniques data collection/analyses:<br>• semi-structured and structured interviews<br>• questionnaires via web-based platform<br>• Focus group (workshop)<br>• Thematic analysis<br>• Simple statistical techniques based on a majority principle<br>• Pattern matching / logic models</td></tr>
<tr><td>RQ2: Which strategic agenda and measures can be derived for the selected medium-sized system integrator by using the Enabling Factors?</td><td>RO2: To devise a strategic agenda and measures for the effective purchasing integration into the innovation process of the selected medium-sized system integrator.</td></tr>
<tr><td>RQ3: Are there indications that the identified Enabling Factors are relevant for other system integrators?</td><td>RO3: To investigate whether the identified Enabling Factors are confirmed (or not) by purchasers of other system integrators.</td></tr>
</table>

Table 7: Overview of research question, objective and design

# 4 Data analysis and results

The main objective of this chapter is to present the results of the data analysis process. To give insight into how the coding process was realised, sub-chapter 4.1 gives an overview of the analysis process and sub-chapter 4.2 describes the coding and refinement process of data on the basis of three examples. The detailed analysis results are presented in sub-chapter 4.3, while sub-chapter 4.4 delineates the results of the external validation. Finally, sub-chapter 4.5 summarises the findings.

## 4.1 General analysis process

The analysis process was realised in stepwise and iterative procedures, comprising the categorising, coding, refinement, quantification of data and gap-analysis steps. At first, based on the results of the literature review (Chapter 2), a node-structure was created in NVivo10. The related categories were based on the eight Enabling Factors and tendencies which were the results of the literature review, summarised in the conceptual framework (Chapter 2: Literature Review). Furthermore and, based on the in-depth interview form, the node structure ‘drivers’, ‘inhibitors’, ‘events’ and ‘causal mechanism’ was attributed to each of the EFs. Afterwards, the researcher undertook the coding and refinement process, a step consisting of the iterative sub-steps ‘initial reading, coding, re-reading and refinement’. In this way, solid information with regard to drivers, causal mechanism and acceptance level of (a priori) suggested tendencies could be obtained. Afterwards, the data were quantified for the reasons of face validity or external validity respectively (Guest *et al.*, 2012). Quantification of data was also realised with regard to the analysis of relationships. The method devised for data collection and analysis with pattern matching and logic models was introduced above (Chapter 3.3). The last step, gap analysis, was concerned with RO2: to devise a strategic agenda and measures for the effective purchasing integration into the innovation process of the selected medium-sized system integrator. This step was realised on the basis of validated findings (face and external validity). Thus, the definition of a strategic agenda for Loewe’s PO was based on all findings and expert opinions were gathered throughout the complete research process.

The table below gives an overview of the generic analysis process.

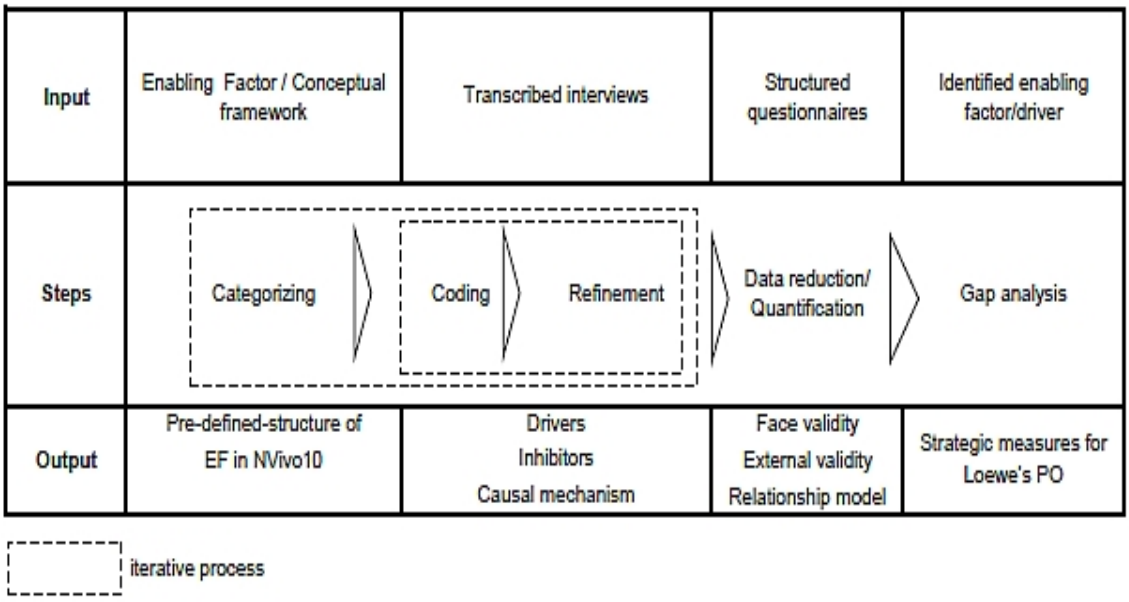



Figure 23: Overview data analysis process

## 4.2 Coding, reorganisation and refinement

During the thematic analyses, the relevant text passages of documents (academic papers, transcribed interviews) are marked and attributed to a predefined (a priori) meaningful structure. In line with the deductive element of thematic analysis (Guest *et al.*, 2012), the pre-defined structure was realised on the basis the 8 EFs, the result of the literature review (Chapter 2). The following sub-chapter looks at the inductive (a posteriori) element of the coding and refinement step, concerned with the identification of drivers, inhibitors and the causal mechanism. This process can be best described as iterative and intensive interaction of the researcher with the data (moving forwards and backwards) until a point of data saturation was reached.

### 4.2.1 Identification of drivers and the causal mechanism

With regard to the a posteriori identification of drivers, the code structure was devised via an open coding approach through which themes (drivers, inhibitors, events) were directly obtained from the data (Sinkovics *et al.*, 2005). Based on relevant research participants' quotes, subordinated code structures were devised for the driver, inhibitor and events categories.

After the initial coding was realised, codes were re-read, reorganised and further refined (data reorganisation). As driver and inhibitor can be considered as opposite conditions, both categories were compared and logically aligned with each other. For example, if a short 'spatial distance' is a driver condition, then a 'long spatial distance' is the related inhibitor condition. In this way, differences between coded drivers and inhibitors could be identified. As mentioned above, this analysis procedure makes sense, as people can often remember negative experiences better. As events can be considered as results of activated drivers and inhibitors (Sayer, 1992), further alignment with the driver and inhibitor categories with the coded 'events' category was realised. In this way, the 'inhibitor' and 'event' categories served as logical control/alignment categories in order to condense and gradually complete information with regard to relevant drivers. The iterative principle for data analysis was also applied for the identification of the causal mechanism, intended to give insights with regard to the underlying mechanism or working principle of the EF. Finally, all coded elements were logically inter-related and reflected against each other. Through this process, the initial 102 coded drivers and inhibitors were reduced to 44 drivers. In a further step, the drivers were logically compared among the EF categories. During this refinement step, it became evident that 12 drivers had slightly different code names but the same underlying meaning. Therefore, the respective codes were unified, reducing the number of drivers to 32. The iterative process was stopped as soon as the researcher recognised data saturation. It needs to be pointed out, that the delineated coding process requires the researcher to have solid knowledge and a high level of experience with regard to the research field and context. The figure below illustrates this process.

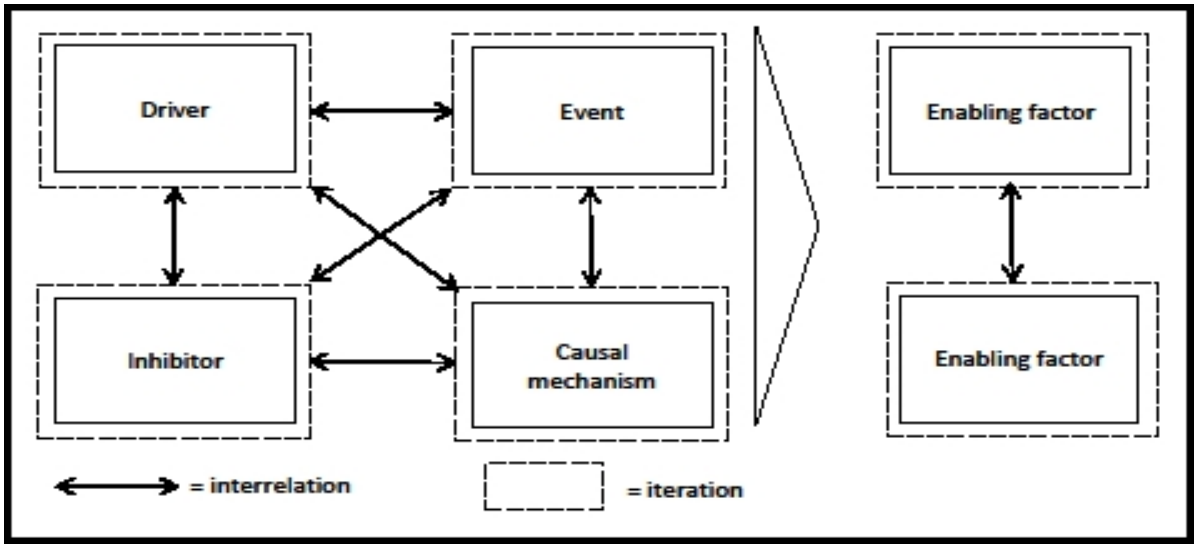



Figure 24: Inductive coding process for identification of driver, causal mechanism

### 4.2.2 Reorganisation of codes examples

This sub-chapter exemplifies how the coding process was realised. Example number 1 is concerned with the EF1: 'External Interconnectedness' or the 'Degree of Professionalisation of the PO' EF respectively and reflects reorganisation of data with regard to changing the scope of a code because of a change of meaning and level of hierarchy (King, 2012). Initially, a code was devised for the term 'to have the right contact information'. However, in the course of re-reading and refinement which was based on deeper reflective considerations, it was recognised that the initial code 'to have the right contact information' is two-fold in its meaning. On the one hand, the underlying meaning is concerned with the EF6, degree of 'professionalisation of the PO'. Further analysis in this category showed that very similar quotes, with regard to contact information and access to networks, had been summarised under the driver 'Purchasing members have a detailed knowledge about supplier capabilities' which is considered as formative to the EF 'Degree of Professionalisation of the PO'. On the other hand, the code 'to have the right contact information' is also related to the availability of sufficient time resources, found as the formative driver of EF1: 'External Interconnectedness'. Therefore, the code 'to have the right contact information' was regarded as subordinate to the 'sufficient time resources for outside-in innovation management' driver. The second example is concerned with the reorganisation with regard to changing a higher-order classification King (2012). The EF8: 'Open-minded Relations based on Trust' was identified at a late stage of the literature review. Furthermore, EF8: 'Open-minded Relations based on Trust' had initially been named as 'the kind of relations between stakeholders'. In the course of the analysis process of transcribed interviews and deeper reflective considerations, EF8: was finally described with the more concrete term 'Open-minded Relations based on Trust'. The third example is related to the narrow-down process. King (2012) describes this approach for data re-organisation as merging, deletion and insertion of new codes. With regard to the EF3: 'Preferred Customer status Process', 15 drivers and inhibitors were initially attributed. After further reading, deeper reflection and alignment with the inhibitor and event category, the number of codes could be narrowed down to 5 drivers.

### 4.2.3 Data reduction and quantification

Quantification of data was concerned with the exploration of Enabling Factors during the literature review, an analysis process defined in Chapter 2. With regard to the analysis of interview results, quantification was realised to get insights with regard to face and exter-

nal validity of findings (Guest *et al.*, 2012). As the above delineated coding process was realised by the researcher, it was necessary to understand whether the internal and external research participants shared the identified drivers and causal mechanism as defined by the researcher (Guest *et al.*, 2012). Structured questionnaires delivered opinion ratings which were analysed, again via simple statistical analysis methods (Chapter 3.3). Subject to the face validity and external validity (Guest *et al.*, 2012), the opinion data gathered were quantitatively analysed and displayed in diagram form.

## 4.3 Results of data analysis

This sub-chapter shows the results of the data analysis process for each of the Enabling Factors. Entitled with the respective Enabling Factor, the question of whether the research participants confirmed or did not confirm the proposed tendency subject to the PO's capability to generate valuable outside-in innovations is first defined. Then, the identified drivers (inhibitors) are delineated. As the interviews were conducted and transcribed in German, two representative interview quotes were translated from German into English. This proved to be ambitious as (a) people do not write as they speak, and (b) because it is hardly possible to transfer the real interviewees' expression, as well as any grammatical restrictions, word for word from German into English. However, in order to give an impression of the verbal answers as best as possible, the German quotes were not streamlined subject to grammar restrictions and alternative forms of wording. In this way, an English reader can get a good impression concerning the research participants' answers. Based on Guest *et al.* (2012) and as mentioned above, representative interview quotes were attributed to the identified drivers, inhibitors and events. The same principle was applied to the causal mechanism. The English/German versions are attached as Annex III Overview EF, the driver and causal mechanism. In the last sub-chapter of the analysis section, a summary table displays the results of validation interviews subject to the drivers and the terms chosen. Due to space restrictions, the detailed analysis table for validated drivers and the causal mechanisms that show the research participants' opinion rate are attached to this thesis as Annex V (Validation results drivers and the causal mechanism).

### 4.3.1 EF1: External Interconnectedness (EI)

#### 4.3.1.1 Confirmation of the proposed tendency

The table below summarises the research participant's ratings:

| Rating / Interviewee | strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|---|
| P01 | | X | | | | | |
| P02 | X | | | | | | |
| P03 | | X | | | | | |
| P04 | X | | | | | | |
| P05 | X | | | | | | |
| P06 | | X | | | | | |
| P07 | | X | | | | | |
| Sub-total | 3 | 4 | 0 | 0 | 0 | 0 | 0 |
| Total | 7 | | | 0 | | | |
| → | Tendency confirmed | | | Tendency not confirmed | | | |

Table 8: EF1: External Interconnectedness (EI): Summary of ratings

The table shows that 7 out of 7 research participants confirmed the proposed tendency:

"If there is a high level of External Interconnectedness, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations."

Therefore, the tendency is considered accepted in the context of this study.

#### 4.3.1.2 Drivers / Inhibitors and related cause-effect mechanism

Concerning the Enabling Factor External Interconnectedness (EI), 6 drivers (DV) 'short spatial distance', 'good company image and story, 'sufficient time resources for innovation

outside-in management', 'integration into mid and long-term planning', 'sufficient financial resources for innovation outside-in management' and 'domestic on-site support in case of cultural differences/language barriers' could be identified. Five of the six drivers could be found as formative for the other EF. Based on the coding process and the research participants' answers, the causal mechanism 'access to innovation networks leads to generation of knowledge, cross-fertilisation and tapping of innovations' could be derived.

The table below gives an overview of EF1: EI, related drivers and the causal mechanism:

| **Enabling Factor** | **Driver (DV)** |
|---|---|
| EF1: External Interconnectedness (EI) | C1a1 Short spatial distance * |
| | C1a2 Good company image and story * |
| | C1a3 Sufficient time resources for innovation outside-in management* |
| | C1a4 Integration into mid and long-term planning* |
| | C1a5 Sufficient financial resources for innovation outside-in management |
| | C1a6 Domestic on-site support in case of cultural differences/language barriers* |
| Causal mechanism | Access to innovation networks leads to generation of knowledge, cross-fertilisation and tapping of innovations |
| Formative also for other EF = * | |

Table 9: EF1: EI Overview of drivers/inhibitor and causal mechanism

#### 4.3.1.3 Validation of drivers and the proposed mechanism

The table below gives an overview of the confirmed or not confirmed proposed drivers/inhibitors' conditions and related wording.

| Interviewee / Driver | P01 | P04 | P05 | P06 | P07 | Result Yes/No | Accepted |
|---|---|---|---|---|---|---|---|
| C1a1 Short spatial distance [to innovation suppliers] | Y | Y | Y | Y | Y | 5/0 | Y |
| C1a2 Good company image and story | Y | Y | Y | Y | Y | 5/0 | Y |
| C1a3 Sufficient time resources for outside-in management | Y | Y | Y | Y | Y | 5/0 | Y |
| C1a4 Integration [of innovation suppliers] into mid and long-term product planning | Y | Y | Y | Y | Y | 5/0 | Y |
| C1a5 Sufficient financial resources for outside-in management | Y | Y | Y | Y | Y | 5/0 | Y |
| C1a6 Domestic on-site support in case of cultural differences/language barriers | Y | Y | Y | Y | Y | 5/0 | Y |
| CM1 Access to innovation networks leads to the generation of knowledge, cross-fertilisation and tapping of innovations | Y | Y | Y | Y | Y | 5/0 | Y |

Table 10: EF1: EI Overview of the ratings concerning driver condition

The table shows that the research participants confirmed the (a) driver-conditions identified and the (b) causal mechanism proposed in the context of this study. Therefore, the 6 drivers and the proposed causal mechanism are considered as important.

### 4.3.2 EF2: Preferred Customer status Process (PCP)

#### 4.3.2.1 Confirmation of tendencies

The table below summarises the research participants' ratings:

| Rating / Interviewee | strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|---|
| P01 | | X | | | | | |
| P02 | X | | | | | | |
| P03 | | X | | | | | |
| P04 | | X | | | | | |
| P05 | X | | | | | | |
| P06 | | X | | | | | |
| P07 | X | | | | | | |
| Sub-total | 3 | 4 | 0 | 0 | 0 | 0 | 0 |
| Total | 7 | | | 0 | | | |
| → | Tendency confirmed | | | Tendency not confirmed | | | |

Table 11: EF2: Preferred Customer status Process (PCP): Summary of ratings

The table shows that 7 out of 7 interviewees confirmed the proposed tendency number 2:

"If the purchasing function establishes an assessment process concerning the actual and prospective preferred customer status granted by the supplier, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations."
Therefore, the tendency is considered accepted in the context of this study.

#### 4.3.2.2 Drivers / Inhibitors and related causal mechanism

Concerning the Enabling Factor (2) preferred customer process (PCP), the 6 drivers 'attractive purchasing volume', 'good company image and story', 'good relationship-management to innovation supplier', 'integration into mid and long-term product plan-

ning', 'sound (good) management skills' and 'living systematic and value-based supplier selection process' could be identified. Four of the six drivers could be found as formative for the other EFs. Based on the coding process and the research participants' answers, the causal mechanism 'a Preferred Customer status Process leads to prioritised resource allocation passed by the supplier to the customer' could be identified.

The table below gives an overview of the EF2: PCP, related drivers and the causal mechanism:

| **Enabling Factor** | **Driver (DV) / Inhibitor (IN)** |
|---|---|
| EF2: Preferred Customer status Process (PCP) | C2a1 Attractive purchasing volume |
| | C2a2 Good company image and –story* |
| | C2a3 Good relationship-management to innovation supplier |
| | C2a4 Integration into mid and long-term product planning* |
| | C2a5 Sound (good) management skills* |
| | C2a6 Living systematic and value based supplier selection process* |
| Causal mechanism | A Preferred Customer status Process leads to prioritised resource allocation passed by the supplier to the customer. |
| Formative also for other EF = * | |

Table 12: EF2: PCP Overview drivers and causal mechanism

#### 4.3.2.3 Validation of drivers and proposed mechanism

The table below gives an overview of whether the research participants confirmed or not the proposed drivers and mechanism.

| Interviewee / Driver | P01 | P04 | P05 | P06 | P07 | Result | Accepted |
|---|---|---|---|---|---|---|---|
| C2a1 Attractive purchasing volume | Y | Y | Y | Y | Y | 5/0 | Y |
| C2a2 Good company image and story | Y | Y | Y | Y | Y | 5/0 | Y |
| C2a3 Good relationship-management to innovation supplier | Y | Y | Y | Y | Y | 5/0 | Y |
| C2a4 Integration into mid and long-term product planning | Y | Y | Y | Y | Y | 5/0 | Y |
| C2a5 Sound (good) management skills | Y | Y | Y | Y | Y | 5/0 | Y |
| C2a6 Living systematic and value based supplier selection process | Y | Y | Y | Y | Y | 5/0 | Y |
| CM2 PCP process leads to prioritised resource allocation passed by the supplier to the customer | Y | Y | Y | Y | Y | 5/0 | Y |

Table 13: EF2: PCP Overview of the ratings concerning driver condition

The table shows that the research participants confirmed the (a) driver-conditions identified and the (b) causal mechanism proposed. Therefore, the six drivers are considered as important in the context of this study.

### 4.3.3 EF3: Management Commitment (MC)

#### 4.3.3.1 Confirmation of tendencies

The table below summarises the research participants' ratings:

| Rating / Interviewee | strongly agree | Agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|---|
| P01 | | X | | | | | |
| P02 | | | X | | | | |
| P03 | X | | | | | | |
| P04 | X | | | | | | |
| P05 | X | | | | | | |
| P06 | X | | | | | | |
| P07 | X | | | | | | |
| Sub-total | 5 | 1 | 1 | 0 | 0 | 0 | 0 |
| Total | 7 | | | 0 | | | |
| → | Tendency confirmed | | | Tendency not confirmed | | | |

Table 14: EF3: Management Commitment (MC): Summary of ratings

The table shows that for the interviewees 7 out of 7 research participants confirmed the proposed tendency number 3:

"If there is a high level of Management Commitment to the purchasing function, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations."

Therefore, the tendency is considered accepted in the context of this study.

#### 4.3.3.2 Drivers / Inhibitors and the related causal mechanism

Concerning the Enabling Factor (3) Management Commitment (MC), of the 6 drivers 'clear process description with PO-responsibility', 'management shows positive attitude to

the PO involvement into the innovation outside-in-process', 'management complies with agreed innovation process', 'clear innovation strategy and innovation targets', 'management approves necessary resources (financial, personnel)' and 'PO has direct reporting line to the top management' could be identified. 2 of the 6 drivers could be found as formative for the other EFs. Based on the coding process and the research participants' answers, the causal mechanism "Management Commitment authorises the PO and leads to acceptance by other stakeholders" could be identified.

The table below gives an overview of the EF3: MC, related drivers and causal mechanism:

| **EF** | **Driver (DV)** |
|---|---|
| EF3: – Management Commitment | C3a1 Clear process description with PO-responsibility* |
| | C3a2 Management shows positive attitude to the PO involvement into the innovation outside-in-process |
| | C3a3 Management complies with agreed innovation process management complies with agreed innovation process |
| | C3a4 Clear innovation strategy and innovation targets* |
| | C3a5 Management approves necessary resources (financial, personnel) |
| | C3a6 PO has direct reporting line to the top management |
| Causal mechanism | Management Commitment authorises the PO and leads to acceptance by other stakeholders |
| Formative also for other EF = * | |

Table 15: EF3: MC Overview drivers

#### 4.3.3.3 Validation of drivers and proposed mechanism

The table below gives an overview whether the research participants confirmed or not the proposed drivers and mechanism.

| Interviewee / Driver | P01 | P04 | P05 | P06 | P07 | Result | Confirmed |
|---|---|---|---|---|---|---|---|
| C3a1 Clear process description with PO-responsibility | Y | Y | Y | Y | Y | 5/0 | Y |
| C3a2 Management shows positive attitude to the PO involvement into the OI-process | Y | Y | Y | Y | Y | 5/0 | Y |
| C3a3 Management complies with agreed innovation process | Y | Y | Y | Y | Y | 5/0 | Y |
| C3a4 Clear innovation strategy and OI-targets | Y | Y | Y | Y | Y | 5/0 | Y |
| C3a5 Management approves necessary resources (financial, personnel) | Y | Y | Y | Y | Y | 5/0 | Y |
| C3a6 PO has direct reporting line to the top management | Y | Y | Y | Y | Y | 5/0 | Y |
| RM3 Management Commitment authorises the PO and leads to acceptance by other stakeholders | Y | Y | Y | Y | Y | 5/0 | Y |

Table 16: EF3: MC Overview of the ratings concerning driver condition

The table shows that the interviewees confirmed the identified (a) driver-conditions and the proposed (b) causal mechanism is confirmed by the research participants. Therefore, the six drivers and the derived causal mechanism are considered as important in the context of this study.

### 4.3.4 EF4: Internal Interconnectedness (II)

#### 4.3.4.1 Confirmation of tendencies

The table below summarises the interviewees' ratings:

| Rating / Interviewee | strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|---|
| P01 | | X | | | | | |
| P02 | | X | | | | | |
| P03 | X | | | | | | |
| P04 | X | | | | | | |
| P05 | X | | | | | | |
| P06 | X | | | | | | |
| P07 | X | | | | | | |
| Sub-total | 5 | 2 | 0 | 0 | 0 | 0 | 0 |
| Total | 7 | | | 0 | | | |
| → | Tendency confirmed | | | Tendency not confirmed | | | |

Table 17: EF4: Internal Interconnectedness (II): Summary of ratings

The table shows that the research participants confirmed the proposed tendency number 4:

'If a high level of Internal Interconnectedness is achieved by the purchasing function, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.'

Therefore, the tendency is considered accepted in the context of this study.

#### 4.3.4.2 Drivers / Inhibitors and related causal mechanism

Concerning the Enabling Factor (4) Internal Interconnectedness (II), the 6 drivers 'PO is accepted by other innovation stakeholder', 'PO members are willing to work in cross-functional teams', 'Process orientation and short reporting /-decision lines', 'short spatial

distances (between innovation stakeholders) and 'sufficient technical knowledge of PO members' could be identified. Four of the six driver could be found as formative for another EF. Based on the coding process and the research participants' answers, the following causal mechanism "Internal Interconnectedness leads to a free flow of innovation related information between stakeholders" could be identified. The table below gives an overview of the EF4: II, related drivers and causal mechanism.

| **EF** | **Driver (DV)** |
|---|---|
| EF4: – Internal Interconnectedness | C4a1 PO is accepted by other innovation stakeholder |
| | C4a2 PO members are willing to work in cross-functional teams |
| | C4a3 Process thinking (orientation) and short reporting decision lines* |
| | C4a4 Short spatial distances (between innovation stakeholders)* |
| | C4a5 Sufficient technical knowledge of PO members* |
| | C4a6 Sufficient (on-site) domestic support in case of cultural differences/language barriers* |
| Causal mechanism | Internal Interconnectedness leads to a free flow of innovation related information between stakeholders' |
| Formative also for other EF = * | |

Table 18: EF4: II Overview drivers and causal mechanism

#### 4.3.4.3 Validation of drivers and proposed mechanism

The table below gives an overview of whether the research participants confirmed or not the proposed drivers and mechanism.

| Interviewee / Driver | P01 | P04 | P05 | P06 | P07 | Result | Accepted |
|---|---|---|---|---|---|---|---|
| C4a1 PO accepted by other innovation stakeholder | Y | Y | Y | Y | Y | 5/0 | Y |
| C4a2 PO members are willing to work in cross-functional teams | Y | Y | Y | Y | Y | 5/0 | Y |
| C4a3 Process thinking (orientation) and short reporting decisions lines | Y | Y | Y | Y | Y | 5/0 | Y |
| C4a4 Short spatial distances (between innovation stakeholders) | Y | Y | Y | Y | Y | 5/0 | Y |
| C4a5 Sufficient technical knowledge of PO members | Y | Y | Y | Y | Y | 5/0 | Y |
| C4a6 Sufficient (on-site) domestic support in case of cultural differences / language barriers | Y | Y | Y | Y | Y | 5/0 | Y |
| CM 4 Internal Interconnectedness leads to free flow of innovation related information between stakeholders | Y | Y | Y | Y | Y | 5/0 | Y |

Table 19: EF4: II Overview of the ratings concerning driver condition

The table indicates that the interviewees confirmed the identified (a) driver conditions and the proposed (b) causal mechanism. Therefore, the six drivers and the derived causal mechanism are considered important in the context of this study.

### 4.3.5 EF5: Early Integration into Product Planning (EIP)

#### 4.3.5.1 Confirmation of tendencies

The table below summarises the interviewees' ratings:

| Rating / Interviewee | strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|---|
| P01 | | X | | | | | |
| P02 | | X | | | | | |
| P03 | X | | | | | | |
| P04 | X | | | | | | |
| P05 | X | | | | | | |
| P06 | X | | | | | | |
| P07 | X | | | | | | |
| Sub-total | 5 | 2 | 0 | 0 | 0 | 0 | 0 |
| Total | 7 | | | 0 | | | |
| → | Tendency confirmed | | | Tendency not confirmed | | | |

Table 20: EF5: Early Integration into Product Planning (EIP): Summary of ratings

The table illustrates that the research participants confirmed the proposed tendency number 5:

'If the purchasing function is integrated early into the product planning process, there is the tendency that it has the capability to generate valuable outside-in innovations.'
Therefore, the tendency is considered accepted in the context of this study.

#### 4.3.5.2 Drivers / Inhibitors and the related cause effect mechanism

Concerning the Enabling Factor (5) 'integration into product planning', the 5 drivers 'early PO involvement is common living practice', 'detailed product description are available', 'purchasing members have detailed knowledge about supplier capabilities', 'ideas from

purchasing members are desired', 'living systematic and value-based supplier selection process' could be identified. Two of the six drivers could be found as formative for the other EFs. Based on the coding process and the research participants' answers, the causal mechanism "the Integration into product planning increases the knowledge of the purchasing function concerning required product features as a basis for the efficient/effective utilisation of supplier capabilities" could be identified. The table below gives an overview of the EF5: EIP, related drivers and causal mechanism:

| **Enabling Factor** | **Driver (DV) / Inhibitor (IN)** |
|---|---|
| EF5:<br>Early Integration into Product Planning | C5a1 Early PO involvement is common living practice |
| | C5a2 Detailed product description are available |
| | C5a3 Purchasing members have detailed knowledge about supplier capabilities |
| | C5a4 Ideas from purchasing members are desired* |
| | C5a5 Living systematic and value-based supplier selection process* |
| Causal mechanism | The integration into product planning increases the knowledge of the purchasing function concerning required product features as a basis for the efficient/effective utilisation of supplier capabilities |
| Formative also for other EF = * | |

Table 21: EF5: EIP Overview of drivers

#### 4.3.5.3 Validation of drivers and proposed mechanism

The table below gives an overview of whether the research participants confirmed or not the proposed drivers and mechanism.

| Interviewee / Driver | P01 | P04 | P05 | P06 | P07 | Result | Accepted |
|---|---|---|---|---|---|---|---|
| C5a1 Early PO involvement (integration) is common living practice | Y | Y | Y | Y | Y | 5/0 | Y |
| C5a2 Detailed product descriptions are available | Y | Y | Y | Y | Y | 5/0 | Y |
| C5a3 Ideas from purchasing members are desired | Y | Y | Y | Y | Y | 5/0 | Y |
| C5a4 Purchasing members have detailed knowledge about supplier capabilities | Y | Y | Y | Y | Y | 5/0 | Y |
| C5a5 Living systematic and value-based supplier selection | Y | Y | Y | Y | Y | 5/0 | Y |
| CM 5 The integration into product planning increases PO knowledge about required product features as a basis for the efficient/ effective utilisation of supplier capabilities | Y | Y | Y | Y | Y | 5/0 | Y |

Table 22: EF5: EIP Overview of the ratings concerning driver condition

The table shows that the interviewees confirmed the identified (a) driver-conditions and the proposed (b) causal mechanism in the context of this study. Therefore, the six driver conditions are considered as important in the context of this study.

### 4.3.6 EF6: Degree of Professionalisation of the PO (PDP)

#### 4.3.6.1 Confirmation of tendencies

The table below summarises the research participants' ratings:

| Rating / Interviewee | strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|---|
| P01 | | X | | | | | |
| P02 | | X | | | | | |
| P03 | | X | | | | | |
| P04 | X | | | | | | |
| P05 | X | | | | | | |
| P06 | | X | | | | | |
| P07 | | X | | | | | |
| Sub-total | 2 | 5 | 0 | 0 | 0 | 0 | 0 |
| Total | 7 | | | 0 | | | |
| → | Tendency confirmed | | | Tendency not confirmed | | | |

Table 23: EF6: Degree of Professionalisation of purchasing (PDP): Summary of ratings.

The table shows that the research participants confirmed the proposed tendency number 5:

'If the purchasing function has gained a high Degree of Professionalisation, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.'

Therefore, the tendency is considered accepted in the context of this study.

#### 4.3.6.2 Drivers / Inhibitors and the related cause effect mechanism

Concerning the Enabling Factor (6) Degree of Professionalisation of the PO, the 6 drivers 'purchasing members have a detailed knowledge about supplier capabilities', 'sound (good) management knowledge', 'sufficient technical knowledge', 'good leadership skills', 'sufficient time resources for outside-in management' and 'willingness to learn' could be identified. Four of the six drivers could be found as formative for the other EFs. Based on the coding process and the research participants' answers, the causal mechanism "a high Degree of Professionalisation of the purchasing function enables the purchasing members to drive and co-ordinate the innovation outside-in process" could be identified. The table below gives an overview of the EF6: PDP, related drivers and causal mechanism:

| **Enabling Factor** | **Driver (DV) / Inhibitor (IN)** |
|---|---|
| EF6: Degree of Professionalisation of purchasing | C6a1 Purchasing members have a detailed knowledge about supplier capabilities* |
| | C6a2 Sound (good) management knowledge* |
| | C6a3 Sufficient technical knowledge* |
| | C6a4 Good leadership skills |
| | C6a5 Sufficient time resources for outside-in management* |
| | C6a6 Willingness to learn |
| Causal mechanism | A high Degree of Professionalisation enables the purchasing members to drive and co-ordinate the innovation outside in process. |
| Formative also for other EF = * | |

Table 24: EF6: PDP Overview of drivers and causal mechanism

#### 4.3.6.3 Validation of drivers and proposed mechanism

The table below gives an overview of whether the research participants confirmed or not the proposed drivers and mechanism.

| Interviewee / Driver | P01 | P04 | P05 | P06 | P07 | Result | Accepted |
|---|---|---|---|---|---|---|---|
| C6a1 Purchasing members have a detailed knowledge about supplier capabilities | Y | Y | Y | Y | Y | 5/0 | Y |
| C6a2 Sound (good) management skills | Y | Y | Y | Y | Y | 5/0 | Y |
| C6a3 Sufficient technical knowledge | Y | Y | Y | Y | Y | 5/0 | Y |
| C6a4 Good leadership skills | Y | Y | Y | Y | Y | 5/0 | Y |
| C6a5 Sufficient time resources for outside-in management | Y | Y | Y | Y | Y | 5/0 | Y |
| C6a6 Willingness to learn | Y | Y | Y | Y | Y | 5/0 | Y |
| CM 6 A high Degree of Professionalisation of the purchasing function enables the purchasing members to drive and co-ordinate the innovation outside-in process | Y | Y | Y | Y | Y | 5/0 | Y |

Table 25: EF6: PDP Overview of the ratings concerning driver condition

The table shows that the research participants confirmed the identified (a) drivers and the proposed (b) causal mechanism in the context of this study. Therefore, the six driver conditions are considered as important in the context of this study.

### 4.3.7 EF7: Innovation Management System (IMS)

#### 4.3.7.1 Confirmation of tendencies

The table below summarises the research participant's ratings:

| Rating / Interviewee | strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|---|
| P01 | | X | | | | | |
| P02 | X | | | | | | |
| P03 | | X | | | | | |
| P04 | X | | | | | | |
| P05 | | X | | | | | |
| P06 | X | | | | | | |
| P07 | | X | | | | | |
| Sub-total | 3 | 4 | 0 | 0 | 0 | 0 | 0 |
| Total | 7 | | | 0 | | | |
| → | Tendency confirmed | | | Tendency not confirmed | | | |

Table 26: EF7: Innovation Management System (IMS): Summary of ratings

The table shows that the research participants confirmed the proposed tendency:

'If there is a company-wide accepted and practiced Innovation Management System in place, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.'

Therefore, the tendency is considered accepted in the context of this study.

#### 4.3.7.2 Drivers / Inhibitors and the related cause effect mechanism

Concerning the Enabling Factor (7) Innovation Management System, 3 drivers 'clear process description with purchasing responsibility', 'IMS tool ensures easy access and prag-

matic submission and monitoring of innovation outside-in subjects' and 'innovation process, tools are practised by stakeholders and related inhibitors' could be identified. 1 of the 3 drivers could be found as formative for the other EF. Based on the coding process and the research participant's answers, the causal mechanism "A lived and pragmatic Innovation Management System ensures efficient and effective processing of outside-in innovations" could be identified.

The table below gives an overview of the EF7: II and related drivers and causal mechanism:

| **Enabling Factor** | **Driver (DV) / Inhibitor (IH)** |
|---|---|
| EF7: Innovation Management System | C7a1 Clear process description with purchasing responsibility * |
| | C7a2 Easy access and pragmatic submission and monitoring of innovation outside-in subjects |
| | C7a3 Innovation process, tools are practiced by stakeholders |
| Causal mechanism | A lived and pragmatic Innovation Management System (IMS) ensures the efficient and effective processing of outside-in innovations. |
| Formative also for other EF = * | |

Table 27: EF7: IMS Overview of drivers and causal mechanism

#### 4.3.7.3 Validation of drivers and proposed mechanism

The table below gives an overview of whether the research participants confirmed or not confirmed the proposed drivers and mechanism.

| Interviewee / Driver | P01 | P04 | P05 | P06 | P07 | Result | Accepted |
|---|---|---|---|---|---|---|---|
| C7a1 Clear process description with purchasing responsibility | Y | Y | Y | Y | Y | 5/0 | Y |
| C7a2 Easy access and pragmatic submission, monitoring of innovation outside-in subjects | Y | Y | Y | Y | Y | 5/0 | Y |
| C7a3 Innovation process, tools are practiced by stakeholders | Y | Y | Y | Y | Y | 5/0 | Y |
| CM 7 A lived and pragmatic Innovation Management System (IMS) ensures the efficient and effective processing of outside-in innovations | Y | Y | Y | Y | Y | 5/0 | Y |

Table 28: EF7: IMS Overview of the ratings concerning driver condition

The table shows that the research participant's confirmed the identified (a) drivers and the proposed (b) causal mechanism. Therefore, the three driver conditions and the causal mechanism are considered important in the context of this study.

### 4.3.8 EF8: Open-minded Relations based on Trust (ORT)

#### 4.3.8.1 Confirmation of tendencies

The table below summarises the research participants' ratings:

| Rating / Interviewee | strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|---|
| P01 | | X | | | | | |
| P02 | | X | | | | | |
| P03 | X | | | | | | |
| P04 | X | | | | | | |
| P05 | X | | | | | | |
| P06 | X | | | | | | |
| P07 | | X | | | | | |
| Sub-total | 3 | 4 | 0 | 0 | 0 | 0 | 0 |
| total | 7 | | | 0 | | | |
| → | Tendency confirmed | | | Tendency not confirmed | | | |

Table 29: EF8: Open-minded Relations based on Trust (ORT): Summary of ratings

The table shows that the interviewees confirmed the proposed tendency 8:

'If there is a high degree of Open-minded Relations based on Trust among the stakeholders of the innovation process, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.'

Therefore, the tendency is considered accepted in the context of this study.

#### 4.3.8.2 Drivers / Inhibitors and the related cause effect mechanism

Concerning the Enabling Factor (8) Open-minded Relations based on Trust (ORT), the 6 drivers 'approachable and courteous nature of innovation stakeholders', 'living cross-functional communication between innovation stakeholders', 'co-ordinated actions of innovation stakeholders', 'process thinking (orientation)', 'short reporting decision lines', 'clear innovation strategy and innovation targets' and 'sufficient time resources for innovation outside-in management' could be identified. Three of the six drivers could be described as formative for other EFs. Based on the coding process and the research participants' answers, the causal mechanism 'trust and open-minded relations activate a non-biased/open exchange of information between stakeholders' could be identified. The table below gives an overview of the EF8: ORT, and related drivers and the causal mechanism:

| **Enabling Factor** | **Driver (DV) / Inhibitor (IN)** |
|---|---|
| EF8: Open-minded Relations based on Trust | C8a1 Approachable and courteous nature of innovation stakeholders |
| | C8a2 Living cross-functional communication among innovation stakeholders |
| | C8a3 Co-ordinated actions of innovation stakeholders |
| | C8a4 Process thinking (orientation) and short reporting decision lines * |
| | C8a5 Clear innovation strategy and innovation targets * |
| | C8a6 Sufficient time resources for innovation outside-in management * |
| Causal mechanism | Trust and open-minded relations activate non-biased/open exchange of information between stakeholders |
| Formative also for other EF = * | |

Table 30: EF8: ORT Overview of drivers

#### 4.3.8.3 Validation of drivers and proposed mechanism

The table below gives an overview of whether the research participants confirmed or not the proposed drivers and mechanism.

| Interviewee / Driver | P01 | P04 | P05 | P06 | P07 | Result | Accepted |
|---|---|---|---|---|---|---|---|
| C8a1 Approachable and courteous nature of innovation stakeholders | Y | Y | Y | Y | Y | 5/0 | Y |
| C8a2 Living cross-functional communication between innovation stakeholders | Y | Y | Y | Y | Y | 5/0 | Y |
| C8a3 Co-ordinated actions of innovation-stakeholders | Y | Y | Y | Y | Y | 5/0 | Y |
| C8a4 Process thinking (orientation) and short reporting decision lines | Y | Y | Y | N | Y | 4/1 | Y |
| C8a5 Clear innovation strategy and innovation targets | Y | Y | Y | Y | Y | 5/0 | Y |
| C8a6 Sufficient time resources for outside-in management | Y | Y | Y | Y | Y | 5/0 | Y |
| CM8 Trust and open-minded relations activate non-biased/open exchange of information between stakeholders | Y | Y | Y | Y | Y | 5/0 | Y |

Table 31: EF8: ORT Overview of the ratings concerning driver condition

The table shows that the research participants confirmed: (a) the identified drivers and (b) the proposed causal mechanism. Therefore, the six drivers are considered as important in the context of this study.

### 4.3.9 RQ1: Result of analyses

Relating to RQ 1: What are the Enabling Factors for the effective integration of purchasing into the outside-in innovation process? and connecting to the results of Phase I of this data collection and analysis process, the eight Enabling Factors enabling EF1: External Interconnectedness (EI), EF2: Preferred Customer status Process (PCP), EF3: Management Commitment to the PO (MC), EF4: Internal Interconnectedness (II), EF5: Early Integration into Product Planning (EIP), EF6: professionalisation degree of the PO (PDP), EF7: Innovation Management System (IMS) and EF8: Open-minded Relations based on Trust (ORT) could be identified and corroborated in the context of Loewe's PO. Furthermore, eight related causal mechanisms and 32 drivers (inhibitors) could be identified. Some 11 of the 32 drivers (inhibitors) could be identified as multiple drivers (inhibitors). That means that they build formative elements of two or three Enabling Factors respectively. For example, driver D01: short spatial distance, is attributed to EF1: External Interconnectedness and EF4: Internal Interconnectedness. This can be explained as EF1: External Interconnectedness, relates to third party organisations and EF4: Internal Interconnectedness, relates to internal innovation stakeholders of a specific organisation. Anyway, the background to realise, as far as this is possible, a short spatial distance between the EF remains the same. Out of the 32 drivers (inhibitors), 21 are formative elements of one specific Enabling Factor, while 10 drivers (inhibitors) build formative elements of two Enabling Factors. In particular 1 driver (inhibitor), builds a formative element of three different Enabling Factors.

The table further displays the EF identified, the causal mechanism and related drivers. Multiple assigned drivers are marked as a sub-condition (Cnxn). For reasons of clarity, multiple used drivers are marked and highlighted in yellow. Due to the exploratory character of this study, the terms used for identified themes (Enabling Factors, drivers, inhibitors, causal mechanism) were gradually refined in the course of this study. For clarity, the table below shows the final terms used which were applied in Phase II: external validation.

| EF | Driver | Code 1 | Code 2 | Code 3 |
|---|---|---|---|---|
| EF1: EI | D01 Short spatial distance (to innovation suppliers) | C1a1 | C4a4 | |
| | D02 Good company image and –story | C1a2 | C2a2 | |
| | D03 Sufficient time resources for innovation outside-in management | C1a3 | C6a5 | C8a6 |
| | D04 Integration (of innovation suppliers) into mid and long-term product planning | C1a4 | C2a4 | |
| | D05 Sufficient financial resources for innovation outside-in management | C1a5 | | |
| | D06 Sufficient (on-site) domestic support in case of cultural differences/language barriers | C1a6 | C4a6 | |
| EF2: PCP | D07 Attractive purchasing volume | C2a1 | | |
| | D02 Good company image and story | C2a2 | C1a2 | |
| | D08 Good relationship management to innovation supplier | C2a3 | | |
| | D04 Integration (of innovation suppliers) into mid and long-term product planning | C2a4 | C1a4 | |
| | D09 Sound (good) management skills | C2a5 | C6a2 | |
| | D10 Living systematic and value based supplier selection process | C2a6 | C5a5 | |
| EF3: MC | D11 Clear process description with purchasing responsibility | C3a1 | C7a1 | |
| | D12 Management shows positive attitude to the PO involvement into the innovation outside-in process | C3a2 | | |
| | D13 Management complies with agreed innovation process | C3a3 | | |
| | D14 Clear innovation strategy and innovation targets | C3a4 | C8a5 | |
| | D15 Management approves necessary resources (financial, personnel) | C3a5 | | |
| | D16 PO has direct reporting line to the top management | C3a6 | | |
| EF4: II | D17 PO accepted by other innovation stakeholder | C4a1 | | |
| | D18 PO members are willing to work in cross-functional teams | C4a2 | | |
| | D19 Process thinking (orientation)and short reporting decision lines | C4a3 | C8a4 | |
| | D01 Short spatial distances (between innovation stakeholders) | C4a4 | C1a1 | |
| | D20 Sufficient technical knowledge of PO members | C4a5 | | |
| | D21 Sufficient (on-site) domestic support in case of cultural differences/language barriers | C4a6 | C1a6 | |
| | Continued on next page | | | |

| EF | **Driver** (continued from previous page) | **Code 1** | **Code 2** | **Code 3** |
|---|---|---|---|---|
| EF5: EIP | D22 Early PO integration is common living practice | C5a1 | | |
| | D23 Detailed product description are available | C5a2 | | |
| | D24 Ideas from purchasing members are desired | C5a3 | | |
| | D25 Purchasing members have detailed knowledge about supplier capabilities | C5a4 | C6a1 | |
| | D10 Living systematic and value-based supplier selection process | C5a5 | C2a6 | |
| EF6: PDP | D25 Purchasing members have detailed knowledge about supplier capabilities | C6a1 | C5a4 | |
| | D09 Sound (good)management skills | C6a2 | C2a5 | |
| | D20 Sufficient technical knowledge of PO members | C6a3 | C4a5 | |
| | D26 Good leadership skills | C6a4 | | |
| | D03 Sufficient time resources for innovation outside-in management | C6a5 | C1a3 | C8a6 |
| | D27 Willingness to learn | C6a6 | | |
| EF7: IMS | D11 Clear process description with purchasing responsibility | C7a1 | C3a1 | |
| | D28 Easy access and pragmatic submission, monitoring of innovation outside-in subjects | C7a2 | | |
| | D29 Innovation process, tools are practiced by stakeholders | C7a3 | | |
| EF8: ORT | D30 Approachable and courteous nature of innovation-stakeholders | C8a1 | | |
| | D31 Living cross-functional communication between innovation stakeholders | C8a2 | | |
| | D32 Co-ordinated actions of innovation-stakeholders | C8a3 | | |
| | D19 Process (thinking) orientation goes in line with short reporting decision lines | C8a4 | C4a3 | |
| | D14 Clear innovation strategy and innovation targets | C8a5 | C3a4 | |
| | D03 Sufficient time resources for innovation outside-in management | C8a6 | C1a3 | C6a5 |
| Comment: Drivers marked in yellow are formative for more than 1 EF. | | | | |

Table 32: Overview of identified Enabling Factors and drivers

### 4.3.10 Direct relations among the identified EF

#### 4.3.10.1 Relationships EF1: External Interconnectedness (EI)

| EF1: External Interconnectedness is linked to: | no direct linkage | as pre-condition of → | interaction with ↔ | dependent from ← |
|---|---|---|---|---|
| External Interconnectedness | | | | |
| Preferred Customer status Process | II | I | II | |
| Management Commitment | II | | | III |
| Internal Interconnectedness | IIII | | I | |
| Early Integration into Product Planning | III | | II | |
| Degree of Pofessionalisation of the PO | | | II | III |
| Innovation Management System | I | | IIII | |
| Open-minded Relations based on Trust | | | IIII | I |
| Sum per column: | 12 | 1 | 15 | 7 |

direct dependency

Table 33: EF1: EI Statistical analysis of dependency relationship

The table shows that EF1: External Interconnectedness was 12 times rated as 'no direct' linkage and 15 times rated as 'interaction with'. Based on the applied majority principle, it can be interpreted that EF1: is not a direct pre-condition of the other seven Enabling Factors. Regarding direct dependency, three of five research participants argued that EF1: External Interconnectedness, is dependent on EF3: Management Commitment and EF4: Degree of Professionalisation of the PO.

#### 4.3.10.2 Relationships EF2: Preferred Customer status Process (PCP)

| EF2: Preferred Customer status Process is linked to: | no direct linkage | as pre-condition of → | interaction with ↔ | dependent from ← |
|---|---|---|---|---|
| External Interconnectedness | II | | II | I |
| Preferred Customer status Process | | | | |
| Management Commitment | II | | | III |
| Internal Interconnectedness | IIII | | I | |
| Early Integration into Product Planning | III | I | I | |
| Degree of Pofessionalisation of the PO | I | | I | III |
| Innovation Management System | I | | IIII | |
| Open-minded Relations based on Trust | I | | III | I |
| Sum per column: | 14 | 1 | 12 | 8 |

direct dependency

Table 34: EF2: PCP Statistical analysis of dependency relationship

The table shows that EF2: preferred customer process was 14 times rated as 'no direct linkage' and 12 times rated as 'interaction with'. Based on the majority principle applied, it can be interpreted that EF2: Preferred Customer status Process is not a direct pre-condition of the other seven Enabling Factors. Subject to direct dependency, 3 of 5 research participants argued that EF2: Preferred Customer status Process is dependent on EF3: Management Commitment, and EF4: Degree of Professionalisation of the PO.

### 4.3.10.3 Relationships EF3: Management Commitment (MC)

| EF3: Management Commitment is linked to: | no direct linkage | as pre-condition of → | interaction with ↔ | dependent from ← |
|---|---|---|---|---|
| External Interconnectedness | II | III | | |
| Preferred Customer status Process | II | III | | |
| Management Commitment | | | | |
| Internal Interconnectedness | II | II | I | |
| Early Integration into Product Planning | II | III | | |
| Degree of Pofessionalisation of the PO | | III | II | |
| Innovation Management System | | III | II | |
| Open-minded Relations based on Trust | I | I | III | |
| Sum per column: | 9 | 18 | 8 | |

direct dependency

Table 35: EF3: MC Statistical analysis of dependency relationship

The table shows that EF3: Management Commitment was 9 times rated with 'no direct linkage' and 8 times rated with 'interaction with'. Subject to direct dependency, 3 of 5 research participants argued that EF2: Preferred Customer status Process, EF5: Early Integration into Product Planning, EF6: Degree of Professionalisation of purchasing and commitment, EF4: Degree of Professionalisation of the PO and EF7: Innovation Management System are directly dependent on EF3. Subject to EF4: Internal Interconnectedness, 2 of 5 respondents voted that Management Commitment is a direct pre-condition of Internal Interconnectedness. 1 research participant voted that there is an interaction with Management Commitment and the remaining 2 research participants voted that there is no direct linkage.

### 4.3.10.4 Relationships EF4: Internal Interconnectedness (II)

| EF4: Internal Interconnectedness is linked to: | no direct linkage | as pre-condition of → | interaction with ↔ | dependent from ← |
|---|---|---|---|---|
| External Interconnectedness | IIII | | I | |
| Preferred Customer status Process | IIII | | I | |
| Management Commitment | II | | I | II |
| Internal Interconnectedness | | | | |
| Early Integration into Product Planning | | I | IIII | |
| Degree of Pofessionalisation of the PO | | | II | III |
| Innovation Management System | II | | III | |
| Open-minded Relations based on Trust | | | III | II |
| Sum per column: | 12 | 1 | 15 | 7 |

direct dependency

Table 36: EF4: II Statistical analysis of dependency relationship

The table shows that EF4: Internal Interconnectedness was 12 times rated with 'no direct linkage' and 15 times rated with 'interaction with'. Based on the applied majority principle, it can be interpreted that EF4: is no direct pre-condition of the other seven Enabling Factors. Subject to direct dependency, EF4: Internal Interconnectedness was rated as de-

pendent from EF6: Degree of Professionalisation of the PO but not, as mentioned above, as directly dependent from EF3: Management Commitment-.

#### 4.3.10.5 Relationships EF5: Early Integration into Product Planning (EIP)

| EF5: Early Integration into Product Planning is linked to: | no direct linkage | as pre-condition of → | interaction with ↔ | dependent from ← |
|---|---|---|---|---|
| External Interconnectedness | III | | II | |
| Preferred Customer status Process | III | | I | I |
| Management Commitment | II | | | III |
| Internal Interconnectedness | | | IIII | I |
| Early Integration into Product Planning | | | | |
| Degree of Pofessionalisation of the PO | | | I | IIII |
| Innovation Management System | I | | IIII | |
| Open-minded Relations based on Trust | | | IIII | I |
| Sum per column: | 9 | | 16 | 10 |

direct dependency

Table 37: EF5: EIP Statistical analysis of dependency relationship

The table shows that EF5: Early Integration into Product Planning was 9 times rated with 'no direct linkage' and 16 times rated with 'interaction with'. Based on the applied majority principle, it can be interpreted that EF5: is no direct pre-condition of the other six Enabling Factors. Subject to direct dependency, EF5: Early Integration into Product Planning was rated as dependent on EF3: Management Commitment and EF5: Degree of Professionalisation of the PO. This is in line with the analysing table of Management Commitment (4.3.10.3).

#### 4.3.10.6 Relationships EF6: Degree of Professionalisation of the PO (PDP)

| EF6: Degree of professionalisation of the PO is linked to: | no direct linkage | as pre-condition of → | interaction with ↔ | dependent from ← |
|---|---|---|---|---|
| External Interconnectedness | | III | II | |
| Preferred Customer status Process | I | III | I | |
| Management Commitment | | | II | III |
| Internal Interconnectedness | | III | II | |
| Early Integration into Product Planning | | IIII | I | |
| Degree of Pofessionalisation of the PO | | | | |
| Innovation Management System | III | I | I | |
| Open-minded Relations based on Trust | I | | IIII | |
| Sum per column: | 5 | 14 | 13 | 3 |

direct dependency

Table 38: EF6: PDP Statistical analysis of dependency relationship

The table shows that EF6: Degree of Professionalisation of the PO, was 5 times rated with 'no direct linkage' and 13 times rated with 'interaction with'. Based on the applied majority principle, it can be interpreted that EF6: is a direct pre-condition of EF1: External Interconnectedness, EF2: Preferred Customer status Process, EF4: Internal Interconnectedness

and EF5: Early Integration into Product Planning. Subject to direct dependency, EF6: Degree of Professionalisation of PO was rated as directly dependent on EF3: -Management Commitment-. This is in line with the analysis table of Management Commitment (4.3.10.3). However, Management Commitment was also considered as a direct pre-condition of EF1: (EI), EF2: (PCP) and EF5: (EIP) while EF4: (II) could be rather interpreted as indirectly dependent on EF3: (MC). The results suggest that EF3: Management Commitment, is a pre-condition of EF6: Degree of Professionalisation of purchasing. In turn, the available evidence suggests that EF3: (MC) is an in-direct pre-condition of EF1: External Interconnectedness, EF2: Preferred Customer status Process, EF4: Internal Interconnectedness, EF5: Early Integration into product panning.

### 4.3.10.7 Relationships EF7: Innovation Management System (IMS)

| EF7: Innovation Management System is linked to: | no direct linkage | as pre-condition of → | interaction with ↔ | dependent from ← |
|---|---|---|---|---|
| External Interconnectedness | I | | IIII | |
| Preferred Customer status Process | I | | IIII | |
| Management Commitment | | | II | III |
| Internal Interconnectedness | II | | III | |
| Early Integration into Product Planning | I | | IIII | |
| Degree of Pofessionalisation of the PO | III | | I | I |
| Innovation Management System | | | | |
| Open-minded Relations based on Trust | II | | III | |
| Sum per column: | 10 | 0 | 21 | 4 |
| direct dependency | | | | |

Table 39: EF7: IMS Statistical analysis of dependency relationship

The table shows that EF7: Innovation Management System was 10 times rated with ‘no direct linkage’ and 21 times rated with ‘interaction with’. Based on the applied majority principle, it can be interpreted that EF7: has no direct pre-condition to the other 7 EFs. Subject to direct dependency, EF7: Innovation Management System was rated as directly dependent on EF3: -Management Commitment-. This is in line with the analysis table of Management Commitment (4.2.2.10.3). This result indicates that EF7: Innovation Management System is a moderating factor that affects, subject to the effective integration of the PO into the innovation outside-in innovation process, the relationship of EFs that are directly dependent to each other (Saunders et al., 2012). Furthermore, it is understandable that Management Commitment is a pre-condition to the realisation of EF7: Innovation Management System as executive management is considered as responsible to decide and drive the introduction of a companywide and living Innovation Management System.

### 4.3.10.8 Relationships EF8: Open-minded Relations based on Trust (ORT)

| EF8: Open-minded Relations based on Trust are linked to: | no direct linkage | as pre-condition of → | interaction with ↔ | dependent from ← |
|---|---|---|---|---|
| External Interconnectedness | | I | IIII | |
| Preferred Customer status Process | I | I | III | |
| Management Commitment | I | | III | I |
| Internal Interconnectedness | | II | III | |
| Early Integration into Product Planning | | I | IIII | |
| Degree of Pofessionalisation of the PO | I | | IIII | |
| Innovation Management System | II | | III | |
| Open-minded Relations based on Trust | | | | |
| Sum per column: | 5 | 5 | 24 | 1 |

direct dependency

Table 40: EF8: ORT Statistical analysis of dependency relationship

The table shows that EF8; Open-minded Relations based on Trust, was 5 times rated with 'no direct linkage' and 24 times rated with 'interaction with'. Based on the applied majority principle, it can be interpreted that EF8: Open-minded Relations based on Trust is no direct pre-condition to the other 7 EFs. This result indicates that EF8: Open-minded Relations based on Trust is a moderating factor that affects, subject to the effective integration of the PO into the innovation outside-in process, the relationship of EFs that are directly dependent to each other (Saunders *et al.*, 2012).

### 4.3.10.9 Proposed relationship model

Subject to the above delineated analyses of the EF relationship tables, the following relationship model can be devised:

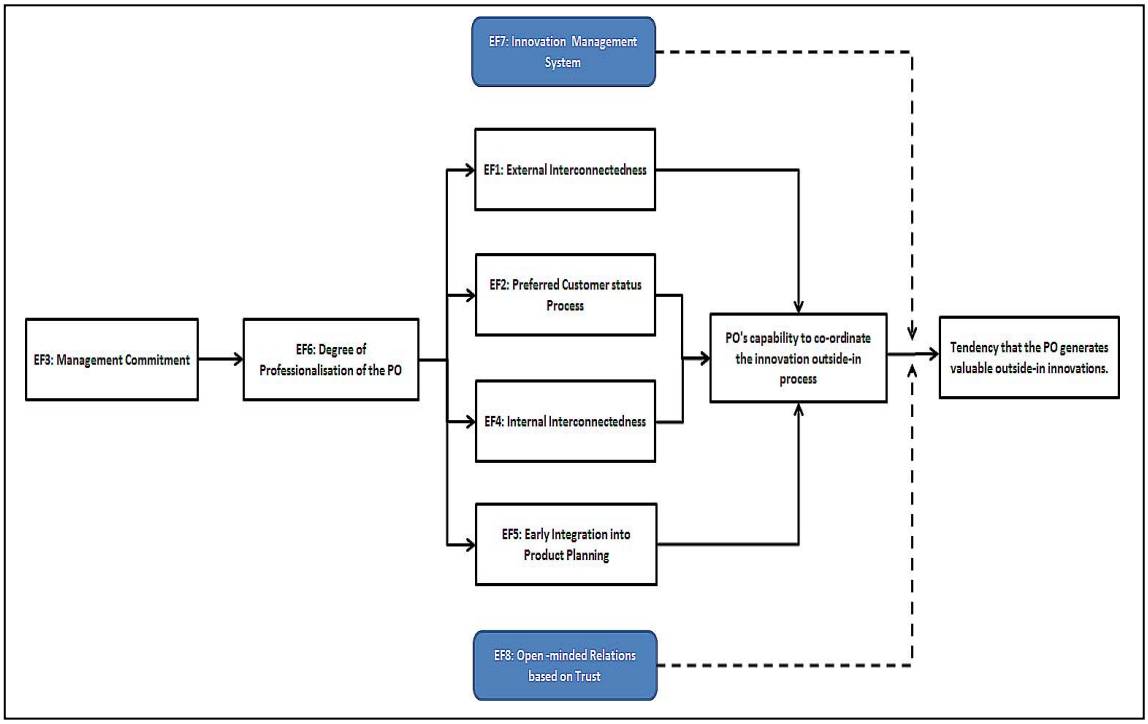


Figure 25: Proposed relationship of EFs at research unit in Loewe

The relationship model is an abstraction of the relationships of the EFs. It needs to be pointed out that only the dependency relations identified at Loewe's PO are proposed in the relationship model. Beside simple statistical analysis and subsequent interpretation, consensus subject to the relevance for Loewe's PO was achieved, again via an approach of achieving a shared understanding with the research participants.

The EF-relationship model proposes that EF3: Management Commitment is a direct pre-condition of EF6: Degree of Professionalisation of the PO-. On the other hand, EF6: (PDP) is a direct pre-condition of EF1: External Interconnectedness (EI), EF2: Preferred Customer status Process (PDP), EF4: Internal Interconnectedness (II) and EF5: Early Integration into Product Planning (EIP). Based on the above delineated considerations and in line with the required capability to timely absorb and appropriately assess component innovations (Cohen and Levinthal, 1990), the dependent factor 'PO capability to co-ordinate the innovation outside-in process' was integrated. Sammerl (2006) defines this effect as a capability that *"represents a company's potential to effectively co-ordinate competences and resources that are further devised over time, which corresponds with a dynamic perspective"* (Sammerl, 2006, p. 166).

Related to EF7: management innovation system and EF8: Open-minded Relations based on Trust between innovation stakeholder, the analyses tables (sub-chapter 4.3.10.7 and 4.3.10.8) indicate that both Enabling Factors can positively affect the capability of Loewe's PO to co-ordinate the innovation outside-in process, thus increasing the tendency that valuable outside-in innovations are generated by the PO.

It has to be emphasised that the approach selected above to determine relationships between the identified Enabling Factors reflects a highly exploratory approach applied in the early research stage and due to a lack of suitable qualitative techniques. However, based on past experience, theoretical considerations and subsequent discussion with the research participants, the direct relations outlined between the Enabling Factors can be reasonably justified. Therefore, in line with the applied principle of continuous corroboration, the relationship model became subject of Phase II: external validation. In order to obtain initial insights as to the generalisability of the suggested relations among the EFs, the following tendential predictions were devised:

- CR01: The greater the **Management Commitment** to the purchasing function, the greater the tendency that the purchasing function gains a **high Degree of Professionalisation.**

- CR02: The greater the **Degree of Professionalisation** of the purchasing function, the greater the tendency towards the **Early Integration** of the purchasing function into the **strategic product planning process**.

- CR03: The greater the **professionalisation degree** of the purchasing function, the greater the tendency towards **Internal Interconnectedness** of the purchasing function.

- CR04: The greater the **Degree of Professionalisation** of the purchasing function, the greater the tendency towards **External Interconnectedness** of the purchasing function.

- CR05: The greater the **Degree of Professionalisation** of the purchasing function, the greater the tendency that the purchasing function **rates** the actual and the achievable **preferred customer status** granted by a supplier.

- CR06: The greater the Early Integration of the purchasing function into the product planning process, the greater the purchasing function's capability to **co-ordinate** the innovation outside-in process.

- CR07: The greater the **Internal Interconnectedness** of the purchasing function, the greater the purchasing function's capability to **co-ordinate** the innovation outside-in process.

- CR08: The greater the **External Interconnectedness** of the purchasing function, the greater the purchasing function's capability to **co-ordinate** the innovation outside-in process.

- CR09: The better the purchasing function **rates** the actual and achievable **customer status** granted by the supplier, the greater the purchasing function's capability to **co-ordinate** the innovation outside-in process.

- CR10: The greater a living and pragmatic **Innovation Management System (IMS)** is companywide practiced, the greater the purchasing function's capability to **co-ordinate** the innovation outside-in process.

- CR11: The greater the degree of **Open-minded Relations based on Trust** among innovation stakeholders, the greater the purchasing function's capability to **co-ordinate** the innovation outside-in process.

- CR12: The greater the capability of the purchasing function to **co-ordinate** the innovation outside-in process, the greater the tendency that the purchasing function **generates** valuable outside-in innovations.

In the subsequent Phase III of the data collection and analysis process, the hitherto identified Enabling Factor, driver, causal mechanism and relations between the EFs became subject of an external validation. The following sub-chapter 4.4 external validation dwells on the process and results gained.

## 4.4 External validation

Whereas the principle of corroboration was achieved during Phase I of the data collection and analysis process via face validity (Guest *et al.*, 2012), the main focus of Phase II, external validation was, subject to RQ 3, whether there are indications that the identified Enabling Factors are relevant for other system integrators or not? For this reason, (RO3), the main objective of Phase II of the data collection and analysis process was to investigate whether the identified Enabling Factors and corresponding drivers, causal mechanism and tendencies are confirmed (or not) by practitioners who have working experience with the SI that are dependent on innovation suppliers. Thus, initial insights can be gained as to the generalisability of the devised Enabling Factors (Miles & Huberman, 2002).

The following sub-chapter delineates the preparative steps of Phase II and then turns to the results of the data-analysis.

### 4.4.1 Results of data analysis

The following sub-chapter presents the findings of Phase II – external validation. Subject to the decision whether during phases I and II of the data collection and analysis process the identified Enabling Factors, drivers, causal mechanism and relations between the EFs are accepted or not by the External Experts (EEs), the collected opinion data analysed were entered into the table. Then, the average value was calculated. As the 7-point Likert scale was used, all proposed Enabling Factors, drivers, causal mechanism and relations between the EFs are considered accepted by the EIs in case that the average value is greater than or equal to 5. Beside this, no further statistical analysis was conducted.

#### 4.4.1.1 EF1: External Interconnectedness

The table below shows the collected opinion data for the drivers, tendency (T) and causal mechanism (CM) and the related average value.

| External interviewee / Driver | EE01 | EE02 | EE03 | EE04 | EE05 | EE06 | EE07 | EE08 | EE09 | EE10 | EE11 | Average value | Accepted |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C1a1 Short spatial/physical distance to innovation suppliers | 6 | **5** | 6 | 5 | 6 | 3 | 6 | 5 | 6 | 6 | 6 | 5,46 | Yes |
| C1a2 Good company image and –story [of the purchasing company] | 5 | 7 | 6 | 7 | 6 | 6 | 5 | 6 | 7 | 5 | 6 | 6,0 | Yes |
| C1a3 Sufficient **time** resources for innovation outside-in management | 6 | 7 | 6 | 6 | 7 | 6 | 7 | 5 | 7 | 6 | 7 | 6,36 | Yes |
| C1a4 Integration of innovation suppliers into mid and long-term product planning | 6 | 6 | 6 | 7 | 6 | 6 | 7 | 7 | 7 | 6 | 7 | 6,45 | Yes |
| C1a5 Purchasing has a sufficient **financial** budget for innovation outside-in management (e.g. business meetings, purchasing office located in the technology cluster) | 7 | 6 | 6 | 7 | 7 | 6 | 6 | 7 | 6 | 7 | 7 | 6,54 | Yes |
| C1a6 On-site domestic support in case of cultural differences/language barriers | 7 | 5 | 6 | 7 | 6 | 5 | 7 | 7 | 5 | 7 | 5 | 6,09 | Yes |
| T1 If there is a high level of External Interconnectedness, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations. | 7 | 7 | 7 | 7 | 6 | 6 | 5 | 6 | 5 | 6 | 7 | 6,27 | Yes |
| CM1 Access to innovation networks leads to the generation of knowledge, cross-fertilisation and tapping of innovations. | 7 | 6 | 7 | 7 | 6 | 6 | 6 | 7 | 7 | 5 | 7 | 6.45 | Yes |

Table 41: EF1: EI Collected opinion data and results

The table shows that the EF, drivers and causal mechanism are confirmed by the external interviews. Given the short spatial distance, only EE06 somewhat disagreed that short spatial distance supports the PO's External Interconnectedness. As this opinion differs from other opinion data collected, EE06 was contacted again as foreseen in the research design. EE06 rationalised the rating with a potential higher importance of global networking activities via internet platforms, e.g. Xing or LinkedIn. However, this argument cannot be

viewed as opposed to the driver of a short spatial distance. Experience in the field shows that networking via internet platforms is rather used in the initial phases of contact management but is not an alternative to short distances approached, for example during advanced technology discussions. Furthermore, the EEs confirmed the tendency number 1.

‘If there is a high level of External Interconnectedness, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.’

Based on the findings, EF1: and related drivers, the causal mechanism and the proposed tendency number 1 are considered accepted in the context of this study.

4.4.1.2 EF2: Preferred Customer status Process

The table below shows the collected opinion data for the drivers, tendency (T) and causal mechanism (CM) and the related average value.

| External interviewee / Driver /T/CM | EE01 | EE02 | EE03 | EE04 | EE05 | EE06 | EE07 | EE08 | EE09 | EEI0 | EE11 | Average value | Accepted |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C2a1 Attractive purchasing volume | 7 | **7** | 6 | 6 | 6 | 4 | 5 | 7 | 7 | 7 | 6 | 6,18 | Yes |
| C2a2 Good company image and -story [of the purchasing company] | 5 | 7 | 7 | 7 | 6 | 6 | 6 | 5 | 6 | 7 | 6 | 6,18 | Yes |
| C2a3 Good relationship-management to innovation suppliers | 6 | 7 | 7 | 7 | 7 | 6 | 7 | 7 | 5 | 7 | 6 | 6,55 | Yes |
| C2a4 Integration of innovation suppliers into midand long-term product planning | 6 | 7 | 7 | 7 | 6 | 6 | 6 | 7 | 5 | 6 | 7 | 6.36 | Yes |
| C2a5 Good management skills [of strategic purchasers] | 5 | 6 | 6 | 7 | 6 | 6 | 5 | 6 | 6 | 7 | 7 | 6.09 | Yes |
| C2a6 Living systematic and value-based supplier selection process | 4 | 6 | 6 | 6 | 7 | 5 | 6 | 6 | 5 | 6 | 6 | 5.72 | Yes |
| T2 If the purchasing function establishes an assessment process concerning the actual and prospective Preferred Customer status granted by the supplier, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations. | 7 | 6 | 6 | 7 | 6 | 5 | 4 | 6 | 4 | 6 | 7 | 5.82 | Yes |
| CM2 A Preferred Customer status Process leads to prioritised resource allocation passed by the supplier to the customer. | 5 | 6 | 6 | 6 | 7 | 6 | 6 | 6 | 7 | 6 | 7 | 6.82 | Yes |

Table 42: EF2: PCP Collected opinion data and results

The table shows that the EF, drivers and causal mechanism are confirmed by the external interviews. Furthermore, the EEs confirmed the tendency number 2

‘If the purchasing function establishes an assessment process concerning the actual and prospective preferred customer status granted by the supplier, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.’

Based on the findings, EF2: and related drivers, causal mechanism and the proposed tendency number 2 is considered accepted in the context of this study.

#### 4.4.1.3 EF3: Management Commitment

The table below shows the opinion data collected for the drivers, tendency (T) and causal mechanism (CM) and the related average value.

| External interviewee / Driver /T/CM | EE01 | EE02 | EE03 | EE04 | EE05 | EE06 | EE07 | EE08 | EE09 | EE10 | EE11 | Average value | Accepted |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C3a1 Clear process description of the innovation management process with purchasing responsibility | 7 | 6 | 6 | 7 | 6 | 5 | 5 | 6 | 5 | 6 | 7 | 6.00 | Yes |
| C3a2 Management shows positive attitude to the purchasing involvement into the innovation outside-in process | 7 | 7 | 6 | 6 | 6 | 6 | 7 | 7 | 7 | 6 | 6 | 6.45 | Yes |
| C3a3 Management complies with the agreed innovation process | 7 | 7 | 6 | 7 | 7 | 6 | 7 | 7 | 6 | 6 | 7 | 6.64 | Yes |
| C3a4 Clear company innovation strategy and innovation targets | 7 | 7 | 6 | 7 | 7 | 6 | 7 | 7 | 7 | 6 | 6 | 6.64 | Yes |
| C3a5 Management approves necessary resources (financial, personnel) | 7 | 6 | 6 | 7 | 7 | 6 | 6 | 6 | 6 | 6 | 7 | 6.37 | Yes |
| C3a6 Purchasing has a direct reporting line to the top management | 6 | 7 | 6 | 6 | 7 | 6 | 7 | 6 | 7 | 7 | 7 | 6.54 | Yes |
| T3 If there is a high level of Management Commitment to the purchasing function, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations. | 7 | 7 | 6 | 6 | 6 | 6 | 6 | 7 | 6 | 6 | 7 | 6.37 | Yes |
| CM3 The Management Commitment authorises the purchasing function and leads to acceptance by the other innovation stakeholders. | 6 | 6 | 6 | 6 | 7 | 6 | 5 | 6 | 6 | 6 | 7 | 6.09 | Yes |

Table 43: EF3: MC Collected opinion data and results

The table shows that the EF, drivers and causal mechanism are confirmed by the External Experts (EEs). Furthermore, the EEs confirmed tendency number 3

‘If there is a high level of Management Commitment to the purchasing function, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.’

Based on the findings, EF3: and related drivers, causal mechanism and the proposed tendency number 3 is considered accepted in the context of this study.

#### 4.4.1.4 EF4: Internal Interconnectedness

The table below shows the collected opinion data for the drivers, tendency (T) and causal mechanism (CM) and the related average value.

| External interviewee / Driver /T/CM | EE01 | EE02 | EE03 | EE04 | EE05 | EE06 | EE07 | EE08 | EE09 | EE10 | EE11 | Average value | Accepted |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C4a1 Purchasing is accepted by other innovation stakeholders | 5 | 6 | 6 | 6 | 7 | 6 | 6 | 7 | 7 | 7 | 7 | 6.36 | Yes |
| C4a2 Purchasing members are willing to work in cross-functional teams | 5 | 6 | 6 | 7 | 7 | 7 | 7 | 7 | 5 | 7 | 7 | 6.45 | Yes |
| C4a3 Process orientation and short reporting and decision lines | 6 | 6 | 6 | 7 | 6 | 6 | 7 | 7 | 5 | 6 | 6 | 6.19 | Yes |
| C4a4 Short spatial/physical distances between innovation stakeholders | 5 | 6 | 6 | 5 | 6 | 4 | 6 | 5 | 6 | 5 | 6 | 5.46 | Yes |
| C4a5 Sufficient technical knowledge of purchasing members | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 5 | 6 | 6 | 7 | 5.91 | Yes |
| C4a6 Sufficient on-site domestic support in case of cultural differences/language barriers | 5 | 6 | 6 | 7 | 6 | 5 | 7 | 7 | 5 | 6 | 6 | 6.0 | Yes |
| T4 If a high level of Internal Interconnectedness is achieved by the purchasing function, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations. | 7 | 7 | 6 | 7 | 6 | 6 | 6 | 6 | 7 | 6 | 7 | 6.45 | Yes |
| CM 4 Internal Interconnectedness leads to free flow of innovation related information between innovation stakeholders. | 6 | 6 | 6 | 6 | 6 | 7 | 7 | 7 | 7 | 6 | 7 | 6.45 | Yes |

Table 44: EF4: II Collected opinion data and results

The table shows that the EF, drivers and causal mechanism are confirmed by the External Experts (EEs). Furthermore, the EEs confirmed the tendency number 4

'If a high level of Internal Interconnectedness is achieved by the purchasing function, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.'

Based on the findings, EF4: and related drivers, the causal mechanism and the proposed tendency number 4 are considered accepted in the context of this study.

#### 4.4.1.5 EF5: Early Integration into Product Planning

The table below shows the collected opinion data for the drivers, tendency (T) and causal mechanism (CM) and the related average value.

| External interviewee / Driver /T/CM | EE01 | EE02 | EE03 | EE04 | EE05 | EE06 | EE07 | EE08 | EE09 | EE10 | EE11 | Average value | Accepted |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C5a1 Early Purchasing integration is a common and living practice | 7 | 6 | 6 | 7 | 5 | 5 | 6 | 4 | 6 | 7 | 7 | 6.0 | Yes |
| C5a2 Detailed product descriptions (characteristics, functions) are available | 6 | 6 | 6 | 5 | 5 | 5 | 7 | 5 | 6 | 7 | 7 | 5.91 | Yes |
| C5a3 Ideas from purchasing members are desired | 6 | 6 | 6 | 6 | 5 | 5 | 6 | 7 | 7 | 6 | 7 | 6.09 | Yes |
| C5a4 Purchasing members have a detailed knowledge about supplier capabilities | 6 | 6 | 6 | 7 | 6 | 6 | 7 | 7 | 6 | 6 | 7 | 6.37 | Yes |
| C5a5 A living systematic and value-based supplier selection process | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 7 | 6.09 | Yes |
| T5 If the purchasing function is integrated early into the product planning process, there is the tendency that it has the capability to generate valuable outside-in innovations. | 7 | 7 | 6 | 6 | 7 | 6 | 5 | 7 | 7 | 6 | 7 | 6.45 | Yes |
| CM 5 The integration into the product planning process increases the knowledge of the purchasing function concerning required product features as a basis for the efficient/effective utilisation of supplier capabilities. | 7 | 7 | 6 | 7 | 7 | 6 | 7 | 7 | 7 | 6 | 7 | 6.73 | Yes |

Table 45: EF5: EIP Collected opinion data and results

The table shows that the EF, drivers and causal mechanism are confirmed by the External Experts (EEs). Furthermore, the EEs confirmed the tendency number 5 (T5)

'If the purchasing function is integrated early into the product planning process, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.'

Based on the findings, EF5: and related drivers, the causal mechanism and the proposed tendency number 5 is considered accepted in the context of this study.

#### 4.4.1.6 EF6: Degree of Professionalisation of the PO

The table below shows the opinion data collected for the drivers, tendency (T) and causal mechanism (CM) and the related average value.

| External interviewee / Driver /T/CM | EE01 | EE02 | EE03 | EE04 | EE05 | EE06 | EE07 | EE08 | EE09 | EE10 | EE11 | Average value | Accepted |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C6a1 Purchasing members have a detailed knowledge about supplier capabilities | 6 | 6 | 6 | 7 | 6 | 6 | 7 | 7 | 6 | 6 | 7 | 6.36 | Yes |
| C6a2 Good management skills [of strategic purchasers] | 7 | 7 | 6 | 7 | 7 | 6 | 6 | 7 | 7 | 7 | 6 | 6.64 | Yes |
| C6a3 Sufficient technical knowledge [of strategic purchasers] | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 7 | 6 | 7 | 7 | 6.27 | Yes |
| C6a4 Good leadership skills [of strategic purchasers] | 7 | 6 | 6 | 6 | 6 | 6 | 7 | 7 | 6 | 5 | 7 | 6.27 | Yes |
| C6a5 Sufficient time resources for innovation outside-in management | 6 | 6 | 6 | 6 | 7 | 6 | 6 | 6 | 7 | 6 | 6 | 6.18 | Yes |
| C6a6 Willingness to learn [of strategic purchasers] | 7 | 7 | 6 | 7 | 7 | 6 | 6 | 6 | 7 | 7 | 7 | 6.64 | Yes |
| T6 If the purchasing function has gained a high Degree of Professionalisation, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations. | 7 | 7 | 6 | 7 | 7 | 6 | 6 | 7 | 7 | 6 | 7 | 6.64 | Yes |
| CM 6 – A high Degree of Professionalisation of the purchasing function enables the purchasing members to drive and co-ordinate the innovation outside-in process. | 7 | 7 | 6 | 7 | 6 | 6 | 5 | 6 | 7 | 6 | 7 | 6.36 | Yes |

Table 46: EF6: PDP Collected opinion data and results

The table shows that the EF, drivers and causal mechanism are confirmed by the External Experts (EEs). Furthermore, the EEs confirmed the tendency number 6

'If the purchasing function has gained a high Degree of Professionalisation, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.'

Based on the findings, EF6: and related drivers, causal mechanism and the proposed tendency number 6 is considered accepted in the context of this study.

#### 4.4.1.7 EF7: Innovation Management System

The table below shows the opinion data collected for the drivers, tendency (T) and causal mechanism (CM) and the related average value.

| External interviewee / Driver /T/CM | EE01 | EE02 | EE03 | EE04 | EE05 | EE06 | EE07 | EE08 | EE09 | EE10 | EE11 | Average value | Accepted |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C7a1 Clear process description with purchasing responsibility | 6 | 6 | 6 | 7 | 7 | 5 | 4 | 6 | 7 | 6 | 7 | 6.09 | Yes |
| C7a2 Easy access and pragmatic submission, monitoring of innovation outside-in subjects. | 6 | 6 | 6 | 6 | 7 | 5 | 6 | 6 | 5 | 6 | 6 | 5.91 | Yes |
| C7a3 Innovation process and tools are actually practiced by internal innovation stakeholders and technology suppliers. | 6 | 6 | 7 | 7 | 7 | 5 | 7 | 3 | 7 | 6 | 7 | 6.18 | Yes |
| T7 If there is a companywide accepted and practiced Innovation Management System in place, there is the tendency that the purchasing function has the capability to generate val-uable outside-in innovations. | 6 | 6 | 6 | 6 | 7 | 5 | 5 | 5 | 7 | 6 | 7 | 6.0 | Yes |
| CM7 – A lived and pragmatic Innovation Management System (IMS) ensures the efficient and effective processing of outside-in innovations. | 6 | 6 | 6 | 6 | 6 | 5 | 6 | 6 | 6 | 6 | 7 | 6.0 | Yes |

Table 47: EF7: IMS Collected opinion data and results

The table shows that the EF, drivers and causal mechanism are confirmed by the External Experts (EEs). Furthermore, the EEs confirmed the tendency number 7

'If there is a companywide accepted and practiced Innovation Management System in place, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.'

Based on the findings, EF7: and related drivers, causal mechanism and the proposed tendency number 7 is considered accepted in the context of this study.

#### 4.4.1.8 EF8: Open-minded Relations based on Trust

The table below shows the opinion data collected for the drivers, tendency (T), causal mechanism (CM) and the related average value.

| External interviewee / Driver /T/CM | EE01 | EE02 | EE03 | EE04 | EE05 | EE06 | EE07 | EE08 | EE09 | EE10 | EE11 | Average value | Accepted |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C8a1 Approachable and courteous nature of innovation-stakeholders | 7 | 7 | 6 | 7 | 6 | 5 | 6 | 7 | 5 | 6 | 6 | 6.18 | Yes |
| C8a2 Living cross-functional communication between innovation stakeholders | 7 | 7 | 6 | 7 | 7 | 6 | 6 | 7 | 6 | 6 | 6 | 6.45 | Yes |
| C8a3 Co-ordinated actions of innovation-stakeholders | 7 | 7 | 7 | 7 | 7 | 5 | 4 | 7 | 7 | 6 | 6 | 6.36 | Yes |
| C8a4 Process orientation goes in line with short reporting and decision lines | 7 | 7 | 6 | 6 | 6 | 6 | 4 | 6 | 6 | 6 | 7 | 6.09 | Yes |
| C8a5 Clear innovation strategy and innovation targets | 7 | 7 | 7 | 7 | 7 | 5 | 5 | 6 | 7 | 6 | 7 | 6.45 | Yes |
| C8a6 Sufficient time resources for innovation outside-in management | 7 | 6 | 6 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 6 | 6.36 | Yes |
| T8 If there is a high degree of Open-minded Relations based on Trust among the stakeholders of the innovation process, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations. | 6 | 7 | 6 | 6 | 6 | 5 | 5 | 6 | 7 | 6 | 7 | 6.09 | Yes |
| CM8 Trust and open-minded relations activate the non-biased/open exchange of information between innovation stakeholders. | 6 | 7 | 6 | 7 | 6 | 5 | 6 | 7 | 7 | 6 | 6 | 6.27 | Yes |

Table 48: EF8: ORT Collected opinion data and results

The table shows that the EF, drivers and causal mechanism are confirmed by the External Experts (EEs). Furthermore, the EE's confirmed the tendency number 8

‘If there is a high degree of Open-minded Relations based on Trust among the stakeholders of the innovation process, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.’

Based on the findings, EF8: and related drivers, the causal mechanism and the proposed tendency number 8 is considered accepted in the context of this study.

#### 4.4.1.9 Relations between the EFs

Subject to the proposed relations between the EFs (CR01 – CE12) the table below shows the findings.

| External interviewee / Causal relation | EE01 | EE02 | EE03 | EE04 | EE05 | EE06 | EE07 | EE08 | EE09 | EE10 | EE11 | Average value | Accepted |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CR01 (EF3: → EF6) | 7 | 7 | 7 | 6 | 6 | 6 | 6 | 6 | 5 | 6 | 7 | 6.27 | Yes |
| CR02 (EF6: → EF5) | 7 | 6 | 7 | 6 | 6 | 6 | 6 | 6 | 6 | 5 | 7 | 6.18 | Yes |
| CR03 (EF6: → EF4) | 7 | 7 | 6 | 7 | 6 | 6 | 5 | 7 | 6 | 6 | 7 | 6.36 | Yes |
| CR04 (EF6: → EF1) | 6 | 7 | 7 | 7 | 7 | 6 | 4 | 6 | 7 | 6 | 7 | 6.36 | Yes |
| CR05 (EF6: → EF2) | 7 | 6 | 6 | 7 | 6 | 6 | 5 | 5 | 6 | 5 | 7 | 6.0 | Yes |
| CR06 (EF5:→ DV 1) | 6 | 7 | 6 | 6 | 7 | 6 | 7 | 7 | 6 | 6 | 7 | 6.45 | Yes |
| CR07 (EF4: → DV 1) | 7 | 7 | 7 | 7 | 7 | 6 | 6 | 7 | 6 | 6 | 7 | 6.64 | Yes |
| CR08 ( EF1: → DV1) | 7 | 7 | 6 | 6 | 7 | 6 | 6 | 6 | 7 | 6 | 7 | 6.45 | Yes |
| CR09 (EF2: → DV1) | 6 | 7 | 7 | 7 | 6 | 6 | 4 | 5 | 6 | 6 | 7 | 6.09 | Yes |
| CR10 (EF7: → DV1) | 6 | 6 | 6 | 6 | 6 | 5 | 6 | 6 | 7 | 6 | 7 | 6.09 | Yes |
| CR11 (EF8: → DV1) | 6 | 6 | 6 | 6 | 7 | 6 | 5 | 7 | 7 | 6 | 7 | 6.27 | Yes |
| CR12 (DV1 → DV2) | 6 | 7 | 6 | 6 | 6 | 6 | 6 | 7 | 7 | 6 | 7 | 6.36 | Yes |

Table 49: Causal relations – collected EEs opinion data and results

The table shows that the CRs are confirmed by the EEs. Therefore, the proposed causal relations are considered accepted in the context of this study.

### 4.4.2 Phase IIa: Definition of a strategic agenda for Loewe's PO

Besides the definition of (a) theoretical managerial knowledge, the DBA programme has the objective of also generating (b) practical managerial knowledge, this objective being reflected by RO2 'to devise a strategic agenda and measures for the effective purchasing integration into the innovation process of the selected medium-sized system integrator'.

Given the effective integration of Loewe's PO into the innovation process, the definition of a strategic agenda sets the strategic framework for subsequent operative measures with detailed responsibilities, milestones and target dates. In this way, the results of this study are the initial step of a subsequent change project, for example realised via an action research approach (Barton & Haslett, 2007; Borda, 2008; Lewin, 1948; Valsa, 2005).

As Loewe's research participants were interested in the further progress of the study, results of Phase I (interview survey and validation interviews) and Phase II (external validation) were informed throughout the research progress by personal dialogues. In this way, the Loewe research participants were further integrated into the research and did not lose thematic contact with the research project. Subject to the definition of a strategic agenda, a ½-day workshop was organised. Again, a major target was to achieve a shared understanding of meeting participants via joint evaluation. For this reason, a suitable meeting room with a monitor was selected.
At the outset of the workshop, the objective and interim study results were presented. Then, the identified (a) relationship model (sub-chapter 4.3.10.9) that reflects the direct dependencies of the identified EF and (b) the performance comparison sheet (sub-chapter 3.3.7.3) were introduced.

In the following sub-chapter, the suggested measures for each of the Enabling Factors are described.

#### 4.4.2.1 EF1: External Interconnectedness:

A major issue was that Loewe purchasing needs suitable time/financial resources to maintain and keep personal contact with innovation suppliers in Europe and Asia. Furthermore, planning regular meetings with the members of the Asian purchasing offices (China, Korea), who provide domestic on-site support in the respective countries and technology clusters was suggested. Quarterly meetings alternating between the sites in Germany, China

and Korea were proposed, thus improving the personal relations to key players considerably. Based on the target of achieving good relations, the integration of innovation suppliers into the mid- and long-term product planning process can be systematically moved forward.

Based on evaluation of EF1, the following strategic measures were defined:

1) To provide suitable financial/time resources for outside-in innovation management
2) To enhance the integration of innovation suppliers into mid and long-term product planning

**Topic: Effective integration of Purchasing into the innovation process**

**Organisation:** Loewe Purchasing

**EF 1: External Interconnectedness (EI)**

**A) Target performance comparison**

| Driver | Improvement potential | Strategic action: |
|---|---|---|
| C1a1 - Short spatial/physical distance to innovation suppliers | No | |
| C1a2 - Good company image and -story [of the purchasing company] | No | |
| C1a3 - Sufficient **time** resources for innovation outside-in management | No | |
| C1a4 - Integration of innovation suppliers into mid- and long-term product planning | Yes | To enhance the integration of innovation suppliers into mid- and long-term product planning (see also PCP) |
| C1a5 -Sufficient financial resources for innovation outside-in management (e.g. business meetings, purchasing office located in the technology cluster) | Yes | To provide suitable financial/time resources for outside-in innovation management. |
| C1a6 -Sufficient on-site domestic support in case of cultural differences/language barriers | No | |

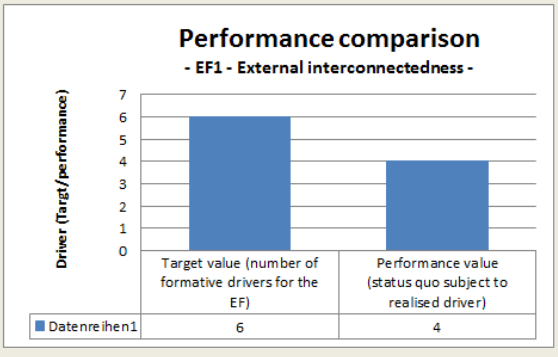
Comment:

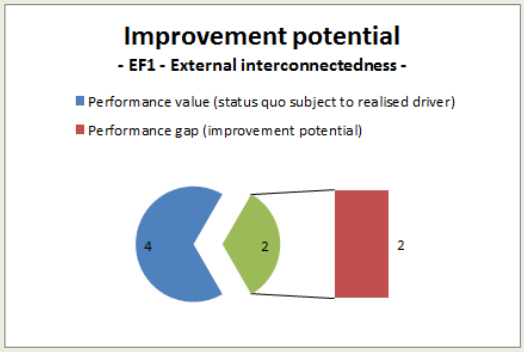
On-site domestic support requries additional manpower for supervision of external staff members/entities (e.g. IPO Korea, Loewe Asia)

More systematic integration of innovation suppliers, for example, regular meetings to discuss innovation approaches.

**B) Bar-chart**

| | |
|---|---|
| Target value (number of formative drivers for the EF) | 6 |
| Performance value (status quo subject to realised driver) | 4 |
| **Performance gap (improvement potential)** | **2** |




| Assesment by: | Status: | Approved: |
|---|---|---|
| Loewe Purchasing | January 2015 | 1st of February 2015 |

Figure 26: Performance comparison sheet EF1: EI

#### 4.4.2.2 EF2: Preferred Customer status Process

The main topic was the necessary bundling of purchasing volumes so that Loewe can also offer an attractive minimum purchasing volume to innovation suppliers. This is reasonable as innovation suppliers usually need a minimum purchasing volume to justify innovation efforts with a specific customer. For this reason, it was suggested that commodity management should be revitalised again with emphasis on bundling efforts for innovation suppliers. Subject to given and potential innovation suppliers, commodity management meetings are to evaluate whether a preferred customer status can be achieved (or not) so that scarce resources will be invested in promising innovation supplier relations. In this context, it was discussed that managerial skills need to be improved as Loewe purchasing needs to be prepared for related purchasing marketing activities that should improve the attractiveness of Loewe for current and prospective innovation suppliers. Based on this insight, it was decided to revise the competence profile of Loewe's purchasing managers. In a second step and via individual evaluation interviews, the (target) competence profile can be evaluated against the achieved competence level of the respective purchasing manager so that an individual training plan can be devised. To start this process, the study results will be introduced to the Human Resource Department so that related training activities can be considered in the company's overall training plan.

Based on evaluation of EF2: External Interconnectedness, the following strategic measures were defined:

3) To revitalise the commodity management with a focus on (a) an attractive purchasing volume for innovation suppliers and (b) evaluation of realised / prospective preferred customer status

4) To improve management skills of purchasers based on a revised competence profile and an individual agreed training plan

## Topic: Effective integration of Purchasing into the innovation process

**Organisation:** Loewe Purchasing

### EF2: Preferred Customer status Process (PCP)

**A) Target performance comparison**

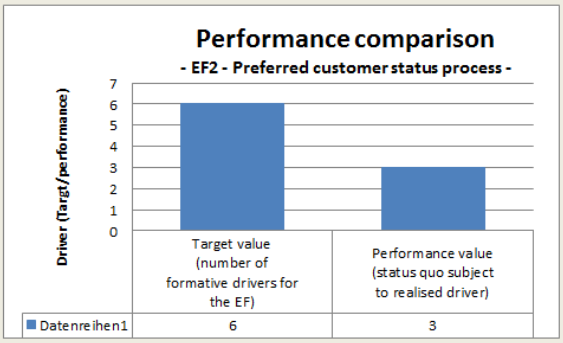
| Driver | Improvement potential | Strategic action: |
|---|---|---|
| C2a1 -Attractive purchasing volume | Yes | To revitalise the commodity management with focus on (a) attractive pur-chasing volume for innovation suppliers and (b) evaluation of realised / prospective preferred customer status. |
| C2a2 - Good company image and -story [of the purchasing company] | No | |
| C2a3 - Good relationship-management to innovation suppliers | No | |
| C2a4 - Integration of innovation suppliers into mid- and long-term product planning | Yes | To enhance the integration of innovation suppliers into mid- and long-term product planning (see also EI). |
| C2a5 - Good management skills [of strategic purchasers] | Yes | To improve management skills of purchasers based on a revised competence profile and an individual agreed training plan (see also PDP) |
| C2a6 - Living systematic and value-based supplier selection process | No | |

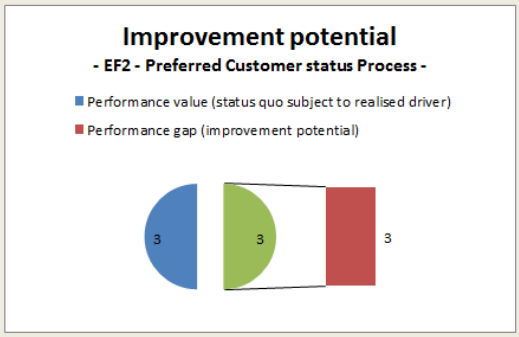
Comment:

Revitalisation of commodity management for bundling purposes. Definition of minimum requried turnover level together with innovation supplier (if possible).

**B) Bar-chart**

| | |
|---|---|
| Target value (number of formative drivers for the EF) | 6 |
| Performance value (status quo subject to realised driver) | 3 |
| **Performance gap (improvement potential)** | **3** |




| Assesment by: | Status: | Approved: |
|---|---|---|
| Loewe Purchasing | January 2015 | 1st February 2015 |

Figure 27: Performance comparison sheet EF2: PCP

#### 4.4.2.3 EF3: Management Commitment

A major topic was the current absence of a process description available that delineates and illustrates Loewe's innovation process and the specific responsibility of Loewe's Purchasing Organisation in the context of outside-in innovations. Based on further driver evaluation, it was suggested that the innovation strategy for outside-in innovation management should be formalised in writing to achieve a shared understanding with other stakeholders of the innovation process (internal, external). Experience in the past suggests that Loewe's top management should more actively involve and comply with the agreed innovation processes and respect the responsibilities of the different stakeholders. This implies, for example, informing and integrating the Purchasing Organisation at the right time concerning upcoming meetings with prospective or existing innovation suppliers. Otherwise, the Purchasing Organisation cannot efficiently realise the co-ordination function ($2^{nd}$ order capability) for the outside-in innovation process. As mentioned above (strategic measure number 1), a suitable budget for innovation outside-in management is viewed as an expression of the Management Commitment. Compliance with the innovation process should be part of the yearly internal audit plan. Based on the evaluation of EF3: Management Commitment, the following strategic measures were defined:

5) To formalise a clear outside-in innovation strategy and targets.

6) To devise a process description of the innovation process with purchasing and other stakeholders' responsibilities

7) To audit stakeholder compliance with the innovation process on a regular basis

## Topic: Effective integration of Purchasing into the innovation process

**Organisation:** Loewe Purchasing

### EF3: Management Commitment (MC)

**A) Target performance comparison**

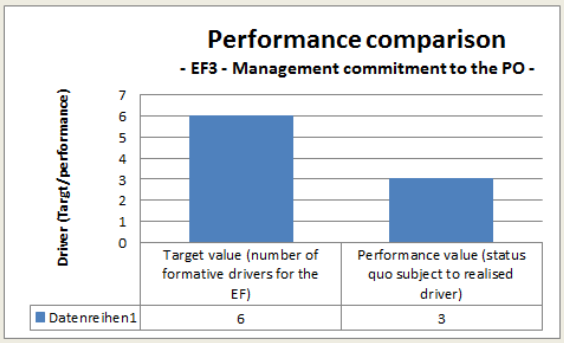
| Driver | Improvement potential | Strategic action: |
|---|---|---|
| C3a1 - Clear process description of the innovation management process with purchasing responsibility | Yes | To devise a process description of the innovation process with purchasing and other stakeholders responsibilities (see also EIP). |
| C3a2 - Management shows positive attitude to the purchasing involvement into the innovation outside-in process | No | |
| C3a3 - Management complies with the agreed innovation process | Yes | To audit stakeholder compliance to the innovation process on regular basis. |
| C3a4 - Clear company innovation strategy and innovation targets | Yes | To formalise a clear innovation strategy and targets (see also ORT) |
| C3a5 - Management approves necessary resources (financial, personnel) | No | |
| C3a6 - Purchasing has a direct reporting line to the top management | No | |

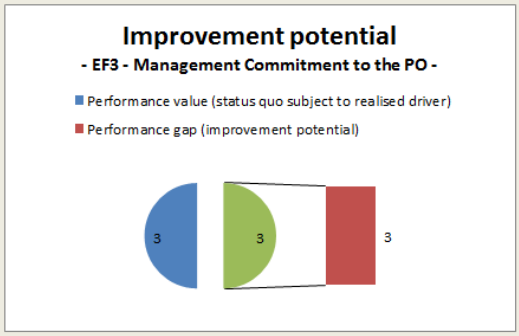
Comment:

Currently, no description of processes and -responsibilites (approved by Board - Management). No formalised innovation strategy in regard to outside-in innovation.

**B) Bar-chart**

| | |
|---|---|
| Target value (number of formative drivers for the EF) | 6 |
| Performance value (status quo subject to realised driver) | 3 |
| **Performance gap (improvement potential)** | **3** |




| Assesment by: | Status: | Approved: |
|---|---|---|
| Loewe Purchasing | January 2015 | 1st of February 2015 |

Figure 28: Performance comparison sheet EF3: MC

#### 4.4.2.4 EF4: Internal Interconnectedness

Considering the given dynamic, turbulent company environment in the CE branch the major topic discussed was that process-related activities need to be in the forefront of daily working activities. So, a major area of discussion was the revitalisation of purchasing members' awareness that cross-functional teamwork is more effective compared with solitary functional work. On the other hand, the role of the Purchasing Organisation needs to be well understood by other stakeholders as well. For this reason, the process and responsibility description, as defined with the strategic measure number 6 was viewed as a major condition. Taking this viewpoint into account, it was suggested that the process/responsibility description of the innovation process should be realised during a workshop that involves all further innovation stakeholders. In this way, the stakeholders could devise the outside-in innovation process and can achieve, in parallel, a clear and shared understanding of the different roles and mutual expectations.

Based on the evaluation of EF4: Internal Interconnectedness, the following strategic measure was defined:

8) To revitalise the awareness of purchasing members and innovation stakeholders of their roles and background/advantages of cross-functional teamwork.

**Topic: Effective integration of Purchasing into the innovation process**

**Organisation:** Loewe Purchasing

**EF 4: Internal Interconnectedness (II)**

**A) Target performance comparison**

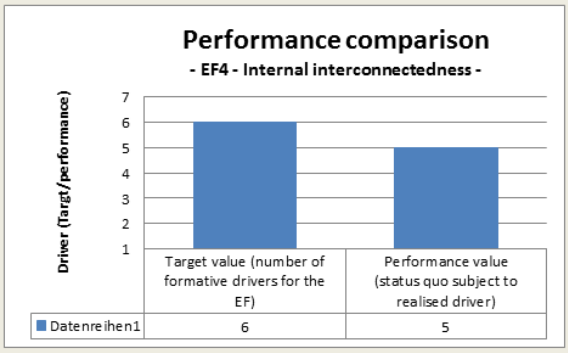
| Driver | Improvement potential | Strategic action: |
|---|---|---|
| C4a1 - Purchasing is accepted by other innovation stakeholde | No | |
| C4a2 - Purchasing members are willing to work in cross-functional teams | Yes | To revitalise the awareness of purchasing members and innovation stakeholders of their roles and background/advantages of cross-functional teamwork. |
| C4a3 - Process thinking (orientation) and short reporting-/decision lines | No | |
| C4a5 - Short spatial/physical distances between innovation stakeholder | No | |
| C4a5 - Sufficient technical knowledge of purchasing members | No | |
| C4a6 - Sufficient on-site domestic support in case of cultural differences/language barriers | No | |

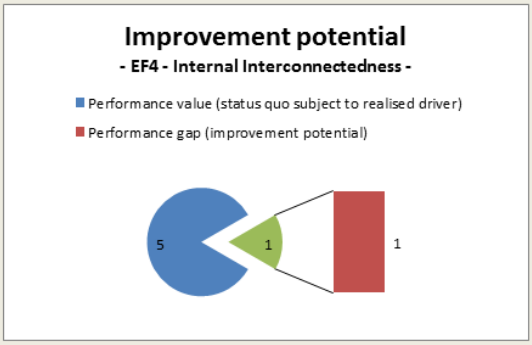
Comment:

It needs to be explained/understood why efficient teamwork processes are more effective than solitary functional work - (Human Resource Department should offer trainings to achieve a shared understanding) .

**B) Bar-chart**

| | |
|---|---|
| Target value (number of formative drivers for the EF) | 6 |
| Performance value (status quo subject to realised driver) | 5 |
| **Performance gap (improvement potential)** | **1** |




| Assesment by: | Status: | Approved: |
|---|---|---|
| Loewe Purchasing | January 2015 | 1st of February 2015 |

Figure 29: Performance comparison sheet EF4: II

#### 4.4.2.5 EF5: Early Integration into Product Planning

Loewe's purchasers are firm members of the innovation projects. However, this is in the majority related to the project realisation phase and not to the creative cloud respectively product definition phase (Gassmann & Engel, 2004). Therefore, the purchasing members stated that they are not involved early enough into strategic product planning. In consequence, the level of detail of product specification (expected functions, surface, material) for new products is often not detailed enough to efficiently discuss with innovation suppliers. In consequence, product development times are planned too optimistically as the definition of sufficient detailed product specifications is realised as part of the project realisation phase and not as a major part and output of the (creative) product definition phase (Gassmann & Sutter, 2011). After the restart in April 2014, Loewe is still in a reorganisation phase, which requires the active contribution of company members. Due to this situation, it was concluded that the PO needs to actively initialise outside-in innovation activities that contribute to the innovation process. As an example, purchasing can take over the ownership for the outside-in technology road map that consolidates the planned and future technologies of innovation suppliers. In turn, the PO comes into position to actively require the Early Integration into the product planning process. This needs to be considered in the said process/responsibility description of the innovation process (strategic measure number 5). In this way, Loewe's Purchasing Organisation can prove that it generates 'added value' via the co-ordination of the innovation outside-in process and related activities. In parallel, the Purchasing Organisation is involved in the complete process and can make sure that the product descriptions are sufficiently detailed before entering into the product realisation phase.

Based on the evaluation of EF5: Early Integration into Product Planning-, the following strategic measures were defined:

9) To actively contribute and participate in early product planning meetings.

10) To take over the ownership for the co-ordination of the outside-in innovation process (e.g. via definition / update of the outside-in technology roadmap).

## Topic: Effective integration or Purchasing into the innovation process

**Organisation:** Loewe Purchasing

### EF5: Early Integration into Product Planning (EIP)

**A) Target performance comparison**

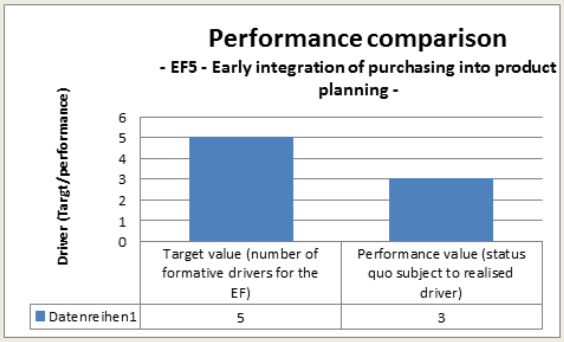
| Driver | Improvement potential | Strategic action: |
|---|---|---|
| C5a1 - Early Purchasing integration is a common and living practice | Yes | To take over the ownership for the co-ordination of the outside-in innovation process (e.g. via definition / update of the outside-in technology roadmap). |
| C5a2 - Detailed product descriptions (characteristics, functions) are available | Yes | To actively contribute and participate in early product planning meetings. |
| C5a3 - Ideas from purchasing members are desired | No | |
| C5a4 - Purchasing members have a detailed knowledge about supplier capabilities | No | |
| C5a5 - A living systematic and value-based supplier selection process | No | |
| | | |

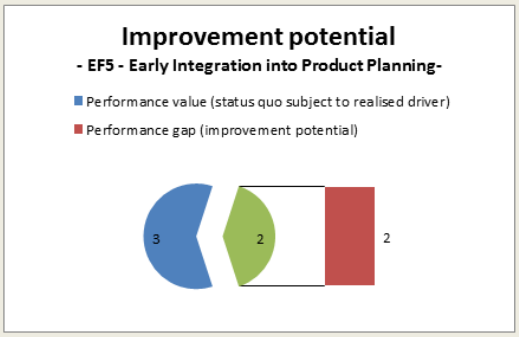
Comment:

Frequently, purchasing is still too late involved into the process.

**B) Bar-chart**

| | |
|---|---|
| Target value (number of formative drivers for the EF) | 5 |
| Performance value (status quo subject to realised driver) | 3 |
| **Performance gap (improvement potential)** | **2** |




| Assesment by: | Status: | Approved: |
|---|---|---|
| Loewe Purchasing | January 2015 | 1st of February 2015 |

Figure 30: Performance comparison sheet EF5: EIP

#### 4.4.2.6 EF6: Degree of Professionalisation of the PO

Due to the high dependency on suppliers, the purchasing volume contributes ca. 70% of the total value-added of Loewe. Due to this reason, in order to control and reduce product cost, Loewe's Purchasing Organisation was always in the special focus in the past and implemented plenty of advanced purchasing tools like commodity management, risk management or spend analysis with the support of an external consultancy. In parallel, related training activities were realised for the purchasing managers. In this way, the Degree of Professionalisation of Loewe's PO was well advanced. However, in the past, the PO's focus has been on (a) general cost reduction and (b) relationship management and not on (c) the active ownership for the co-ordination of advanced outside-in innovation activities. As it was identified in this study, the co-ordination of the outside-in innovation process requires leadership capabilities that lead, in turn, to the acceptance of other innovation stakeholders. Therefore, it was decided to revise the competence profile of purchasing managers and to work out, as delineated above and individual training plan with the respective purchasing manager.

Based on the evaluation of EF5: Early Integration into Product Planning, the following strategic measure was defined:

11) To improve leadership skills of purchasing members.

**Topic: Effective integration or Purchasing into the innovation process**

**Organisation:** Loewe Purchasing

**EF 6: Degree of Professionalisation of the PO (PDP)**

**A) Target performance comparison**

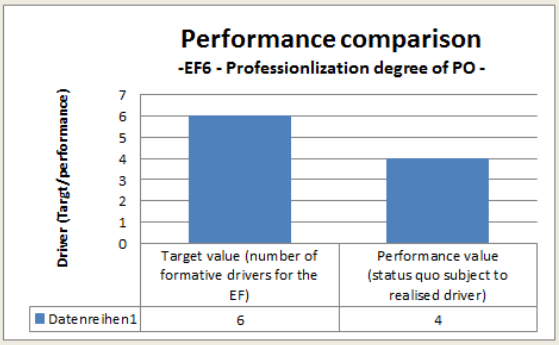
| Driver | Improvement potential | Strategic action: |
|---|---|---|
| C6a1 - Purchasing members have a detailed knowledge about supplier capabilities | No | |
| C6a2 - Good management skills [of strategic purchasers] | Yes | To improve management skills of purchasers based on a revised competence profile and an individual agreed training plan (see also PCP) |
| C6a3 - Sufficient technical knowledge [of strategic purchasers] | No | |
| C6a4 - Good leadership skills [of strategic purchasers] | Yes | To improve leadership skills of purchasing members. |
| C6a5 - Sufficient time resources for innovation outside-in management | No | |
| C6a6 - Willingness to learn [of strategic purchasers] | No | |

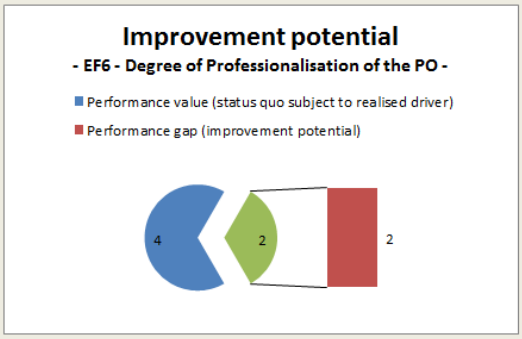
Comment:

The improvement of management- and leadership skills is necessary to gain the neccessary acceptance level inside and outside the organisation (for example, in a process to build up new strategic procurement sources)

**B) Bar-chart**

| | |
|---|---|
| Target value (number of formative drivers for the EF) | 6 |
| Performance value (status quo subject to realised driver) | 4 |
| **Performance gap (improvement potential)** | **2** |




| Assesment by: | Status: | Approved: |
|---|---|---|
| Loewe Purchasing | January 2015 | 1st of February 2015 |

Figure 31: Performance comparison sheet EF6: PDP

#### 4.4.2.7 EF7: Innovation Management System

In the context of the PO's integration into the outside-in innovation process, this study attributed the availability of an Innovation Management System to the group of moderating Enabling Factors. Management Commitment was identified as a condition of the Innovation Management System (Chapter 4.3.10.3). This is reasonable, as the top management needs to initiate and realise the introduction of an Innovation Management System. In the past, related approaches were already undertaken, for example, in co-operation with the Fraunhofer Institute for Systems and Innovation Research. However, these well-prepared processes were discontinued over time, ascribed to insufficient interest among the previous management team. As discussed for the EF3: Management Commitment and reflected by strategic measures number 5 and 6, Loewe should devise an innovation strategy and targets (strategic measure number 5) and a respectively related process and description of responsibilities of the involved stakeholders (strategic measure number 6) with high priority. Subject to compliance with the innovation process, strategic measure number 7 (to audit stakeholder compliance with the innovation process on a regular basis) has been defined. Subject to the availability of a related data collection and monitoring tool, the workshop members suggested not waiting for top management activities but to contribute actively to the activation of the EF7: Innovation Management System. Subject to the systematic collection, processing and monitoring of innovation outside-in initiatives, starting with related market research activities that should suggest related software programmes was suggested. In line with the identified drivers of EF7: Innovation Management System the software needs to facilitate easy access for the stakeholders, the pragmatic submissions and monitoring of specific innovation outside-in matters. For example, easy access could be realised by a web-based application and related software apps that can be also installed on mobile devices. In this way, outside-in approaches could be easily forwarded and registered as an initiative from anywhere in the world. Subject to monitoring of outside-in innovation approaches, devising and integrating key performance indicators that reflect the efficiency and effectiveness of Loewe's outside-in innovation process was put forward.

Based on the evaluation of EF7: IMS, the following strategic measure was defined:

12) To introduce a data collection pool process that allows easy access and processing of outside-in innovation subjects
13) To define a related key performance indicator for the outside-in process and related measurement system.

## Topic: Effective integration or Purchasing into the innovation process

**Organisation:** Loewe Purchasing

### EF7: Innovation Management System (IMS)

**A) Target performance comparison**

| Driver | Improvement po | Strategic action: |
|---|---|---|
| C7a1 - Clear process description with purchasing responsibility | Yes | To devise a process description of the innovation process with purchasing and other stakeholders responsibilities (see also MC) |
| C7a2 - Easy access and pragmatic submission, monitoring of innovation outside-in subjects | Yes | To introduce a data collection pool that allows easy access and processing of outside-in subjects. |
| C7a3 - Innovation process and -tools are actually practiced by internal innovation stakeholders and technology suppliers. | Yes | To define related key-performance indicator for outside-in process and related measurement system (see also ORT) |
| | | |
| | | |
| | | |

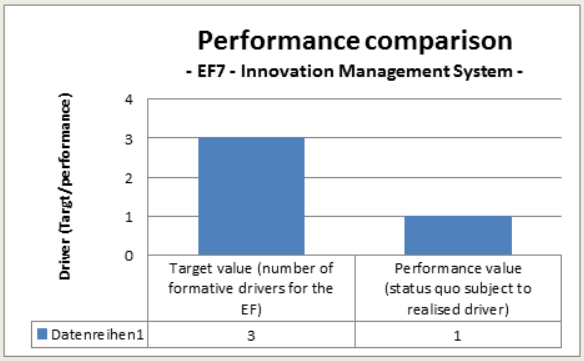
Comment:

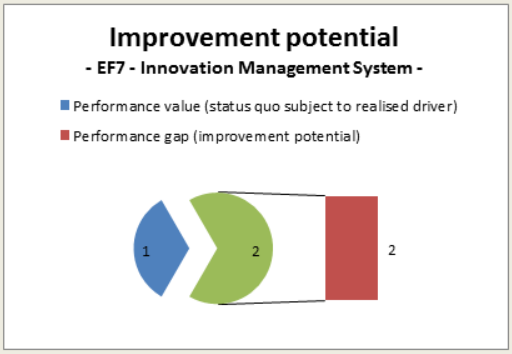
There is currently no data collection pool in place (data base) that ensures easy access and monitoring of outside-in projects. Suppliers contribution to 'innovations' is not measured.

Prrocess description/defintion of stakeholder roles necessary.

**B) Bar-chart**

| | |
|---|---|
| Target value (number of formative drivers for the EF) | 3 |
| Performance value (status quo subject to realised driver) | 1 |
| **Performance gap (improvement potential)** | **2** |




| Assesment by: | Status: | Approved: |
|---|---|---|
| Loewe Purchasing | January 2015 | 1st of February 2015 |

Figure 32: Performance comparison sheet EF7: IMS

#### 4.4.2.8 EF8: Open-minded Relations based on Trust

This study identified the importance of Open-minded Relations based on Trust. However, Open-minded Relations based on Trust belong to the group of moderating factors that are not solely dependent on the purchasing contribution. For this reason, it has been suggested that the topic of Open-minded Relations based on Trust should be integrated into cross-functional team and communication training activities. In parallel, Loewe is already in the process of locating the offices of innovation stakeholders close to each other (in the past, stakeholders were located in different buildings). It was argued during the workshop, that this measure would also help to improve the informal communication processes between innovation stakeholders as well. However, activities and related formal and informal talks should be based on a clear innovation strategy and innovation targets and a common understanding how the innovation process works at Loewe. These driver conditions were already discussed for the EF3: Management Commitment and the strategic measures numbers 5 and 6 were defined. In this way, formal and informal talks of the innovation stakeholders are based on a shared underlying understanding.

Based on the evaluation of EF8: Open-minded Relations based on Trust, the following strategic measure was suggested:

14) To integrate the topic of Open-minded Relations based on Trust between innovation stakeholders into the training and communications activities.

**Topic: Effective integration or Purchasing into the innovation process**

**Organisation:** Loewe Purchasing

**EF 8: Open-minded Relations based on Trust (ORT)**

**A) Target performance comparison**

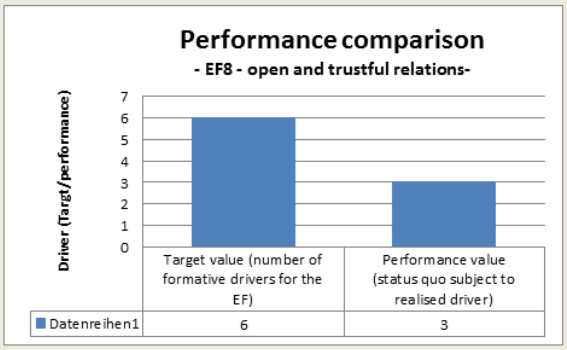
| Driver: | Improvement potential | Strategic action: |
|---|---|---|
| C8a1- Approachable and courteous nature of innovation-stakeholders | Yes | To integrate the topic of Open-minded Relations based on Trust among innovation stakeholders into the training and communications activities. |
| C8a2 - Living cross-functional communication between innovation stakeholders | No | |
| C8a3 - Coordinated actions of innovation-stakeholders | Yes | To define a related key performance indicator for the outside-in process and related measurement system (see also MC) |
| C8a4 - Process orientation goes in line with short reporting and -decision lines | No | |
| C8a5 - Clear innovation strategy and innovation targets | Yes | To formalise a clear innovation strategy and targets (see also MC) |
| C8a6 - Sufficient time resources for innovation outside-in management | No | |

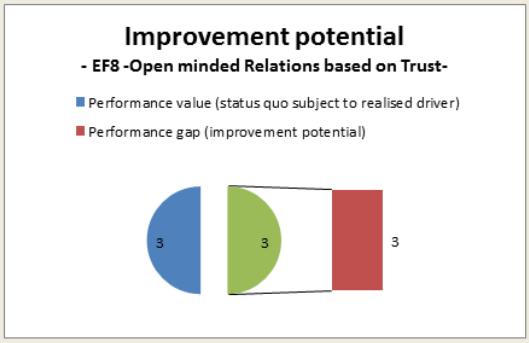
Comment:

Training topics should be aligned with actual specific projects/processes/developments (not just general traiings).

**B) Bar-chart**

| | |
|---|---|
| Target value (number of formative drivers for the EF) | 6 |
| Performance value (status quo subject to realised driver) | 3 |
| **Performance gap (improvement potential)** | **3** |




| Assesment by: | Status: | Approved: |
|---|---|---|
| Loewe Purchasing | January 2015 | 1st of February 2015 |

Figure 33: Performance comparison sheet EF8: ORT

#### 4.4.2.9 Summary of Strategic Agenda

| EF | # | Strategic measures | Responsible |
|---|---|---|---|
| EI | 1 | To provide suitable financial/time resources for outside-in innovation management. | Management |
| EI/ PCP | 2 | To enhance the integration of innovation suppliers into mid- and long-term product planning. | Purchasing |
| PCP | 3 | To revitalise the commodity management with focus on (a) attractive purchasing volume for innovation suppliers and (b) evaluation of realised / prospective preferred customer status. | Purchasing |
| PCP/ PDP | 4 | To improve management skills of purchasers based on a revised competence profile and an individual agreed training plan. | Human Resource |
| MC/ ORT | 5 | To formalise a clear outside-in innovation strategy and targets. | Management |
| MC / IMS | 6 | To devise a process description of the innovation process with purchasing and other stakeholders responsibilities. | Management |
| MC | 7 | To audit stakeholder compliance to the innovation process on regular basis. | Management |
| II | 8 | To revitalise the awareness of purchasing members and innovation stakeholders of their roles and background/advantages of cross-functional teamwork. | Purchasing |
| EIP | 9 | To actively contribute and participate in early product planning meetings. | Purchasing |
| EIP | 10 | To take over the ownership for the co-ordination of the outside-in innovation process (e.g. via definition / update of the outside-in technology road map). | Purchasing |
| PDP | 11 | To improve leadership skills of purchasing members. | Human Resource |
| IMS | 12 | To introduce a data collection pool that allows easy access and processing. | Purchasing |
| ORT/ IMS | 13 | To define a related key performance indicator for the outside-in process and related measurement system. | Purchasing |
| ORT | 14 | To integrate the topic of Open-minded Relations based on Trust among innovation stakeholders into the training and communications activities. | Human resource |

Table 50: Overview of strategic measures at Loewe purchasing

## 4.5 Summary of findings / writing up

This sub-chapter summarises the results of the data collection and analysis process concerning the research questions, suggested tendencies and explored relations between the EFs.

### 4.5.1 Findings with regard to the research questions

Dealing with RQ1 What are the Enabling Factors for the effective integration of purchasing into the outside-in innovation process? the study found however, the 8 major Enabling Factors: EF1: External Interconnectedness (EI), EF2: preferred customer process (PCP), EF3: Management Commitment to the PO (MC), EF4: Internal Interconnectedness, EF5: Early Integration into Product Planning (EIP), EF6: Degree of Professionalisation of the PO (PDP) , EF7: Innovation Management System (IMS) and EF8: Open-minded Relations based on Trust (ORT) as decisive Enabling Factors for the effective purchasing integration into the outside-in innovation management process of the selected medium-sized SI of consumer electronic products. Furthermore, the study identified 32 drivers that could be clearly attributed to the Enabling Factor. In addition, eight causal mechanisms were identified that explain the functioning principle of the Enabling Factor. In addition, direct relationships between Enabling Factors were identified. In the context of the research unit – Loewe's PO – EF3: Management Commitment to the PO was found to be decisive for EF6: Degree of Professionalisation of the PO while, in turn, EF6: itself was found to be decisive for EF1: Internal Interconnectedness, EF2: Preferred Customer status Process, EF4: External Interconnectedness and EF5: Early Integration into Product Planning. Furthermore, EF7: Innovation Management System and EF8: Open-minded Relations based on Trust between the innovation stakeholders were found to be moderating Enabling Factors that accelerate and facilitate the outside-in innovation process.

Subject to RQ2 Which strategic agenda and measures can be derived for the selected medium-sized system integrator by using the Enabling Factors? This study identified 14 strategic measures which set the framework for the effective integration of Loewe's PO into the innovation outside-in process. As the implementation phase is not part of this study, undertaking the implementation of the identified strategic measures is suggested, via a change management project that is realised on the basis of action research (Borda, 2008; Reason & Bradbury, 2008; Valsa, 2005).

Relating to RQ3 Are there indications that the identified Enabling Factors are relevant for other system integrators? – opinion data of external research participants provided indications that the identified Enabling Factor, driver, causal mechanism and relationships between the Enabling Factors, as found at the selected research units, seem to be relevant also at other SIs that are characterised by high dependency on innovation suppliers.

### 4.5.2 Findings with regard to the suggested tendencies

In accordance with the causal explanation, the study confirmed the following tendencies that were devised after the literature review. The tendency that the purchasing function has the capability to generate valuable outside-in innovations may arise:

(1) If there is a high level of External Interconnectedness.

(2) If the purchasing function establishes an assessment process concerning the actual and prospective preferred customer status granted by the supplier.

(3) If there is a high level of Management Commitment to the purchasing function.

(4) If a high level of Internal Interconnectedness is achieved by the purchasing function.

(5) If the purchasing function is integrated early into the product planning process.

(6) If the purchasing function has gained a high Degree of Professionalisation.

(7) If there is a company-wide accepted and practised Innovation Management System in place.

(8) If there is a high degree of Open-minded Relations based on Trust among the stakeholders of the innovation process.

### 4.5.3 Suggested relationships between the EFs

Furthermore, the study suggests Management Commitment as a basic condition for the Degree of Professionalisation of the PO, while this is suggested as a direct condition of External and Internal Interconnectedness, the implementation of a Preferred Customer status Process and the Early Integration of purchasing into the product planning process. The availability of an IMS and Open-minded Relations based on Trust among innovation

stakeholders are found as moderating variables that facilitate the PO's capability to generate outside-in innovations. In this vein, it is suggested that the identified EF increases the PO's capability to co-ordinate and drive the innovation outside-in process. Thus, the PO contributes to the sustainable competitive advantage of the SI.

# 5 Discussion of the findings

The aim of this chapter is to discuss the findings concerning the research question and management literature that set the basis for the conceptual framework of this study. First, this chapter synthesises the major findings concerning the research questions. Afterwards, the findings are discussed with reference to the scoping literature introduced. In this way, the study findings are linked to the wider underlying management theory discussed in Chapter 2, the literature review.

## 5.1 Identified Enabling Factors

This research was concerned with the PSM field of EPI into the NPD process. The overriding goal of this PSM field is to leverage and exploit the supply base for the SI's own purposes. The findings from Chapter 2, the literature review, showed that given research only partially discussed relevant Enabling Factors. Specifically in the case of a medium-sized German SI of the CEI, none of the selected literature gave sufficient insights about relevant Enabling Factors for purchasing integration into the innovation process. With regard to relevant formative drivers of EFs, the given research explains relevant EFs rather on an exemplary base of events. This reduces the explanatory power of the relevant EF. In contrast, this study explored and attributed concrete formative driver conditions to every EF. With regard to RQ1 ('What are the Enabling Factors for the effective integration of purchasing into the outside-in innovation process?') the study suggests eight EFs and 32 drivers considered as formative to the EF. If considered carefully in the specific context of a SI, the eight EFs and related drivers are expected to cause a positive tendency, subject to the PO's capability to co-ordinate the outside-in innovation process which in turn, is expected to positively influence the level of generated outside-in innovations. The following subsections briefly synthesise the findings with regard to the EF and suggested direct dependencies between the EFs. Even if the identified EFs are discussed in separate sub-chapters, it is important to understand them as a coherent cause-effect model, which can only cause a positive tendency concerning the POs' capability to generate valuable outside-in innovations, if all EFs are sufficiently considered in a specific context.

### 5.1.1 Enabling Factors

#### 5.1.1.1 Management Commitment (MC)

In line with other studies (e.g. Nijssen, 2002; Ragatz & Scannel, 1997; Schiele, 2010), Management Commitment is found to be a basic Enabling Factor for EPI. Besides a general positive attitude of the management to integrate the PO into the innovation process, Management Commitment requires a clear description of the innovation process with the POs' responsibilities. Even if this sounds trivial, attention needs to be paid to the fact that the management complies with the relevant process. In addition, a clear innovation strategy is found as a basic condition. To realise the expected PO role in the outside-in innovation process, the PO needs to be equipped with sufficient financial and personnel resources. From an organisational point of view, direct reporting lines to the top management are identified as a driver condition. This is supported by the research participants' requirement to have the possibility of reporting directly to top management. In contrast to Schiele's findings (2010), this study suggests MC as a direct condition of the Degree of Professionalisation of purchasing (PDP) and not as a kind of parallel condition for early purchasing integration (Schiele, 2010). The study further suggests that MC commitment to the PO authorises the PO members to actively participate in the innovation process.

#### 5.1.1.2 The Degree of Professionalisation of the PO (PDP)

As delineated above, the EF Degree of Professionalisation of purchasing (PDP) is suggested as being directly dependent on the Management Commitment. In turn, the PDP is suggested as a direct condition of the EF's External (EI) and Internal Interconnectedness (II), early purchasing integration into product planning process (EIP) and the Preferred Customer status Process (PCP). The Degree of Professionalisation of the PO is driven by sufficient knowledge of the PO members concerning supplier capabilities, technical knowledge, and management and leadership skills. These drivers can be considered indicators of a high learning orientation of the PO, which, as suggested by Hult *et al.* (2000), generates an effective response by the SI's environment (internal and external stakeholder). In addition, the PO needs to realise sufficient time resources for the outside-in innovation process. This should be accompanied by a general willingness of PO members to engage in new knowledge domains. The study suggests that a high PDP enables the PO to co-ordinate and drive the innovation outside-in process. This is in line with Schiele (2007) who suggests that early PO integration into the innovation process indicates high PO maturity. In contrast, a low PDP, which is only customised to realise the operational processing of purchas-

ing orders, is considered as not suitable to drive and co-ordinate the innovation outside-in process.

#### 5.1.1.3 External Interconnectedness (EI)

External Interconnectedness is suggested as being directly dependent on the EF PDP. The EF External Interconnectedness is explained by short/physical distances to innovation suppliers. With regard to a worldwide innovation network of a medium-sized SI of electronic consumer products, the study suggests building up a functioning network with innovation suppliers, which could be supported, for example, by local purchasing offices located within or near the technology clusters. Local purchasing offices should act as listening posts and matchmakers (Boutellier *et al.*, 2007). In this way, as suggested by Matthyssens *et al.* (2003), the PO facilitates learning processes. Subject to the innovation outside-in process, the term PO needs can be viewed as a functioning organisational network that drives and facilitates the relationships with relevant innovation suppliers on the behalf of the SI and involved internal stakeholders. Therefore, subject to purchasing integration into the innovation process, the major focus should be on process-related activities. However, structural issues like short reporting lines to top management and adequate financial budget are important. In contrast to Schiele (2010), whose findings argue that satisfactory contributions to innovations are, in the majority, realised by suppliers located within a radius of 400 km round the customer, especially small and medium-sized SIs like the German television set manufacturer Loewe do not have the market power to motivate innovation suppliers to locate representatives close to the headquarters. Therefore, small and medium-sized companies have to devise a different relationship strategy with the focus of realising good relations with innovation suppliers. In this process, as suggested by this study, a good company image and story, sufficient time and financial resources, the Early Integration of suppliers into the mid and long-term product planning process and on-site domestic support are suggested as drivers of EF External Interconnectedness. In this way, access to innovation networks can be facilitated, from the tapping of innovations, to cross-fertilisation between innovation stakeholders and, subsequently, the generation and diffusion of knowledge.

#### 5.1.1.4 Internal Interconnectedness (II)

Internal Interconnectedness (II) is suggested as being directly dependent on the EF PDP. Internal Interconnectedness (II) supports and facilitates the exchange of relevant information between the internal stakeholders. Besides sufficient technical knowledge, EF Internal Interconnectedness requires a general willingness of PO members to work in cross-

functional team structures. A short physical/spatial distance between the innovation stakeholders is considered to facilitate the communication processes between innovation stakeholders. In an ideal case, all innovation stakeholders are physically located close to each other. This also supports the level of informal information exchange amomg the stakeholders, which is further driven by process orientation and short reporting, and decision lines. Overall, Internal Interconnectedness supports the free flow of information between innovation stakeholders. In this way, it facilitates the organisational learning processes. Cross-functional communication processes between innovation stakeholders can then be driven and co-ordinated by the PO. Based on the information exchanged, the PO can build up, for example, a technology road map that becomes a linking element between market requirements, innovation and sourcing strategies (Schiele, 2010).

#### 5.1.1.5 Early Integration into Product Planning (EIP)

Early Integration into Product Planning (EIP) is suggested as being directly dependent on the EF PDP. The EF EIP is driven by a general attitude and real-life practice to integrate the PO early into the product planning process. This implies also that innovation ideas from the PO are desired, and are not handled with resistance by product planners. In this way, EIP is considered a platform upon which the PO can prepare and explain external innovation potentials to the stakeholders of the product planning process. In turn, sufficient detailed information with regard to product features and characteristics can be freely exchanged. The findings further suggest that PO members have to build up sufficient knowledge concerning supplier capabilities. This implies that supplier selection is realised on the ground of a living, systematic analysis process, which considers the requirements and characteristics of the planned products. On the other hand, the PO can forward early signals with regard to potential incremental or disruptive innovations to the product planning organisation. In this way, potential supplier capabilities can be exploited in an efficient and effective way.

#### 5.1.1.6 Preferred Customer status Process (PCP)

The Preferred Customer status Process is suggested as being directly dependent on the EF PDP. The importance of such a process (PCP) at innovation suppliers is extensively discussed in management literature (Monczka *et al.*, 2010; Schumacher *et al.*, 2008). This study suggests that the PCP depends not only on the realisation of a sufficiently attractive purchasing volume, a good company image but also on the Early Integration of innovation suppliers into the product planning process. Therefore, the PO should assess the potential

to gain preferred customer status. Based on the identified potential to get preferred customer status, the PO can initiate suitable measures to achieve such status. The systematic assessment and definition of suitable measures should be driven by the PO but shared and discussed with other internal stakeholders of the innovation process. With regard to innovation suppliers, strategic purchasers are expected to realise and maintain good relationships to key persons among the innovation suppliers. This includes purchasing marketing activities, with the objective of presenting the SI as an attractive partner for the innovation supplier. In this way, innovation suppliers potentially allocate their resources to the SI on a preferred base. As an effective example, Petersen *et al.* (2003) refer to the collocation of supplier and customer resources in the early phase of innovation projects.

#### 5.1.1.7 Innovation Management System (IMS)

The study proposes the EF Innovation Management System as a moderator variable, which positively influences the overall effectiveness of the outside-in innovation process. The findings suggest that an IMS is driven by a clear process description with purchasing responsibility. As delineated above, this process description with PO responsibility is also relevant for the EF 'Management Commitment to the PO'. Furthermore, with regard to the overall acceptance of an IMS, it is important that the IMS tools and processes be actually practised by innovation stakeholders in daily working practice. For this reason, innovation stakeholders should have easy access to the IMS, which allows pragmatic easy submission and monitoring of innovation outside-in projects. For example, the SI could develop application software that offers the possibility to register and forward innovation potential via mobile phones from anywhere in the world. In this way, the IMS supports the efficient, effective processing of outside-in innovations and becomes the main innovation platform, fostering absorptive and adaptive capabilities (Cohen & Levinthal, 1990; Wang & Ahmed, 2007). The IMS should be embedded into the information system strategy which seeks, from a general perspective, to harness customer and supplier opportunities in a systematic way (Wynn, 2009). Subject to the innovation outside-in approach, a professionalised PO can be expected to drive and co-ordinate this process.

#### 5.1.1.8 Open-minded Relations based on Trust (ORT)

Open-minded Relations based on Trust (ORT) are suggested as moderator variables which can positively influence the overall innovation outside-in process. The study suggests that innovation stakeholders with an approachable, courteous nature engender Open-minded Relations based on Trust. In this way, the EF ORT can be viewed as 'oil in the gearbox'

providing a basis upon which living and cross-functional communication processes are realised (Argote & Ren, 2012). This includes the alignment of co-ordinated actions between innovation stakeholders and implies short reporting and decision lines, but the PO has sufficient time resources for innovation outside-in approaches and a clear innovation strategy. The importance of trust for organisational learning processes is widely discussed in management literature (e.g. Johnson, 2009; Ussahawanitchakit, 2011). To achieve a sufficient level of trust, the introduction of the Model II theory (Argyris & Schön, 1978) is considered highly suitable for management tasks that are characterised by uncertainty and complexity. These characteristics apply to co-ordination of outside-in innovations. Therefore, it is suggested that SIs should include Argyris and Schön's Model I and II theory in the innovation stakeholders training programme (Argyris & Schön, 1978; Schön, 1984).

### 5.1.2 Generalisability of the findings

Regarding the RO 3 to investigate whether the identified Enabling Factors are confirmed (or not) by purchasers of other SIs, the study suggests that the identified Enabling Factor and relationships can be considered as relevant for other SIs with a high dependency on innovation suppliers. This insight is based on the analysed opinion data of 11 purchasing experts with working experience in other SIs with high dependency on innovation suppliers. It is argued that the suggested EFs and dependencies can be applied in a different context. However, in line with the philosophical position as a moderate relativist, it needs to be pointed out that hitherto unknown factors can potentially occur in a different context possibly causing a negative tendency on the PO's capability to generate valuable outside-in innovations. Therefore, it is important to recognise that the specific circumstances have to be given due consideration, case by case.

### 5.1.3 Development of a strategic agenda

Regarding RQ2 which strategic agenda and measures can be derived for the selected medium-sized system integrator by using the Enabling Factors? The study suggests 14 strategic measures for Loewe's PO. In this way, it provided examples of how purchasing executives of SIs who like to better embed their PO into the innovation outside-in process can apply the EF identified, the drivers and the relationship model. Based on these elements, a workshop method, functioning on the basis of the focus group interviews, is suggested as a suitable method to devise context-specific strategic measures.

### 5.1.4 Synthesised model

The synthesised empirical findings concerning the conceptual framework (sub-chapter 2.5) suggest:

(a) the activation level of relevant Enabling Factors and

(b) the consideration of the dependency structure between the Enabling Factors in a specific context as a customisable criterion to control and regulate the level of purchasing integration into the innovation process. In other words, if (a) all 8 EFs are activated and (b) the dependency and/or the relationship structure of the EF respectively are considered carefully in the specific context, the PO can be considered as well integrated into the innovation process of SIs. In this way, the PO builds up the capability to co-ordinate the innovation outside-in process. This reflects requirements to continuously improve the exploitation of internal and external resources (Barney, 1995). If suitably co-ordinated, the innovation outside-in process is expected to improve the overall competitiveness of a SI. In this way, the PO becomes an organisational unit that drives and co-ordinates the innovation outside-in process. The figure below displays the synthesised findings:

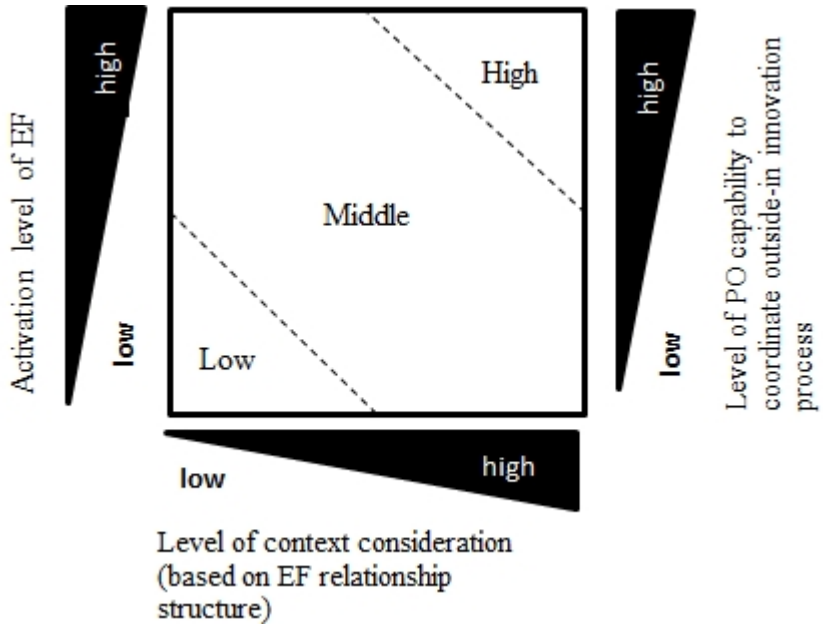



Figure 34: Customisation of PO integration into the innovation process

## 5.2 Discussion with regard to relevant management literature

The following sub-chapters discuss the major findings with regard to the scoping literature introduced (Chapter 2).

### 5.2.1 The PO as a competitive company resource

Academics of the RBV and purchasing and supply management (PSM) research disciplines support the approach to ground research studies in the context of purchasing management on the RBV, or on the DCBV respectively. For example, Barney (2012) points out that the resource-based theory suggests that *"purchasing and supply chain management may often have the characteristics that could lead them to be a source of at least a temporary advantage, if not a sustained competitive advantage for a firm"* (Barney 2012, p. 626), whereas researchers of the PSM field conclude that *"researchers are well advised to ground their analysis in the dynamic, resource advantage theory of completion"* (Hunt & Davis, 2012, p. 19).

As outlined above, co-ordination, reconfiguration and learning processes reflect 2nd order capabilities that enable the SI to "*recognise, assess and integrate new technological and customer-orientated competences"* (Sammerl, 2006, p.165). Eisenhardt and Martin (2000) argue that learning capability is especially important in high velocity markets that are characterised by uncertainty resulting from unclear market conditions. The authors further argue that "*in these markets, dynamic capabilities necessarily rely much less on existing knowledge and much more on rapidly creating situation-specific new knowledge*" (Eisenhardt & Martin, 2000, p. 1111). This requires the PO's capability to rapidly develop and create new networks. In this regard, some authors propose to implement in companies a dedicated alliancing function that provides a formalisation mechanism relating to certain alliancing know-how and routines (Kale, Dyer & Singh, 1999, as cited in Eisenhardt & Martin, 2000). In this vein, this study suggests that a PO, if well-embedded in the innovation outside-in process, can significantly contribute to the enhancement of the SI's innovation capability and sustainable competitive advantage. Based on this viewpoint, a PO, which takes over the co-ordination and driver function for the outside-in innovation process, becomes a valuable resource for the SI. The co-ordination function potentially encompasses the sub-processes of:

(1) innovation recognition

(2) the relationship of management to the external innovation organisation (e.g. technology suppliers, universities, licensors and start-ups)

(3) co-ordination of outside-in measures, and

(4) responsible development and control of an outside-in technology roadmap for the SI (Schiele, 2010).

In order to be clear concerning the sub-process of innovation recognition, PO ownership for the outside-in core process does not mean that the PO is solely responsible for the generation of outside-in innovations. Indeed, the PO has a manifold reservoir of relations to external organisations. Nevertheless, the SI's management needs to motivate the total workforce to be sensitive regarding the innovation potential of external organisations. In this vein, the SI's management should define appropriate organisational structures, such as cross-functional scouting teams into which suitable PO members should be integrated. The responsibility of the PO for the outside-in innovation process rather focuses on an idea of systematic processing and co-ordination of outside-in-innovation ideas which contribute to the SI's capability to innovate ($2^{nd}$ order capability). The co-ordination function of the PO comprises communication and organisational activities to external parties on the basis of a formalised outside-in technology road map, contract management, responsiveness-management to innovation supplier, the cross-functional assessment of innovation approaches as members of innovation scouting teams in the sense of a value to cost account.

As the product definition or cloud-phase of the innovation process is characterised by uncertainty (Gassmann & Sutter, 2011), especially in innovation driven and turbulent branches, for example the consumer electronics industry, the co-ordinated processing of outside-in innovation processes by the PO becomes a highly beneficial and strategic activity for the SI. Inimitability of the PO in the context of the outside-in core-process is rooted in the number and quality of relationships a PO establishes with innovation suppliers. It is clear that the specific network of relationships and social contacts to innovation providers can hardly be copied by competitors. In this way, the devised eco-system of suppliers and personal relations becomes a mechanism of isolation. This mechanism will be amplified based on the establishment of systematic innovation search processes, which aim to accelerate and enhance, for example, the speed of contact of management to potential innovation providers. Managing an increasing, real-life and value-orientated social network to innovation providers will turn the PO, in the context of outside-in innovations, into a non-substitutable organisational unit of the SI and the PO. Needless to say, no price co-ordinated factor markets exist for a PO which meets the requirements of a rare resource.

From an economic point of view, the return on investment for a PO that co-ordinates and drives outside-in innovation management can be calculated based on the comparison of investment into the development of the PO's $2^{nd}$ order capability and the future discounted rents and opportunity costs (Conner, 1992; Mahoney & Pandian, 1992). The aspect of in-

imitability and ambiguity of the PO is then reflected via the specific achieved maturity level gained by the PO (Schiele, 2007). For example, established worldwide innovation networks that are further based on open and honest relationships of the PO members to key personnel of innovation holders, increase the ambiguity and inimitability level of SIs that cannot be easily copied by competitors. The intention of building up good relationships and maintaining trust between the SI and the innovation holder is extremely important, as trust affects the main co-ordination mechanism (Colombo *et al.*, 2011) in the early part of the innovation cloud phase (Gassmann & Sutter, 2011). From the viewpoint of the DCBV, the outside-in core-process (Gassmann & Enkel, 2004) requires the efficient, effective co-ordination of third parties' innovation potentials.

A management who attributes the ownership for the outside-in innovation core process to its PO, views the outside-in innovation process as a procurement task which can be equated, from a bird's eye view, with the procurement of established commodities and services. In this sense, the PO operates as a nominated interface to potential innovation suppliers and takes care, as a bridge function, of the smooth flow of information between the SI's relevant outside world and the SI's organisation. This task can be also described as management of innovation networks, which further includes the anticipation, description and distribution of incremental and radical technological changes (Colombo *et al.*, 2011; Dittrich, Duysters & de Man, 2007). Thus, the PO becomes a catalyst for the SI's innovation management process (Fang & Rice, 2011). As mentioned above, the management of the outside-in core process reflects, in the sense of the DCBV, a 2$^{nd}$ order capability that potentially leads to relative strategic advantage via the efficient, effective integration of external activities and technologies (Teece & Pisano, 1994). To give a practical example in the context of outside-in innovations, care needs to be taken that the innovation topics will be presented to executives who decide whether to approve an innovation proposal for the subsequent outside-in process step. Budgets must be assigned if an innovation is approved, contracts with external organisations possibly need to be prepared and signed, business meetings with potential suppliers have to be organised and good relations with key persons among the technology holders need to be built up and maintained. R&D departments may be reluctant to deal with the organisation and management of the subsequent requirements and there is the latent risk that good innovation projects will not be processed by the SI with the requisite priority and entrepreneurial spirit (Schumpeter, 1934). In this sense, Serhan (2011) argues that many firms, especially small ones, struggle to integrate external expertise, as it requires more testing and interpreting. Additionally, employees' aversion to-

wards unknown technologies is often rooted in the challenge that differences in language with the experts and the issues problem-solving methods pose have to be overcome. Therefore, top management must be aware that the collection of innovation potentials and the subsequent execution of selected innovation potentials involve the SI in considerable organisational efforts.

The following table gives an overview of derived requirements that potentially turn the PO into a VRIO resource in the context of SI's outside-in innovation management:

| Criteria | General requirement | Derived PO requirement to become a VRIN resource. |
|---|---|---|
| Valuable | Enable value creation for the SI. Financial investment needs to be lower than expected future discounted returns. | To take over the co-ordination function and process integration for the outside-in process. Constant monitoring of markets and technologies → creation of value for the SI via the enhancement of the capability to innovate. |
| Rare | To be rare by definition. | To become a professional PO who takes over the 2nd order capabilities to co-ordinate and manage the outside-in core process. No factor markets available which offer a professionalised PO. |
| Inimitable | Difficult to duplicate, isolation mechanism. | To become a professionalised PO, well-embedded internally and externally. The PO's specific network of relations with innovation suppliers and social contacts to key personnel cannot be simply copied by others (social complexity) |
| Non-substitutable organisation | Lack of substitutability | To become a professionalised PO who fulfils the requirements of the outside-in core-process ownership, co-ordinates, and monitors actions subject to the innovation outside-in process, thus enabling the SI to exploit it. |
| Dynamic | Taking over 2nd order capability to enable value generation/sustainable competitiveness. | The PO takes over the process ownership for the outside-in innovation core-process regardless of a specific time frame. The PO is involved in the cloud-phase of the innovation process and the subsequent product planning process, thus understanding the targeted product properties. The PO creates an internal and external network to produce defining organisation units (demand side) and innovative resourcing markets. |

Table 51: VRIO requirements on the PO

Summarising the aspects of the RBV and DCBV in the context of this study, the effective integration of the PO into the innovation process potentially turns into a VRIO resource that contributes to the sustainable competitive advantage of the SI. It is obvious that no factor markets exist from which an innovation network and the wide personal relations with key players can be procured.

### 5.2.2 The PO as an embedded learning agent

Organisational learning is tightly related to the absorptive capability of SIs (Cohen & Levinthal, 1990). It is argued in this thesis that a PO that is capable of building and managing an established worldwide network to innovation holders will considerably enhance the absorptive and adaptive capability of SIs and these capabilities imply the capacity to achieve sustainable competitive advantage (Wang & Ahmed, 2007). Considering the 'first time-confirmation model' knowledge model (Weizäcker, 1974; as cited in Sammerl, 2006), the individual development path and PO's achieved maturity level, in line with the accumulation of useable knowledge (Cohen & Levinthal, 1990), enables the PO to understand and interpret information about incremental component innovations, new technologies and service trends concerning their potential to increase the customer benefits of the SI's product and service portfolio.

In order to realise a double-loop learning process, and deep reflection processes (Argyris & Schön, 1978; Schön, 1984; Argyris, 1993) this study suggests that the effective transformation of external knowledge into valuable knowledge requires Model II behaviour of all stakeholders of the innovation process (Argyris & Schön, 1978). Experience in the field supports this viewpoint as companies, perhaps amplified by a hierarchical and functional structured organisation, that mainly operate on Model I behaviour inevitably cause defensive routines. Defensive routines become visible, for example, via sole justifications of the status quo, mistrust or are based on a specialist department's mindset, so that other functions cannot make meaningful contributions. It is obvious that the innovation process of a company that operates in a highly dynamic environment will be considerably damaged by defensive routines serving as information filters, which hinder or block the free flow of potentially valuable information (Henderson & Clark, 1990).

In the context of innovation management, this thesis suggests that it is necessary to establish an organisational atmosphere that is characterised by openness and trust but also company members' awareness of the programmed defensive routines (Senge, 1990). The level

of openness and trust gained will determine if stakeholders of a SI's innovation management either adopt or resist specific innovation approaches (Zaltman, Duncan & Holbek, 1984, as cited in Seidler-de Alwis & Hartman, 2008). Based on the above insights, it is concluded again in this thesis that a professionalised PO is highly prepared to become an embedded organisational learning agent for the SI.

### 5.2.3 Open Innovation – managing of innovation networks

Medium-sized SIs of the electronics consumer industry have no other choice than to work in an innovation network. As mentioned above, a TV set manufacturer depends on co-operation with a wide field of innovation suppliers for software, hardware components and services. This requires the efficient and effective co-ordination of outside-in innovation processes. This further implies the establishment of a good relationship to prospective innovation suppliers and their intermediaries who have not co-operated with the respective SI so far, for example, in the case of crossover innovations (Gassmann & Sutter, 2011). In this vein, a professionalised PO needs to actively enter into activities like procurement marketing in order to achieve a preferred customer status. However, this requires that the PO is aware of the SI's targeted market segment and related targeted product properties. This market and product relevant information forms the basis for the Innovation Purchasing policy and strategy that serves as a vehicle to implement a shared PO's vision and mission (Senge, 1990). In the context of this research topic, the managerial tenet of Open Innovation has considerable implications concerning the integration of the PO into the Open Innovation process. Firstly, the PO needs to obtain access to the aforesaid discussed information concerning:

(a) the value proposition
(b) buying motives of the targeted market segment and
(c) the derived product properties.

This means, in turn, that the PO needs to be integrated into the company's internal product definition and creation process. The knowledge concerning the respective SI's value proposition and buying motives of the targeted market segment serves as a guideline for the PO via which the PO can initially assess whether an encountered outside-in innovation can potentially contribute to required product properties. In this vein, the Early Integration of the PO into the product planning process serves as the organisational platform for the PO to actively participate in the product planning process and to get first-hand knowledge about future products and related features. However, it can be assumed that the PO will only be

seriously integrated into the product planning process if the SI's management has the real intention and goal to utilise the PO for the innovation outside-in core process. Without the real willingness of management, the engagement of the PO for the outside-in process largely depends on the personal motivation of a purchaser to commit him/herself to the innovation outside-in core process. Therefore, Open Innovation raises the question concerning necessary conditions to be defined and launched by the SI's management concerning the importance of the Management Commitment to integrate the PO efficiently into the innovation outside-in innovations. Without such a Management Commitment, the PO will not be equipped with appropriate human and financial resources for the innovation outside-in process. Moreover, without formal management authorisation, the PO members might be blocked by other innovation stakeholders from actively participating in the innovation process. This means that Management Commitment requires concrete and sustainable organisational measures concerning the integration of the PO into the innovation outside-in process.

Even if Management Commitment and the integration into the product planning process are assured, the PO needs to gain relevant information concerning innovations of technology suppliers which serve as an input for the subsequent organisational learning processes. Furthermore, there is the question how the PO can obtain access to external innovation potentials. For example, Boutellier *et al.* (2007) propose to build listening posts in technology clusters in order to ensure early access to the future developments of technology companies. Without a sufficient level of direct contact with technology suppliers, the PO is not able to, but will have to, efficiently and effectively tap into the innovation potential of third parties, for example new players that possibly come from other branches. This requires the capability to quickly establish relations to external stakeholders. Therefore, the PO should devise appropriate communication processes to external and internal innovation stakeholders which serve as a basis for the establishment of continuous learning processes.

A further aspect raised by Open Innovation refers to the kind of and quality of relations with third parties. For example, the ability to tap into innovative technology of clusters implies that good and sustainable relations have been established to key personnel of the technology companies. Without good, sustainable relations to key people of technology companies, early access to innovation projects of the respective technology company can hardly be achieved. However, a well-integrated PO can only work as an effective interface if good and sustainable relations are also established and maintained with internal stake-

holders in the innovation process. Otherwise, the free flow of relevant information cannot be achieved. This requires that relations to internal and external stakeholders of the innovation process are characterised by trust and open-mindedness that were identified as moderating factors. Trust and open-mindedness are reflected by non-defensive learning routines and actions (Argyris, 1993; Argyris & Schön, 1978; Schön, 1984). Based on this viewpoint, it is further suggested that non-defensive learning routines facilitate and accelerate the socialisation process of knowledge (Nonaka, 1991; Nonaka & Takeuchi, 1995).

A further aspect of organisational learning is concerned with the efficient and effective collection, assessment and processing of innovation approaches. In this vein, a SI should agree on a company-wide Innovation Management System that is applied for the collection, processing and the assessment of relevant innovation approaches. This requires that innovation information can be easily forwarded to the IMS but also covers the triggering and monitoring of detailed activities, such as timely feedback, to the innovation provider.

## 5.3 The PO as the third element of the marketing and R&D interface

The following sub-chapter discusses the POs potential contribution with regard to supporting the communication between R&D and marketing in the new product development context.

### 5.3.1 Interface problems of R&D and marketing

Because of the issue of small size, as delineated in sub-chapter 2.1.5, SMEs have to cope with co-ordination problems when it comes to co-operation with external parties. In addition to the integration problems of R&D and marketing, academics have highlighted potential barriers concerning misunderstandings between R&D and marketing due to communication problems, cognitive distance and distrust (Faas, 1985; Gupta & Wilemon, 1991; Griffin & Hauser, 1996; Shaw & Shaw, 2003; Kyriazis, Couchman & Johnson, 2012). Potential reasons are different educational pathways and personalities, insufficient technological knowledge of marketers, insufficient marketing knowledge of R&D members, physical distance and general stereotypes (Faas, 1985; Griffin & Hauser, 1996; Gupta & Wilemon, 1991; Kyriazis et al., 2012; Shaw & Shaw, 2003). However, as pointed out by Gupta & Wilemon (1991), a harmonious relationship between R&D and marketing is essential for the survival of firms in the high-tech sector. This fact can be considered as even more im-

portant in the case of turbulent market environment which is characterised by high market velocity, short innovation-cycles, uncertainty and high dependency on innovation supplier and uncertainty (Faas, 1982; Kyriazis *et al.*, 2012; Luzzini & Ronchi, 2011). Subject to sensing and seizing process of potential outside-in innovations (Teece, 2007; Ridder, 2011), a turbulent market environment requires the capabilities of

(a) building up, forging and maintaining relationships to new and current innovation suppliers as well as a

(b) solid understanding of market needs and technological opportunities.

To achieve the state of a harmonious co-operation between R&D and marketing, van den Bulte and Moenaert (1998) suggest that the level of integration depends on the type of communication between R&D and marketing which should be motivative, structured and co-ordinative concerning the transfer and dissemination of technical knowledge. To realise a harmonious co-operation between R&D and marketing (Gupta & Wilmon, 1991), teamwork, sufficient level of trust, physical co-location of R&D and marketing teams, sufficient common knowledge and understanding concerning market needs, technologies and supplier capabilities were identified as important factors (Faas, 1982; Mac Allister, 1995; van den Bulte & Moenaert, 1998 & Kyriazis *et al.*, 2012).

### 5.3.2 Co-operation between R&D, marketing and purchasing

Considering the potential interface problems between R&D and marketing combined with the above delineated potential co-ordination problem of SMEs in terms of co-operation with external innovation sources, it is strongly argued that a professionalised PO, which is well embedded into the innovation process, can become, beside R&D and marketing, the third major element stakeholder of an SI's innovation process. This is reasoned because, as outlined by Argote & Ren (2011), the successful integration of new opportunities requires co-ordination which is embedded into proper and aligned business processes (Wang & Ahmed, 2007; Teece, 2007). As dedicated process owner of the innovation outside-in core process, the key-role of a professionalised PO is twofold. On the one hand, the PO represents the major interface to innovation suppliers which builds up, maintains and co-ordinates relations and related business processes. On the other hand, in parallel, the PO is in charge of the structured, co-ordinative and motivative internal transfer of technology information to R&D and marketing which can be considered as decisive for the realisation of a SI's absorptive capacity (Cohen & Levinthal, 1990; Nelson & Winter, 1982; Wang &

Ahmed, 2007). Where adaptive capability is concerned, marketing's role is concerned with the identification of customer needs and market opportunities which are required for a SI's adaptive capability while the main responsibility of a SI's R&D is concerned with the integration of components to realise innovative system architectures (Wang & Ahmed, 2007). As suggested by Schiele (2010), the structured transfer of relevant information can be achieved through dedicated technology roadmaps or innovation meetings with innovation suppliers, universities or research labs. In a further structured process, R&D, marketing and purchasing can jointly sense, seize and transform potential outside-in innovations (Griffin & Hauser, 1996; Ridder, 2011; Shaw & Shaw, 2003; Teece, 2007). Sensing, seizing and transformation of outside-in innovations are facilitated by an IMS (EF7) and Open-minded Relations based on Trust (EF8) that were identified as moderators of effective PO integration. It is further argued, that the structured integration of universities and research labs by the PO increase the probability of more fundamental or disruptive innovations (Brunswicker & van de Vrande, 2014; Henderson & Clark, 1990; Nijssen, 2002). With the structured, co-ordinative and motivative transfer of technology information, the PO facilitates the communication, teamwork and linkages between R&D and marketing, thus strengthening the SI's absorptive capacity (Cohen & Levinthal, 1990; Taylor & Helfat, 2009; Wang & Ahmed, 2007).

Overall, it is argued that the integration of the PO as the third element of the innovation process strengthens the absorptive, adaptive and innovative capabilities of SMEs which operate in a turbulent market environment with high dependency on innovation suppliers (Cohen & Levinthal, 1990; Gupta & Wilemon, 1991; Wang & Ahmed, 2007). The following figure illustrates the co-operation of the PO, as third element of the outside-in innovation process.

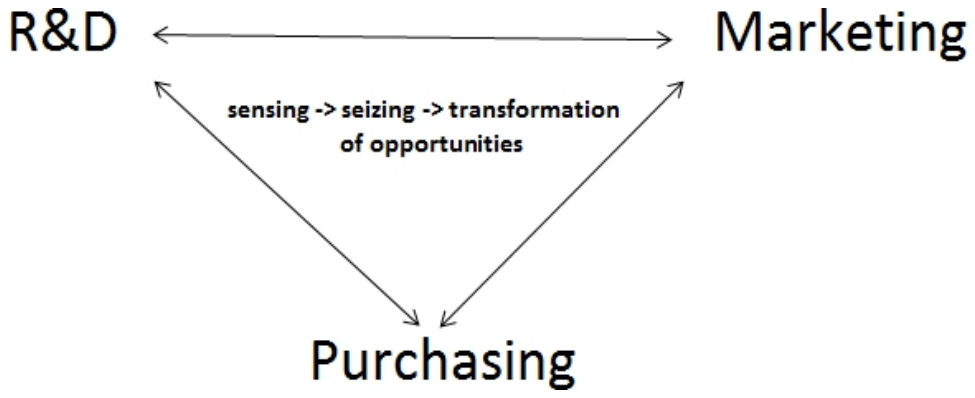



Figure 35: The PO as the third element of the innovation process

# 6 Conclusion

## 6.1 Introduction

At the start of the conclusions, it is appropriate to repeat the citation from the opening of the introduction chapter.

*"In today's world, where the only constant is change, the task of managing innovation is vital for companies of every size in every industry. Innovation is vital to sustain and advance companies"* (Chesbrough, 2006, p. xvii).

This study set out to explore the Enabling Factors of effective purchasing integration into the innovation process in a German medium-sized system integrator of consumer electronics products.

The source of the motivation to conduct research work in this academic sub-field of PSM is recognised organisational shortcomings in Loewe's PO subject to the effective collection and processing of innovation and technology information. Inadequate integration of Loewe's PO into the innovation process is considered a major root cause.

Within the PSM field, the research topic belongs to the overarching PSM issue of supply base exploitation and its sub-field of early purchasing involvement into the new product development process. However, it became clear during the literature review that given academic research has not sufficiently dealt with this research topic. Relevant Enabling Factors have been only partially discussed, sometimes isolated from underlying management theory and rather on the cross sector perspectives of multinational companies. None of the reviewed papers was concerned with the perspective of a German medium-sized SI of consumer electronic products. Furthermore, no comprehensive set of related formative drivers and underlying function principles (causal mechanism) was available in sufficient detail to fit the context of a medium-sized SI with high dependency on innovation suppliers. The same applies to the dependency structure among EFs which extant academic research only partially discussed. These findings are in line with findings of academics from the PSM field who identified considerable research demand with regard to purchasing integration into the innovation process (Schiele, 2010; Luzzini & Ronchi, 2011; Calvi, Johnsen & Phillips, 2011; Glock & Hochrein, 2011; Schoenherr *et al.*, 2012). Besides academics, practitioners from the PSM field point to the low maturity of Purchasing Organisations concerned in securing outside innovation potentials (Roland Berger, 2014). Based on the

recognised research gap, it can be assumed that the research topic is also relevant for other medium-sized SIs with high dependency on innovation suppliers. This is because medium-sized SIs are supposed to have a low vertical integration with regard to added value chain and therefore, have to compete for outside-innovations in order to survive in competition with multinational companies. Furthermore, medium-sized SIs with high dependency on innovation suppliers usually have only limited internal and external resources available.

With these aspects in mind, this research aimed at exploring a comprehensive set of factors that enable the Purchasing Organisation (PO) of a medium-sized system integrator (SI) [specifically in this study of electronic consumer products] to generate valuable outside-in innovations. In addition, the study aimed to derive a strategic agenda and appropriate measures to enhance the PO's ability to generate valuable outside-in innovations.

To achieve these aims, the study sought to answer three major research questions and related research objectives that operationalised the research process. RO1 was devised to understand the Enabling Factors by reviewing academic and practitioner knowledge. RO2 was concerned with the contribution to practical knowledge and outlined the objective of devising a strategic agenda and measures for effective purchasing integration into the innovation process of the selected medium-sized system integrator. Subject to indications as to the generalisability of the findings, RO3 had the objective of investigating whether the identified Enabling Factors are confirmed (or not) by purchasers of other system integrators highly dependent on innovation suppliers. The table below gives an overview of the research questions and objectives:

| **Research questions** | **Research objectives** |
|---|---|
| RQ1: What are the Enabling Factors for the effective integration of purchasing into the outside-in innovation process? | RO1: To understand the Enabling Factors by reviewing academic and practitioner knowledge. |
| RQ2: Which strategic agenda and measures can be derived for the selected medium-sized system integrator by using the Enabling Factors? | RO2: To devise a strategic agenda and measures for the effective purchasing integration into the innovation process of the selected medium-sized system integrator. |
| RQ3: Are there indications that the identified Enabling Factors are relevant for other system integrators? | RO3: To investigate whether the identified Enabling Factors are confirmed (or not) by purchasers of other system integrators. |

Table 52: Overview of research questions and research objectives

The study's philosophical foundations and epistemological approach are based on moderate relativism, which gives flexibility concerning the usage of deductive and inductive research methods and techniques for reasons of data collection and analysis. In this vein, the study applied an embedded multiple qualitative → quantitative case study approach (Creswell, 2008). The PO of the German television set manufacturer Loewe was selected as a critical case. Seven Loewe purchasing experts were interviewed. The context of the study was gradually extended via the integration of 11 External purchasing Experts with considerable working experience with other SIs dependent on innovation-/technology suppliers. Applicability of the identified EFs and related drivers has been shown in the example of Loewe's PO, for which a strategic agenda with 14 measures has been devised.

The following chapter discusses the contribution to knowledge and related managerial implications. Furthermore, the chapter dwells on limitations of this study and gives suggestions with regard to future research.

## 6.2 Contribution to knowledge

### 6.2.1 Contribution to theoretical knowledge

The research questions RQ1 what are the Enabling Factors for the effective integration of purchasing into the outside-in innovation process? and RQ3 are there indications that the identified Enabling Factors are relevant for other system integrators? were concerned with the contribution to given literature. Results of the literature review showed that none of the selected academic papers are specifically concerned with effective purchasing integration into the innovation outside-in process from the perspective of a German medium-sized company of the consumer electronics industry. However, the eight major themes/Enabling Factors could be identified based on the selected literature. This indicates that hitherto academic research was already concerned, even if in different research contexts and from different perspectives, with related topics but without having devised a comprehensive model of EFs that gives insight concerning the PO's capability to generate outside-in innovations. Addressing the identified research gap, this study provides a conceptual framework with reference to management theories:

(a) the resource-based or dynamic capability-based view

(b) the organisational learning theory and

(c) its sub-discipline of Open Innovation, purchasing management theory about
(d) purchasing and supply management.

Additionally, the study discussed potential barriers to the innovation process for SIs subject to the NIH syndrome and architectural innovations. In contrast to previous research, this study devised, on the base of the 8 EFs, a comprehensive structure of causal explanation that synthesised the findings of the literature review in an abstract model (Fleetwood & Hesketh, 2006; Sayer, 1992). While previous research in the field of EPI was rather conducted on cross-sector perspectives of multinational companies from the mechanical engineering, chemical, automobile manufacturer, electronic and electrical engineering industries (for example, Schiele, 2010; Luzzini and Ronchi, 2011; Petersen, Handfield and Ragatz 2003), this research adds the viewpoint of the PO of a German medium-sized SI of consumer electronic products. In contrast with the reviewed literature, this study devised, subject to the PO's capability to generate valuable outside-in innovations, a synthesised and comprehensive structure of causal explanation, which considers all 8 EFs and direct dependencies between the EFs. Furthermore, 32 driver conditions were identified which are viewed as formative to the 8 EFs while previous research rather discussed drivers between EFs on a more general and explanatory level (Wynstra *et al.*, 2000; Schiele, 2010).

Subject to direct dependencies between EF, in addition to previous findings (Schiele, 2010), this study suggests the EF 'Degree of Professionalisation of the PO' as directly dependent on the EF 'Management Commitment to the PO'. Furthermore, the four Enabling Factors EF1: External Interconnectedness, EF2: Preferred Customer status Process, EF4: Internal Interconnectedness, EF5: Early Integration into Product Planning are suggested as direct enabler for the POs role to drive and co-ordinate the innovation outside-in core process. In this way, the PO can become a bridge and facilitator between the external and internal company environment. Negligence of one of these Enabling Factors causes a negative tendency subject to the POs capability to co-ordinate the innovation outside-in core process and the capability to generate valuable outside-in innovations for the SI. The EF7: Innovation Management System (IMS) and EF8: trusting and open-minded relations between innovation stakeholders are suggested as a moderator for the efficient purchasing integration into the SI's innovation process. The importance of an Innovation Management System connects to the findings of Monczka *et al.* (2010). However, in addition, this study suggests that the innovation processes description needs to define the purchasing responsibility within the outside-in process. In line with other research studies (e.g., Gonzalez-

Padron *et al.,* 2008; Sammerl, 2006), this study also confirmed the importance of a general open-minded co-operation culture in the context of innovation management. However, in contrast with the rather general term of co-operation or innovation culture, the more concrete term 'Open-minded Relations based on Trust' (EF8) is proposed. Trusting and open-minded relations were found to activate a non-biased and open exchange of information between stakeholders.

From the perspective of the managerial resource based and dynamic capability based view, the identified Enabling Factors and devised structure of causal explanation contribute to addressing the lack of recognition given to the Purchasing Organisation as a VRIO resource (Barney, 1995; Sayer, 1992). The study gives theoretical insights into how a medium-sized SI with high dependency on innovation suppliers utilises its PO as a kind of boundary spanning function, to better exploit external resources (Barney, 1995, Brunswicker & van de Vrande, 2014; March, 1991; Parida, 2012). In this way, the study results contribute to management literature that is concerned with absorptive capabilities and the co-ordination respectively generation of outside-in innovation (Barney, 1995; Brunswicker & van de Vrande, 2014; Cohen & Levinthal, 1990; Nelson & Winter, 1982; Schoenherr *et al*., 2012; Wang & Ahmed, 2007). It is proposed that a mature PO, if well-embedded into the innovation process, can be expected to contribute to the absorptive capability of SIs and sustainable competitiveness (Cohen & Levinthal, 1990; Wang & Ahmed, 2007). A well-embedded PO is supposed to be able to form strategic alliances in the short-term with potential innovation and technology suppliers (Gassmann & Enkel, 2004; Chesbrough, 2006, Phillips *et al*., 2006a; Calvi *et al.*, 2011). Identified causal mechanisms show the related underlying function principle. Thus, with regard to early access to new technologies, SIs can be expected to more easily realise a close and early alignment with innovation suppliers (Wynstra, van Weele & Weggemann, 2003). This also includes co-ordination processes of potential services which are integrated into the products or for which the products serve as a platform for services offered (Neely, 2009; Chesbrough, 2011).

The contribution to knowledge can be summarised as follows:

a) The development of a conceptual framework that is linked to management concepts of the resource-based view, dynamic capability based view, organisational learning and innovation management theory.

b) The identification of a comprehensive set of eight Enabling Factors, eight related causal mechanisms and 32 drivers, formative to each of the Enabling Factors.

c) The suggestion of direct dependencies among the eight Enabling Factors relevant for periodisation of strategic measures.

d) The contribution to management theory of the resource-based view or dynamic capability based view respectively and related issues in regard to the realisation of absorptive capabilities.

### 6.2.1 Contribution to practical knowledge

This case study's findings are based on real-life findings in the context of the German medium-sized SI Loewe. RQ2: which strategic agenda and measures can be derived for the selected medium-sized system integrator by using the Enabling Factors? relates to the contribution to practical knowledge. A contribution to practical knowledge is realised as the study provides an applicable and comprehensive toolset of EFs and drivers to a purchasing practitioner that is flexible concerning the environments of a different context. Purchasing executives are provided with a platform by means of which concrete strategic measures concerning the effective embedding of the PO for the selected research unit can be devised. The study results serve as a (benchmark) platform for management and purchasing executives who want to better integrate the PO into the innovation process. The identified Enabling Factor and driver can be directly applied to the identification of improvement potentials while the causal mechanisms identified explain the functioning principle of the Enabling Factors. This background knowledge about the principle enables executive management and purchasing executives to apply the suggested Enabling Factors and drivers in their specific context. Moreover, the suggested Enabling Factor and drivers reflect a dynamic approach that is flexible to a change of environment. Thus, relating to the securing of innovations, practitioners get insight how to improve the maturity of their PO (Roland Berger, 2014). Sub-chapter 4.4.2 demonstrated, using the example of Loewe's PO, how the purchasing practitioner can devise strategic measures with the help of the suggested gap analysis form.

Summarising the contribution to knowledge can be summarised as follows:

- The study provides an applicable and concrete structure to PO executives who want to better integrate their PO into the innovation process.
- The study provides a flexible toolset to a practitioner for the identification of gaps and the development of strategic measures.
- The study explains the functioning principle (causal mechanism) and dependencies among the EFs so that a purchasing practitioner can prioritise strategic measures.

## 6.3 Implications

### 6.3.1 Theoretical implications

External knowledge sourcing requires appropriate internal managerial processes and capabilities that support the efficient and effective organising and processing of outside-in innovations in SMEs (Brunswicker & Vanhaverbeke, 2014; Parida, 2012). Based on this requirement, this study suggests developing the PO into an organisational unit and company resource that can take over the co-ordinator and driver role for the innovation outside-in management core process. The devised structure of causal explanation advances given theoretical knowledge as it does not view the PO as a sole administrative support function for technology management but as a responsible driver and co-ordinator for the innovation outside-in process that needs to become well-embedded into the innovation process (Schiele, 2007). In this vein, this study's results potentially serve as an input for the further development of purchasing maturity models (e.g. Schiele, 2007).

With regard to the managerial resource based view, the study illustrates how the PO, if considered as an internal organisational resource, can be further developed into a VRIO resource that cannot directly be copied by competitors. The devised structure of causal explanation further integrates a dynamic element, as it is in general open to integrate new insights that are devised over time and in a different context. In this way, the devised structure of causal explanation fulfils the requirement of the dynamic capability based view that targets achieving and maintaining competitive advantage over time. Additionally, the identified Enabling Factors contain the dynamic element as postulated by the dynamic capability based view. For example, the study suggests that External Interconnectedness ensures access to innovation networks which lead to the generation of knowledge, cross-fertilisation and tapping of innovations. This causal mechanism clearly works over time

and does not reflect a static element that only works at a specific given point in time that can merely lead to temporary competitive advantage.

Subject to absorptive capacity in SMEs (Brunswicker & van de Vrande, 2014; Cohen & Levinthal, 1990; Parida, 2012; Wang & Ahmed, 2007), academic research should view a professionalised PO, beside R&D and marketing, as third element of the innovation process. The basic argument of this viewpoint is that a professionalised PO is, based on its gained technological, managerial and leadership skills of the PO members, ideally suited for the co-ordination of the outside-in innovation process (March, 1991; Nelson & Winter, 1982). Meanwhile, R&D, marketing and purchasing should act as receptors of market opportunities in an environment characterised by short innovation-cycles and uncertainty (Cohen & Levinthal, 1990). The PO can ensure, as a direct interface to the network of innovation suppliers, early access to the latest technologies through appropriate relationship management activities to innovation suppliers. With respect to potential communication problems between R&D and marketing, a professionalised PO can ensure the structured transfer of the latest external technology information to both organisational units. The structured distribution of the latest technology information and complementary expertise continuously accumulates the shared background knowledge or knowledge overlap between R&D, marketing and purchasing. As prior accumulated knowledge is a condition for learning, knowledge assimilation and exploitation (Cohen & Levinthal, 1990; von Weizäcker, 1974), a professionalised PO, if well-embedded into the innovation outside-in core process, facilitates the joint process of sensing, seizing and transformation of market opportunities (Argote & Ren, 2012, Ridder, 2011, Teece, 2007). The improvement of linkages between R&D and marketing combined with the joint sensing, seizing and transformation of market opportunities can be expected to increase an SI's adaptive capacity (Cohen & Levinthal, 1990; Henderson & Clark, 1990; Nelson & Winter, 1982). As a greater absorptive capacity makes an SI more sensitive concerning emerging technologies (Cohen & Levinthal, 1990), the integration of the PO into the outside-in process increases the likelihood that SIs recognise emerging technological opportunities, that potentially result in new system architectures or even disruptive innovations, early (Katz & Allen, 1982; Henderson & Clark, 1990). Because of this, academic research should view, especially in the context of SMEs with high dependency on innovation supplier combined, the PO's role as major contributor to achieve and maintain a suitable level of an SI's absorptive capability. As absorptive, adaptive and innovative capabilities are interrelated, the effective integra-

tion of the PO should strengthen the overall SI's adaptive and innovative capabilities (Wang & Ahmed, 2007).

### 6.3.2 Practical managerial implications

Based on the intensive research approach, the study was concerned with the question 'why' the identified Enabling Factors potentially increase the PO's capability of generating valuable outside-in innovations. This is important, as managerial models cannot simply be transferred between different companies. The understanding of the underlying function principle of Enabling Factors is especially important for purchasing executives who wish to use the study results for their purposes. The study further explored relationships between the Enabling Factors identified in the real-life context of Loewe's PO. The following sub-chapter dwells on related implications concerning the EFs identified and appropriate definition of the purchasing role in the context of outside-in innovation management.

#### 6.3.2.1 Implications concerning the identified EFs

The findings suggest 'EF3: Management Commitment to the PO' as the main condition for EF6: 'Degree of Professionalisation of the PO' - in line with Schiele's (2010) findings. Therefore, this study suggests that executive management needs to carefully consider and define the PO's expected role in the context of outside-in innovation management. On the other hand, purchasing executives should actively engage in a dialogue with executive management in order to consciously define the future expected role of the PO in the context of innovation management. Respective considerations have to be expressed by a clear description of the innovation process with purchasing responsibility and where PO responsibility is not already a board member function, at least a 'direct reporting line to executive management'. In addition, Management Commitment is realised when the executive management shows a general positive attitude to purchasing integration into the innovation process. This requires that the PO be equipped with sufficient financial and personal resources. Furthermore, executive management is expected to comply with the agreed innovation process. The study further suggests that EF6: Degree of Professionalisation of the PO forms the pre-condition for EF1: External Interconnectedness, EF2: Preferred Customer status Process, EF4: External Interconnectedness, and EF5: Early Integration into Product Planning. This can be reasoned as a professionalised PO reflects a high level of maturity related to (a) the PO member's commitment to take over a responsible driver and co-ordinator role for the innovation outside-in management and (b) sufficient expertise that

enables the PO members to fulfil the said role as co-ordinator and driver. This implies not only a general willingness to learn, leadership skills, and detailed knowledge about the procurement market but also sound technical and management knowledge. It can be concluded that PO members who fulfil the said requirements become accepted stakeholders in the outside-in innovation process. Subject to innovation suppliers, sound management knowledge is suggested as a necessary condition for purchasing marketing activities, as medium-sized SIs often have to convince innovation suppliers about the benefits of a strategic partnership. Therefore, technical knowledge is a necessary but not sufficient condition for the co-ordination of outside-in innovations. Further focus should be on the issue whether implemented innovation management tools are actually applied or practised by innovation stakeholders. IMS tools have to ensure easy stakeholder access that allows pragmatic submission and monitoring of the specific Open Innovation subjects.

#### 6.3.2.2 Appropriate definition of the ‘purchasing role’

The study results suggest that purchasing executives should actively engage in a dialogue with the executive management in order to consciously define the future appropriate role of the PO in the context of innovation management. A shared understanding between executive management and purchasing management facilitates all related subsequent discussion, for example in terms of financial/personnel resource staffing of the PO or the Early Integration into Product Planning. However, the PO needs to attain a sufficient maturity level to become an accepted partner for internal and external innovation stakeholders, like R&D and marketing. Therefore, purchasing practitioners who wish to engage actively in the innovation process should concentrate their efforts first on the attainment of a high Degree of Professionalisation of the PO. Due to the importance of EF6: Degree of Professionalisation of the PO, the SI should audit the maturity profile of the PO at first and decide on necessary measures to advance the maturity of the PO so that the required Degree of Professionalisation of the PO can be gained. Schiele (2007) suggests a respective audit scheme to identify the gained maturity of the PO. In a second step, focus should be given to achieving External and Internal Interconnectedness (external, internal), the Early Integration into Product Planning and the introduction and application of the Preferred Customer status Process. Besides the willingness to take over the driver and co-ordinator role for the innovation outside-in process, also the general ability of the PO members to drive and co-ordinate the innovation outside-in core process is a necessary condition. If necessary, training activities need to be defined and realised for current PO members. Addition-

ally, if employee development does not lead to sufficient overall maturity, sufficient qualified External purchasing Experts should be hired.

## 6.4 Limitations and future research

### 6.4.1 Limitations

The main target of this research was to identify Enabling Factors subject to the PO's effective integration into the innovation process. As mentioned above, organisational effectiveness is represented by the generation of valuable outside-in innovations that are co-ordinated and driven by the PO. Due to the state of managerial research in the field of the Purchasing Organisation and Open Innovation management, the exploratory phase of this study was carried out on the example of a medium-sized company of the consumer electronics industry. In order to obtain initial insights as to the generalisability of the findings to a wider context, further purchasing Experts who have working experience in other SIs with high supplier dependency were integrated into this study. In this process, study findings that were based on qualitative data collected at Loewe were substantiated with simple descriptive statistical techniques. This means that an interested audience, who only believe in a sole reductionist and inferential approach like confirmatory factor analyses and/or the multivariate analysis approach (Backhaus, Erichson, Plinke & Weiber, 2010), will possibly not be satisfied with the research findings as their understanding of reliability, validity and generalisability might not be met. It is obvious that reductionist requirements can be hardly achieved with one given research unit and its limited number of employees in the Purchasing Organisation. Anyway, as a moderate relativist and with professional experience of more than twenty years in the PSM field, it is apparent that research in social science needs to be context related, especially in the case of a research topic still being in an early research phase. It is further argued that the first matter of interest in practical and academic management research should be to understand the structure and context of a specific management issue. In this vein, management research can only give real insights to an interested audience when its focus is to generate knowledge about specific mechanisms and conditions which can cause events to be viewed as phenomenon (Sayer, 1992, 2000). A further aspect is that the DBA thesis will contribute to practical knowledge. This aim, in turn, necessitated that a specific company context be selected. Otherwise, it would not have been

possible to devise, for the specific research unit, appropriate strategic measures suited to the PO's effective integration into the innovation process.

### 6.4.2 Future research

This study provides manifold opportunities for future research in the research domain of purchasing involvement into the new product development process. For example, as this study confirmed initial insights as to the generalisability of the identified Enabling Factors, a comparative case study approach could explore in more detail whether the suggested pattern of Enabling Factors, drivers and causal mechanism also apply to other SIs (Yin, 2009). A further comparative case study approach could be concerned with the research question why a certain PO is potentially more successful to generate valuable outside-in innovations than another PO. In addition, a case study's main objective could be the examination of rival theories which are in contrast to the propositions examined in the initial research project (Saunders, 1992; Yin, 2009). Based on an overall objective of a company X to organise the process more effectively to recognise and catch diffuse innovations/technologies (Thomas et al., 2000, 2011), theoretical findings of this study could also serve as a starting point of an action research project that applies the suggested Enabling Factors and drivers to improve the integration of the PO into the innovation management process (Valsa, 2005; Borda, 2008; Reason & Bradbury, 2008). This approach applies the principles of organisational learning theory introduced above. In action research projects, selected company members act as co-researchers and work together as an inquiry group which operates in cycles of action and reflection (Reason & Bradbury, 2008). The epistemological background of related co-operative inquiry is that it draws on the team-members' experiential, presentational, propositional, and practical knowledge (Reason and Bradbury, 2008). Reductionists might use the outlined relationship model (sub-chapter 4.3.10.9) as a starting point for a large survey strategy and structural equation modelling analysis, like the partial least square technique (Chin & Newsted, 1999; Henseler, Ringle & Sinkovics; 2009). The identified drivers could serve as formative factors that build the basis for a measurement model (Backhaus *et al.*, 2010). At this point it needs to be emphasised that the utilisation of advanced statistical methods is not in conflict with moderate relativism as long as the generated statistical findings are not considered as predictive, subject to certain events. As partial least square analysis already generates robust results with small samples (Chin & Newsted, 1999; Henseler *et al.*, 2009), it can potentially be applied, in a subsequent step, as a

subordinate explanatory analysis tool to substantiate (or not) the findings of previous qualitative data analysis. Given further research opportunities, each of the identified Enabling Factors could be subject to more detailed research. For example, the exploration of cultural factors in the context of an SI's External Interconnectedness could be an interesting research objective. Dependent upon the preferred customer approach, future research could explore factors that make a medium-sized SI attractive to a multinational company and/or innovation suppliers more deeply. To resolve potential interface problems of R&D and marketing, academic research could focus on the contribution of the PO as the third element of the innovation process.

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# Annex I Overview of selected publications

Legend: HS = Hand Search / DBS = Data Base search

| Search strategy | | Author | Title | Method | Enabling Factors (= themes) |
|---|---|---|---|---|---|
| HS | DBS | | | | |
| X | | Sammerl (2006)<br><br>Type: Thesis | The capability to innovate and advantage in competition. (Innovationsfähigkeit und nachhaltiger Wettbewerbsvorteil) | Survey-strategy quantitative data, research utilising CFA/PLS. | • Degree of Professionalisation of the PO (learning-orientation)<br>• Degree of Open-minded Realtions based on Trust (Innovation culture) |
| X | | Fuhl (2006)<br><br>Type: Thesis | The Influence Factors of Dynamic Capabilities. The Case of Innovation Speed at Korean Electronics Companies | Case study of two Korean MNCs | • Preferred customer status<br>• External Interconnectedness |
| | X | Luzzini and Ronchi (2011)<br><br>Type: Journal Article | Organising the purchasing department for innovation | Case study. Purposive sample: 7 highly innovative companies. | • Customer status<br>• Innovation Management System<br>• Management Commitment<br>• External Interconnectedness<br>• Internal Interconnectedness<br>• Degree of Professionalisation |
| | X | Calvi, Johnsen and Philips | Purchasing and Supplier Involve- | Literature Review (narra- | • Customer status |

| | | | | | |
|---|---|---|---|---|---|
| | | (2011).<br><br>Type: Journal Article | ment in Discontinuous Innovation: A Literature Review. | tive) | • Management Commitment<br>• Innovation Management System<br>• Early Integration<br>• External Interconnectedness<br>• IDegree of Open-minded Relations based on Trust |
| | X | Matthyssens, Quintens and Faes (2003).<br><br>Type: Conference Paper | The process of global purchasing: Critical success factors and supplier impact | Multiple case study.<br><br>In depth interview of eight companies. Data triangulation. | • External Interconnectedness<br>• Early Integration<br>• Customer status<br>• Degree of Open-minded Relations based on Trust |
| | X | Petersen, Handfield and Ragatz (2003)<br><br>Type: Journal Article | A Model of Supplier integration into new product development. | Quantitative study based on case studies of 17 Japanese and American manufacturing organisations. SME/CFA, | • Early Integration<br>• Customer status<br>• Degree of Professionalism<br>• Internal Interconnectedness<br>• Management Commitment<br>• Innovation Management System<br>• External Interconnectedness<br>• Degree of Open-minded Relations based on Trust |
| | X | Gonzalez-Padron (2008) | Exploiting innovative opportunities in global purchasing: An assessment of | Quantitative/ CFA /SME based on a survey of 200 | • Internal Interconnectedness<br>• Degree of Professionali- |

| | | | | | |
|---|---|---|---|---|---|
| | | Type: Journal Article | ethical climate and relationship performance | MNC | sation of the PO (learning orientation)<br>• Degree of Open-minded Relations based on Trust |
| X | | Schumacher; Sven, Schiele, Contzen and Zachau (2008)<br><br>Type: Special Book | The 3 factors of purchasing – strategic positioning of the Purchasing Organisation and Suppliers (Die 3 Faktoren des Einkaufs – Einkauf und Lieferanten strategisch positionieren) | Consortial-Benchmarking | • Internal Interconnectedness<br>• Management Commitment to the PO<br>• Preferred customer status<br>• Early Integration of the PO into product planning<br>• Degree of Professionalisation of the PO<br>• Degree of Open-minded Relations based on Trust (relationship quality) |
| X | | Locker (1999)<br><br>Type: Thesis | Co-operation of R and D and Purchasing (Zusammenarbeit von F and E und Beschaffung) | Qualitative – based on practical problems of 20 companies. | • Internal Interconnectedness<br>• External Interconnectedness |
| X | | Boutellier and Wagner (2009)<br><br>Type: Book | Innovation: what is the role of procurement<br><br>Innovation: welche Rolle spielt die Beschaffung, 2009, Verlag SVME) | Case-study of 17 companies | • Internal Interconnectedness<br>• External Interconnectedness<br>• Degree of Professionalisation<br>• Innovation Management System |

| | | | | | |
|---|---|---|---|---|---|
| | X | Phillips, Noke, Bessant. and Lamming (2006b). Type: Journal Article | Beyond the steady state: Managing discontinuous product and process innovation. | Qualitative, 4 Case study, action research | • Management Commitment<br>• Internal Interconnectedness<br>• Early Integration<br>• External Interconnectedness |
| | X | Schiele, Veldman and Hüttinger (2011)<br><br>Type: Journal Article | Supplier Innovativeness and Supplier Pricing: The Role of Preferred Customer Status | Testing of hypotheses (significant relation of preferred customer status and supplier innovativeness) | • Management Commitment<br>• Degree of Professionalism<br>• External Interconnectedness<br>• Customer status<br>• Degree of Open-minded Relations based on Trust |
| | X | Monczka and Petersen (2012)<br><br>Type: Conference Paper | Accelerating Innovation through Effective Supplier Collaboration | Survey/ 60 interviews at five multinational companies across nine business units and their innovation suppliers.<br><br>- | • Early Integration<br>• Innovation Management System<br>• Preferred customer status<br>• Degree of Open-minded Relations based on Trust |
| | X | Bresmann (2002)<br><br>Type: Journal | External Sourcing of core technologies and the Architectural Dependency of Teams | 92 semi-structured (5 point-Likert scale) interview of pharma corpora- | • Internal Interconnectedness<br>• Innovation Management System |

| | | | | | |
|---|---|---|---|---|---|
| | | Article | | tions over two years. Quantitative analysis. | |
| | X | Seidler-de Alwis and Hartmann (2008)<br><br>Type: Journal Article | The use of tacit knowledge within companies: knowledge management in innovative enterprises | Archival research Interpretive. | • Early Integration<br>• Degree of Professionalism<br>• External Interconnectedness<br>• Innovation Management System<br>• Management Commitment<br>• Internal Interconnectedness<br>• Degree of Open-minded Relations based on Trust |
| | X | Glock and Hochrein (2011)<br><br>Type: Journal Article | Purchasing Organisation and Design: A Literature Review | Content analysis.<br><br>Literature review of 85 papers. | • Innovation Management System<br>• Early Integration<br>• Management Commitment<br>• External Interconnectedness<br>• Internal Interconnectedness<br>• Degree of Professionalism |
| | X | Nijssen, Biemans and de Kort | Involving purchasing in new product development | Exploratory. Telephone interviews of Purchasing | • External Interconnectedness<br>• Internal Interconnected- |

| | | | | | |
|---|---|---|---|---|---|
| | | (2002)<br><br>Type: Journal Article | | Managers and NPD managers of 43 firms. Questionnaire based on 5 point Likert-Scale. Quantitative Analyses. | ness<br>• Management Commitment<br>• Degree of Professionalisation<br>• Early Integration |
| X | | Boutellier, Gassmann and von Zedtwitz (2007).<br><br>Type: Special Book | Managing Global Innovation: Uncovering the Secrets of Future Competitiveness | Case study of 18 MNC | • External Interconnectedness |
| | X | Bessant; von Stamm; Moeslein, Neyer (2010)<br><br>Type: Journal Article | Backing outsiders: selection strategies for discontinuous innovation | Qualitative Date of 150 firms across 12 countries Interpretative | • Degree of Professionalisation of PO<br>• Early Integration into PP<br>• External Interconnectedness<br>• Management Commitment<br>• Innovation Management System |
| | X | Dooley and O'Sullivan (2007)<br><br>Type: Journal Article | Managing within distributed networks | Case Study | • Management Commitment<br>• External Interconnectedness<br>• Innovation Management System<br>• Degree of Open-minded Relations based on Trust |
| | X | Ussahawanitchakit | Organisational learning and inno- | Survey / Fac- | • Professionalisation degree |

| | | | | | |
|---|---|---|---|---|---|
| | | (2011)<br><br>Type: Journal Article | vation: Evidence from electronics business in Thailand | tor-Analyses | • Degree of Open-minded Relations based on Trust |
| | X | Colombo, Dell'Era and Frattini (2011).<br><br>Type: Journal Article | New Product Development (NPD) Service Suppliers in Open Innovation Process: Processes and Organisation for knowledge exchange and integration | Multiple case study | • Degree of Open-minded Relations based on Trust |
| | X | Huang and Rice (2013)<br><br>Type: Journal Article | Does Open Innovation work better in regional clusters? | Quantitative Analysis based on survey data | • External Interconnectedness<br>• Degree of Professionalism<br>• Degree of Open-minded Relations based on Trust |
| | X | Handfield, Ragatz, Petersen and Monczka (1999)<br><br>Type: Journal Article | Involving Suppliers in New Product Development | Mixed method: Case study of 17 manufacturing organisations/survey results of 134 companies | • External Interconnectedness<br>• Customer status<br>• Degree of Professionalisation |
| | X | Hult; Hurley | Organisational | Analysis of | • Innovation Management |

| | | | | | |
|---|---|---|---|---|---|
| | | Giunipero, Nichols (2000).<br><br>Type: Journal Article | Learning in Global Purchasing: A Model and Test of Internal Users and Corporate Buyers | quantitative survey data | System<br>• Early Integration<br>• Degree of Professionalisation<br>• Internal Interconnectedness<br>• Degree of Open-minded Relations based on Trust |
| | X | Hurley. and Hult, (1998)<br><br>Type: Journal Article | Innovation, Market Orientation, and Organisational Learning: An integration and Empirical Examination | Testing of hypotheses based on quantitative data. | • Degree of Professionalisation<br>• External Interconnectedness |
| | X | Lakemond, Berggren and van Weele(2006)<br><br>Type: Journal Article | Co-ordinating supplier involvement in product development projects: a differentiated coordination typology | Case studies | • Customer status<br>• Degree of Professionalisation |
| | X | Phillips, Lamming, Bessant, Noke (2006a).<br><br>Type: Journal Article | Discontinuous innovation andsupply relationships: strategic alliances | Case study of 7 firms | • Innovation Management System<br>• Internal Interconnectedness<br>• Early Integration<br>• External Interconnectedness<br>• Degree of Open-minded Relations based on Trust |
| | X | Pressey, Winklhofer and | Purchasing practices in small to | Mixed method qualita- | • External Interconnected- |

| | | | | | |
|---|---|---|---|---|---|
| | | Tzokas (2009)<br><br>Type: Journal Article | medium-sized enterprises: An examination of strategic purchasing adoption, supplier evaluation and supplier capabilities | tive→quantitative (survey-strategy) | ness |
| | X | Schiele (2007) | Supply-management maturity, cost savings and purchasing absorptive capacity: Testing the procurement–performance link | Testing of hypotheses based on audit results of 14 firms | • Internal Interconnectedness<br>• Management Commitment<br>• Degree of Professionalisation |
| | X | Schiele (2010)<br><br>Type: Journal Article | Early supplier integration: the dual role of purchasing in new product development | Survey consortial benchmarking of six best-practice firms | • Management Commitment<br>• Early Integration<br>• External Interconnectedness<br>• Innovation Management System<br>• Internal Interconnectedness<br>• Degree of Open-minded Relations based on Trust |
| | X | Yeow and Edler(2012)<br><br>Type: Journal Article | Innovation procurement as projects | Case study | • Early Integration<br>• Degree of Professionalisation<br>• Innovation Management System<br>• Internal Interconnected- |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | ness |

## Annex II Semi-structured interview form

**Research Topic:**

# EXPLORING ENABLING FACTORS FOR PURCHASING INTEGRATION INTO THE INNOVATION PROCESS IN A GERMAN MEDIUM-SIZED SYSTEM INTEGRATOR OF CONSUMER ELECTRONICS PRODUCTS

This research is being conducted in accordance with the guidelines of the Handbook of Research Ethics of the University of Gloucestershire. The research plan has been approved by the University, but the contents and opinions expressed in this research instrument are those of the researcher and in no way represent those of the University of Gloucestershire.

Interviewee:

Interview date:

Planned time:

Actual time:

Location: Loewe, E35

Interviewer: Ralf Vogt

**Topic area 1: External Interconnectedness**

Question 1.0

Do you see a connection between the interconnectedness of the PO with relevant procurement markets and the PO's capability to generate valuable outside-in innovations for the SI?

Answer: …

Question 1.1

Concerning question 1.0: what are the possible reasons for a connection (→mechanism)?

Answer: …

Question 1.2

Concerning question 1.0: what is helpful or conducive to the PO? (→condition/driver)

Answer: …

Question 1.3

How can you recognise this in daily working practice? (→ Events)

Answer: …

Question1.4

Concerning question 1.0: what hinders or is obstructive for the PO? (→liabilities/inhibitor)

Answer: …

Question 1.5

How can you recognise what hinders the PO in daily practice? (→ Events)

Answer: …

Question 1.6: please rate this statement:

If there is a high level of External Interconnectedness, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

| strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|
| | | | | | | |
| TENDENCY CONFIRMED | | | TENDENCY NOT CONFIRMED | | | |

**Topic area 2: Customer status**

Question 2.0

Do you see a connection between the PO's status at the supplier (preferred customer/non-preferred customer status) and the PO's capability to generate valuable outside-in innovations for your company?

Answer: …

Question 2.1

Concerning question 2.0: what are possible reasons for a connection (→ mechanism)?

Answer: …

Question 2.2

Concerning question 2.0: what is helpful or conducive for the PO? (→conditions/driver)

Anwer: …

Question 2.3

How can you recognise this in daily working practice? (→ Events)

Answer: …

Question 2.4

Concerning question 2.0: what hinders or is obstructive for the PO? (→liabilities/inhibitor)

Answer: …

Question 2.5

How can you recognise what hinders the PO in daily practice? (→ Events)

Answer: …

Question 2.6: please rate this statement:

If the purchasing function establishes an assessment process concerning the actual and prospective preferred customer status granted by the supplier, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

| strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|
| | | | | | | |
| TENDENCY CONFIRMED | | | TENDENCY NOT CONFIRMED | | | |

**Topic area 3: Management Commitment to the PO**

Question 3.0

Do you see a connection between the Management Commitment to the PO and the PO's capability to generate valuable outside-in innovations for your company

Answer: …

Question 3.1

Concerning question 3.0: what are possible reasons for a connection (→ mechanism)?

Answer: …

Question 3.2

Concerning question 3.0: what is helpful or conducive for the PO? (→conditions/driver)

Answer: …

Question 3.3

How can you recognise this in daily working practice? (→ Events)

Answer:

Question 3.4

Concerning question 3.0: what hinders or is obstructive for the PO? (→liabilities/inhibitor)

Answer: …

Question 3.5

How can you recognise what hinders the PO in daily practice? (→ Events)

Answer: …

Question 3.6: please rate this statement:

If there is a high level of Management Commitment to the purchasing function, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

| strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|
| | | | | | | |
| TENDENCY CONFIRMED | | | TENDENCY NOT CONFIRMED | | | |

**Topic area 4: Internal Interconnectedness**

Question 4.1

Do you see a connection between the Internal Interconnectedness of the PO with product defining and developing departments (Marketing, R&D) and the PO's capability to generate valuable outside-in innovations for your company?

Answer: …

Question 4.1

Concerning question 4.0: what are possible reasons for a connection (→mechanism)

Answer: …

Question 4.2

Concerning question 4.0: what is helpful or conducive for the PO? (→conditions/driver)

Answer: …

Question 4.3

How can you recognise this in daily working practice? (→ Events)

Question 4.4

Concerning question 4.0: what hinders or is obstructive for the PO? (→liabilities/inhibitor)

Answer: …

Question 4.5

How can you recognise what hinders the PO in daily practice? (→ Events)

Answer: …

Question 4.6: please rate this statement:

If a high level of Internal Interconnectedness is achieved by the purchasing function, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

| strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | Disagree | strongly disagree |
|---|---|---|---|---|---|---|
| | | | | | | |
| TENDENCY CONFIRMED | | | TENDENCY NOT CONFIRMED | | | |

**Topic area 5: Early Integration of the PO into product planning**

Question 5.0

Do you see a connection between the internal Early Integration of the PO into the product planning and the PO's capability to generate valuable outside-in innovations for your company?

Answer: …

Question 5.1

Concerning question 5.0: what are possible reasons for a connection (→ mechanism)?

Answer: …

Question 5.2

Concerning question 5.0: what is helpful or conducive for the PO? (→conditions/driver)

Answer: …

Question 5.3

How can you recognise this in daily working practice? (→ Events)

Answer: …

Question 5.4

Concerning question 5.0: what hinders or is obstructive for the PO? (→liabilities/inhibitor)

Answer: …

Question 5.5

How can you recognise what hinders the PO in daily practice? (→ Events)

Answer: …

Question 5.6: please rate this statement:

If the purchasing function is integrated early into the product planning process, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

| strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|
| | | | | | | |
| TENDENCY CONFIRMED | | | TENDENCY NOT CONFIRMED | | | |

**Topic area 6: Degree of Professionalisation of the PO**

Question 6.0

Do you see a connection between the internal Early Integration of the PO into the product planning and the PO's capability to generate valuable outside-in innovations for your company?

Answer: …

Question 6.1

Concerning question 6.0 what are possible reasons for a connection (→ mechanism)?

Answer: …

Question 6.2

Concerning question 6.0: what is helpful or conducive for the PO? (→conditions/driver)

Answer: …

Question 6.3

How can you recognise this in daily working practice? (→ events)

Answer: …

Question 6.4

Concerning question 6.0: what hinders or is obstructive for the PO? (→liabilities/inhibitor)

Answer: …

Question 6.5

How can you recognise what hinders the PO in daily practice? (→ events)

Answer: …

Question 6.6: please rate this statement:

If the purchasing function has gained a high Degree of Professionalisation, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

| strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|
| | | | | | | |
| TENDENCY CONFIRMED | | | TENDENCY NOT CONFIRMED | | | |

**Topic area 7: Innovation Management System**

Question 7.0

Do you see a connection between a companywide accepted and practised Innovation Management System and the PO's capability to generate valuable outside-in innovations for your company?

Answer: …

Question 7.1

Concerning question 7.0: what are possible reasons for a connection (→ mechanism)?

Answer: …

Question 7.2

Concerning question 7.0: what is helpful or conducive for the PO? (→conditions/driver)

Answer: …

Question 7.3

How can you recognise this in daily working practice? (→ events)

Answer: …

Question 7.4

Concerning question 7.0: what hinders or is obstructive for the PO? (→liabilities/inhibitor)

Answer: …

Question 7.5

How can you recognise what hinders the PO in daily practice? (→ Events)

Answer: …

Question 7.6: please rate this statement:

If there is a company-wide accepted and practised Innovation Management System in place, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

| strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|
| | | | | | | |
| TENDENCY CONFIRMED | | | TENDENCY NOT CONFIRMED | | | |

**Topic area 8: Relations with stakeholders**

Question 8.0

Do you see a connection between Open-minded Relations based on Trust among the stakeholders of the innovation process and the PO's capability to generate valuable outside-in innovations for your company?

Answer: …

Question 8.1

Concerning question 8.0: what are possible reasons for a connection (→ mechanism)?

Answer: …

Question 8.2

Concerning question 8.0: what is helpful or conducive for the PO? (→conditions/driver)

Answer: …

Question 8.3

How can you recognise this in daily working practice? (→ events)

Answer: …

Question 8.4

Concerning question 8.0: what hinders or is obstructive for the PO? (→liabilities/inhibitor)

Answer: …

Question 8.5

How can you recognise what hinders the PO in daily practice? (→ Events)

Answer: …

Question 8.6: please rate this statement:

If there is a high degree of Open-minded Relations based on Trust among the stakeholders of the innovation process, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

| strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|
| | | | | | | |
| TENDENCY CONFIRMED | | | TENDENCY NOT CONFIRMED | | | |

**Topic area 9: Further facts from / remarks by the purchaser**

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# Annex III Overview of EFs, driver and causal mechanism

EF1: Driver 'External Interconnectedness (EI)'

| EF | Driver (DV) | RP | Selected quotes in English, translated from German DV (Driver), IH (Inhibitor), EV (Event) |
|---|---|---|---|
| EF1: EI | C1a1 Short spatial distance | P06 | (IH) = "Long distances to suppliers, because they are distributed all over the world" |
| | | P07 | (IH) = "Well, what is always difficult, by definition, is a) spatial distance (…)" [ |
| | C1a2 Good company image and –story | P05 | (DV) = "The company image is supportive" |
| | | P01 | (IH) = "A bad status, a negative image seen by the public" [ |
| | C1a3 Sufficient time resources for innovation outside-in management | P05 | (DV) = "To have the time to take care of the subject, (…) " |
| | | P03 | (IH) = "Too much internal, operative work that precludes visits by external suppliers and trade fair visits" |
| | C1a4 Integration into mid and long-term planning | P04 | (DV) = "Early supplier integration into the development process and, only with early supplier integration on the base of a strategic plan, for example, what I like to achieve within a period of 10 years, what do I want to have in 5 years, what to I want to achieve within 2 years, (…)". |
| | | P01 | (EV) ="No road map for new products and features" |
| EF1: EI | C1a5 Sufficient financial resources for innovation outside-in management | P05 | (DV)= "Necessary financial resources" |
| | | P02 | (EV) = "I can't see that we have (the PO) a concentrated and aligned road map. I need to do this almost in my leisure time, with my money in order to be able to be there (…)." |
| | C1a6 Domestic on-site support in case of cultural differences/language barriers | P04 | (DV) = If I like to have innovations out of certain procurement markets, I need the on-site support of native speakers who are aware which levers they need to pull, who have contact with the authorities, or with institutions, with universities but also with the respective suppliers in the respective country region. |
| | | P07 | (IH) = "Well, what are always difficult are, [….] different mind sets – dependent on the question of how you understand innovation, your approach is different. The fact that different cultures have a different understanding how to approach innovations also needs to be considered and, subsequently, I realise that there is indeed a different understanding and that the subsequent actions are different." |

EF1: Causal mechansim ‘External Interconnectedness (EI)’

| EF | Causal mechanism | RP | Selected quotes in English, translated from German |
|---|---|---|---|
| EF1: EI | Access to innovation networks leads to generation of knowledge, cross-fertilisation and tapping of innovations | P05 | “The reasons are, pretty simply, that you can only gain insights if you have access to the respective networks” |
| | | P03 | “To stay informed about the market, to tap into knowledge, and innovations from suppliers. A good network is important for purchasing in order to introduce the information” |

EF2: Driver ‘Preferred Customer status Process (PCP)’

| EF2 | Driver (DV) | RP | Selected quotes in English, translated from German DV (Driver), IH (Inhibitor), EV (Event) |
|---|---|---|---|
| EF2: PCP | C2a1 Attractive purchasing volume. | P03 | (IH) = “Small business volume is of little interest for the supplier” |
| | | P01 | (IH) = “Not to order only one product from the supplier, so that an SIgnificant turnover can be reached.” |
| | C2a2 Good company image and story. | P05 | (DV) = “To achieve a better customer status, to investigate the actual customer status, a good company presentation that gives an overview of existing, realised innovations and reference projects.” |
| | | P02 | (IN) = “Inhibitors are bad company news, like what we currently have. Product quality and status and the subsequent impact on product desirability are positive stimuli for end consumers.” |
| | C2a3 Good relationship-management to innovation supplier. | P04 | (DV) = “Regular meetings, not only project team meetings, but also organised brainstorming activities on a regular basis in co-operation with suppliers and their sub-suppliers concerning specific topics, regular on-site visits, in order to get a picture of how advanced a supplier is (concerning technologies)” |
| | | P07 | (DV) = “Therefore, your goal should be to enter into a rather long-term relationship” |
| EF2: PCP | C2a4 Integration into mid and long-term product planning. | P03 | (DV) = “To give a perspective of future business possibilities, (…), of course, I need to know my supplier – who is my supplier, how large is the supplier, what is the turnover, what are the strategic goals, what can I offer to convince the supplier to co-operate with us?“ |
| | | P05 | (IN) = “No road-map” |
| | C2a5 Sound (good) management skills . | P05 | (IH) = “Lack of education, unqualified purchasing members, e.g. concerning presentations.” |
| | | P02 | (DV) = “One needs to have a good command of presentation skills. As a purchaser you have to be also a good sales person. However, I pimp up the presentations myself”. |
| | C2a6 Real-life sys- | P07 | (DV) = “That means that it is important to figure out which innovations the supplier can offer, what is his market position, what is the |

| | | | |
|---|---|---|---|
| | tematic and value based supplier selection process. | | strategic orientation and on which grounds can a long term relationship be developed, so that a supplier's product can be integrated and used for our own product." |
| | | P01 | (IH) = "It is difficult when marketing and designing to fix the product features and these features cannot be realised from the given supply base." |

EF2: causal mechanism 'customer status process (PCP)'

| **Enabling Factor** | **Causal mechanism** | **RP** | **Selected quotes in English, translated from German** |
|---|---|---|---|
| EF2: (PCP) | A customer status process leads to prioritised resource allocation-passed by the supplier to the customer. | P06 | "To create central purchasing possibilities, to concentrate on a certain number of suppliers in order to increase the volume and subsequently to achieve a better customer status". |
| | | P07 | "Because, in my opinion if you are not able to generate innovations yourself, as we are talking about technological innovations, then you need to have a generator, a supplier, and you can only realise this on the condition that you have a close relationship." |

EF3: Driver 'Management Commitment (MC)'

| **EF** | **Driver (DV)** | **RP** | **Selected quotes in English, translated from German DV (Driver), IH (Inhibitor), EV (Event)** |
|---|---|---|---|
| EF3: MC | C3a1 – Clear process description with PO responsibility. | P04 | [DV] ="The management needs to show willingness to invest into processes, a clear concept, organisational models, suitable personnel, job and task descriptions of the Purchasing Organisation, (…) , suitable management reports, so that relevant information will not be lost due to certain interests of departments, it is of primary importance to have access to the relevant departments." |
| | | P05 | [IH] = "It is aggravating when you cannot find it (the innovation process] in any process description or when it is not part of the daily working routine. Superiors do not support, and possibly suggest an openly negative attitude (against the PO)" |
| | C3a2 Management shows positive attitude to the PO involvement in the innovation outside-in-process. | P06 | (DV) = "The management needs to back up a department, because its target is also to see independent proposals being initiated concerning new strategies and new technical solutions. That is also the task of purchasing: to look and generate for this (innovations, new techniques)." |
| | | P01 | [IH] ="If there is no Management Commitment, then it is difficult for purchasing to co-operate with other departments." |
| F3: MC | C3a3 – Management complies with agreed innovation process. | P02 | (DV) = It isn't absolutely necessary that the innovation tasks of the purchasing department will be made public, but it would be supportive if an innovation forum took place. There is a best practice, for example 3M, illustrating how management needs to deal with it. Not to ask killer phrases but to promote all ideas as potentially good ideas and to make sure that the ideas will be processed and that a lively discussion of the topics will happen […}. But often the way of think- |

| | | | |
|---|---|---|---|
| | | | ing of the management, is, in a way, "we do not need this, we can buy this as an innovation" and that is wrong. To bring an innovation forum to life and to take it seriously, like 3M, no killer phrases, to bring things alive. |
| | | P04 | (IH) = "If the management pays lip service to, the missing operational and organisational structures and related interfaces to other departments, a general attitude of being consequent in the daily working practice, for example, in case other departments do not comply with agreed approaches constitutes a lack of competence." |
| EF3: MC | C3a4 – Clear innovation strategy and innovation targets. | P06 | (IH) = "If you cannot recognise a clear strategy, if there is no clear direction from the management, then it is difficult to discuss and negotiate with partners, such as […]. Clear structures in purchasing in combination with clear management targets reduce the resource demand in purchasing and increase efficiency. |
| | | P07 | (IH) = "It is an obstacle when there is no commitment, well, to be innovative is always a good thing but if nobody knows what this actually means and how it is anchored within the organisation and, even if it is anchored, the issue of checking the maturity of innovation remains open" |
| EF3: MC | C3a6 – PO has direct reporting line to the top management. | P04 | (DV) = "There should be direct contact to the management board, that means that certain reports need to be directly addressed to the management board". |
| | | P03 | (EV) = "To have the possibility to give presentations to the management on a regular basis, in order to explain on which topics we are working, with which suppliers we have contact, what news there is, e.g., commodity management, to demonstrate what we are doing and what the added value for the company is." |

EF3: Causal mechanism 'Management Commitment (MC)'

| | | | |
|---|---|---|---|
| EF3: MC | Management Commitment authorises the PO and leads to acceptance by other stakeholders | P04 | "In practice, It is only possible to realise and further develop a theoretical system, if the management really wants the innovation process. This kind of topic can only function, if the purchasing function has the competence, as leader, to initiate certain topics and to check these topics throughout the process. " |
| | | P01 | "If there is no Management Commitment for the purchasing function, it will be difficult for the purchasing function to generate outside-in innovations or to put these approaches into the innovation process. Furthermore, there is the potential risk of not being accepted by others. If there is no Management Commitment, then it seems that it is not desired." |

EF4: Driver ‘Internal Interconnectedness’ (II)

| EF | Driver (DV) | RP | Selected quotes in English, translated from German DV (Driver), IH (Inhibitor), EV (Event) |
|---|---|---|---|
| EF4: II | C4a1 PO is accepted by other innovation stakeholder | P05 | (DV) – “To be accepted by other departments, of course the willingness for open exchange of information about a topic, the education level of the PO members.” |
| | | P02 | (EV) – “You can recognise this when, beyond the regular meetings, the personnel starts to exchange information, because they just have fun working on a subject.” |
| | C4a2 PO members willing to work in cross-functional teams | P04 | (IH) – “Daily problems, daily working processes, you need to motivate yourself to maintain certain network structures, also for topics that one does not like so much or other departments with whom the contact is not as good as with others.” |
| | | P07 | (DV) – “Well, it is conducive if you can manage, beyond existing functional structures, to collaborate on product development and product definition. To achieve this, you need team structures and, to take [….], as an example, because of the functional structure, in cases of doubt, you tend to utilise the official reporting line along the functional structure. If the top hierarchy is not able to make changes among themselves, then it will never happen on the operational level.” |
| | C4a3 Process orientation and short reporting decision lines | P03 | (IN) – “No possibilities for co-ordination, no project management, no contact” |
| | | P02 | (DV) – “Without lobbying, without inspiring people, it will not work. The culture of internal information exchange, also the way of internal communication is vitally important.” |
| | C4a4 Short spatial distances (between innovation stakeholders) | P03 | (IN) – “Long spatial distances between the departments, purchasing (Europe), Asia, distance to the development department in Spain. One should have the possibility for regular co-ordinating meetings. However, face to face contact is better, because a person can be better judged then.” |
| | | P06 | (DV) “Short spatial distance also internal, all relevant departments are close to each other, good network.” |
| | C4a5 Sufficient technical knowledge of PO members | P02 | (DV) – “It has proved that Internal Interconnectedness is an absolute necessity. Of course, this depends on how the individual purchaser can deal with this. That does not necessarily mean that he/she only needs to be sympathetic and sociable, but also that he/she can manage the topic from an intellectual point of view ([…), that he/she is able to judge, for example, quality issues or customer returns so that the purchaser can recognise deficits and possibly has to amend technical requirements. |
| | | P04 | (EV) – “Sometimes, one gets the responsibility to manage a certain range of tasks, for which I was last responsible, for example, five years ago.” |
| | C4a6 Sufficient (on-site) domestic support in case of | P05 | (IN) – “Language barriers between organisational units, if they sit too far away from each other, or if cultural differences need to be overcome.” |

| | | | |
|---|---|---|---|
| | cultural differences/language barriers | P07 | (DV) – "Helpful are, in any case, existing networks, because, if you do not have direct access to these networks or you are placed within the network, then you will be left behind." |

EF4: Causal mechanism 'Internal Interconnectedness'

| EF | Causal mechanism | RP | Selected quotes in English, translated from German |
|---|---|---|---|
| EF4: II | Internal Interconnectedness leads to a free flow of innovation related information between stakeholders' | P05 | "Because this is the only way to work together on a subject and to exchange information and, foremost, to learn from other departments on which innovation topics they are working on at the moment." |
| | | P02 | "It is important to have an open information policy. This is not always the case in our company, for example, if the access to the server locked or certain reports that are solely prepared and available for the executive management and not accessible for others." |

EF5: Driver 'Early Integration into Product Planning (EIP)'

| EF | Driver (DV) | RP | Selected quotes in English, translated from German DV (Driver), IH (Inhibitor), EV (Event) |
|---|---|---|---|
| EF5: EIP | C5a1 – Early PO involvement is common living practice | P05 | (DV) ="A general company-wide process that ensures the Early Integration and, of course, also the commitment of the product planning department, marketing, research and development, to integrate purchasing, so that it becomes a matter of course for us, no attempt to go-it alone. " |
| | | P01 | (DV) = "To be integrated from the first meeting on. |
| | C5a2 – Detailed product description are available | P07 | (DV) = "It is helpful, of course, to have, first of all, a product description that outlines what the product makes innovative, so that the product becomes marketable. Not only a description of the used case but a further detailed-level concerning the question what makes the product innovative. Then this is your chance to seek specifically into this direction and to contact respective suppliers." |
| | | P06 | (EV) = "Early co-ordination meetings, project-teams, early concepts so that the right suitable suppliers can be selected respectively and that different alternatives can be shown." |
| EF5: EIP | C5a4 – Ideas from purchasing members are desired. | P05 | (IH) = The fear that another department identifies earlier an innovation than the responsible department. |
| | | P02 | (DV) = "The formal organisation structure, if there is, not at all, the willingness to seriously consider the purchasing department as capable for this. This goes also into the direction of Management Commitment. It seems that this needs to be claimed by the management. Then the circle closes, is complete." |
| | C5a5 – Living systematic and value-based supplier se- | P03 | (IH) = "Unilateral approaches of the departments, R and D contacts suppliers without co-ordination with purchasing, direct agreements with suppliers without integration of purchasing." |
| | | P07 | (EV) = "If other departments start to co-operate independently with |

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|---|---|---|---|
| | lection process. | | certain suppliers, with which they have a relation, and start and drive, unauthorised, product developments." |

EF5: Causal mechansism 'Early Integration into Product Planning (EIP)'

| EF | Causal mechanism | RP | Selected quotes in English, translated from German |
|---|---|---|---|
| EF5 EIP | The Integration into product planning increases the knowledge of the purchasing function concerning required product features as a basis for the efficient/effective utilisation of supplier capabilities | P06 | "In order to look for suitable suppliers at an early stage, the Early Integration into the product planning process is quite important for the purchasing function. To recognise the market requirements, so that I can influence my colleagues to concentrate themselves on the market trends and not on "old things". This can best be achieved if the purchasing department is integrated into the product planning process right from the start" |
| | | P03 | "As purchaser, I have a network and do exactly know the strong points and limits of my suppliers. For this reason, I can recognise, at an early stage, whether we set up feasible or not feasible projects respectively can direct the other departments, in order to keep up my central purchasing structures and to approach my suppliers" |

EF6: Driver 'Degree of Professionalisation of the PO' (PDP)

| EF | Driver (DV) | RP | Selected quotes in English, translated from German DV (Driver), IH (Inhibitor), EV (Event) |
|---|---|---|---|
| EF6: PDP | C6a1 – Purchasing members have a detailed knowledge about supplier capabilities. | P05 | (DV) = "it is helpful to have a good overview of the market, about the technical possibilities, to have a basic technical understanding and a developed social behaviour." |
| | | P03 | (EV) = "Regular visits of trade fairs, trainings, to build up and maintain supplier relations." |
| | C6a2 – Sound (good) management knowledge. | P04 | (DV) = "That there is a constant focus to further develop the respective purchaser, this starts with language training and continues with creativity processes, negotiation techniques, integration of external partners, the maintenance of network relations, the development of organisation structures, self-management, leadership quality, that means, that the capability to lead is further developed." |
| | | P05 | (IH)= "A lack of education." |
| EF6: PDP | C6a3 – Sufficient technical knowledge. | P03 | (DV) = "The knowledge of the purchaser, you can recognise this on his/her behaviour, for example, whether he intensively deals with the things or he just does what he must do." … |
| | | P06 | (DV) = "Organisations with strategic purchasing, capable purchasers who build up a network, who have sufficient time to familiarise themselves with the commodity, so that you know from what you talk.<br>(EV) "to make, for certain technologies, a further education/training in order to build up relevant expertise in certain segments." |
| | C6a4 – | P05 | (EV) = "If one has the feeling to keep up with arguments, to be able |

| | | | |
|---|---|---|---|
| | Good leadership skills. | | to chair discussions, to be able to lead the discussions into a certain direction that is accepted by the others." |
| | | P04 | DV = "That continues with creativity processes, negotiation techniques, integration of external partners, the maintenance of network relations, the development of organisation structures, self-management, leadership quality, that means, that the capability to lead is further developed." |
| EF6: PDP | C6a5 – Sufficient time resources for outside-in management. | P03 | (IH) = "To take over operational tasks, to have only little time to familiarise and to collect informations." |
| | | P02 | (IH) = "(…), but it is also the question which tasks are attributed to purchasing, if the PO is only concerned with standard duties and the processing of administrative tasks and the PO is already well utilised, then there will be no sufficient time to go on business trips, to visit symposiums, to deal with specific topics in detail, that additionally inspires these innovation activities. The operational workload tends to increase, because you have no assistant, so that you have to do everything by yourself. Then you will absolutely not go to business trips or symposiums, because you have no time to do this." (EV) = "Regular trade fair visits, trainings, to maintain business contacts" |
| | C6a6 Willingness to learn. | P02 | (DV) = "And I must say, that I get the most information from the VDI news. That is compulsory reading." |
| | | P01 | (IH) = "Employees who do not improve their professional skills." |

EF6: Causal mechanism 'Degree of Professionalisation of the PO' (PDP)

| **EF** | **Causal mechanism** | **RP** | **Selected quotes in English, translated from German** |
|---|---|---|---|
| EF6: PDP | A high Degree of Professionalisation of the purchasing function enables the purchasing members to drive and coordinate the innovation outside-in process. | P05 | "At first, to be accepted, as contact person, by the other company and, of course, to be accepted by other internal company members of Marketing and R and D, who have a University degree, to keep up with others, to participate in discussions, to be accepted also for these kinds of topics." |
| | | P02 | "Innovations are not the simplest everyday tasks, but considering the degree of technology of our society, rather complex. To recognise innovations, to recognise interrelationships, connecting transfer thoughts, is not given to each and everyone, from the intellectual point of view. Well, if you require innovations from a clerk, it will be possibly more difficult, and, therefore, a purchaser needs to have a certain background combined with a good life experience. However, there are also natural talents, or somebody who studied at least, that is an essential and conducive factor. To consider purchasing solely as administration that is just responsible for the order processing, then purchasing will not be, for sure, the driver of the innovation process." |

EF7: Driver ‘Innovation Management System (IMS)’

| EF | Driver (DV) | RP | Selected quotes in English, translated from German DV (Driver), IH (Inhibitor), EV (Event) |
|---|---|---|---|
| EF7: IMS | C7a1 – Clear process description with purchasing responsibility. | P03 | (DV) = “A responsible person who takes care about the Innovation Management System and who drives it.” |
| | | P07 | (DV) = “It is helpful to exactly know, companywide, how innovation or the innovation process actually works, in the sense, who forwards which information, how will this information be collected, processed, used and selected or then integrated into the product creation process.” |
| | C7a2 – IMS tool ensures easy access and pragmatic submission and monitoring of innovation outside-in subjects. | P02 | (DV) = “It is certainly conducive, if you can quickly address the things. Well, if you look to our situation, if you have at first to search where you can find the application form for innovation management, where I can write down my idea, I have to search longer for this form than I actually can spend time. This has to be realised as a hot spot button in the intranet, even if might be a flashing lamp. A directory, into which I can contribute my thoughts.“ |
| | | P03 | (EV) = I don‘t know where to put. |
| EF7: IMS | C7a3 – Innovation process, tools are practiced by stakeholders. | P04 | (DV) = Executives who view innovation and respectively innovation management as part of their responsibility, accompanied by innovation processes, of organisation structures and, last but not least, of systems. |
| | | P01 | (DV) = “A precondition for the efficient and effective collection and processing of innovations is a lived Innovation Management System in the company.” |

F7: Causal mechanism ‘Innovation Management System (IMS)’

| EF | Causal mechanism | RP | Selected quotes in English, translated from German |
|---|---|---|---|
| EF7: IMS | A lived and pragmatic Innovation Management System (IMS) ensures the efficient and effective processing of outside-in innovations. | P03 | “A good company wide innovation management drives new technologies, and speeds up proposals. Management conclusions are not biased and independently of names and thus, new innovation approaches are pushed forward.” |
| | | P07 | "The company can only benefit from innovations if this process is systematically managed and not always happens by accident. Of course, innovations can come across by accident, this is very good, but this has nothing to do with an organised and systematic innovation process” |

EF8: Driver 'Open-minded Relations based on Trust (ORT)'

| EF | Driver (DV) | RP | Selected quotes in English, translated from German DV (Driver), IH (Inhibitor), EV (Event) |
|---|---|---|---|
| EF8: ORT | C8a1 Approachable and courteous nature of innovation stakeholders. | P03 | (IH) = "To be convinced of myself, in a way, I do not make errors, arrogance." |
| | | P07 | (IH) = If you have the feeling that your involvement is not desired, there is no forum for this kind of thing and people are not able to discuss this subject with each other. |
| | C8a2 Living cross-functional communication between innovation stakeholders. | P05 | (DV) = "If you have an atmosphere of openness and trust, it is easier for me to express my ideas even if they might be a little bit futuristic and do not necessarily fit into the current corporate image respectively do not fit the times, or, to think lateral and, I believe, that you will then have more of your own propulsion to engage yourself with all sorts of things, also from the organisational point of view". |
| | | P06 | (DV) = "A good relation to other departments, no aloofness, simple communication with each other, to meet each other on eye-level, to express openly what I think." |
| EF8: ORT | C8a4 process thinking (orientation) and short reporting decision lines. | P07 | (EV) = An event, on the example of (…), there was innovation management in the sense of giving an initial impetus, but there was, afterwards, no processing and, subsequently, nobody had knowledge whether somebody currently works on this topic, what is the status concerning the integration into the product creation process. That means that the control loop, starting from the idea, to the assessment of the idea, has never taken place ([…)]. |
| | | P03 | (IH) = "If you don't know whom to address concerning innovations." |
| | C8a5 Clear innovation strategy and innovation targets. | P02 | (DV) = Trainings, corporate goals, how does the company locate itself, strategic guidelines, to question these strategic guidelines from time to time. |
| | | P07 | (DV) = "At first, It is helpful, if all parties have the same understanding to consider innovation as an important matter and, in that respect, to deduct their actions. Furthermore, that the deducted actions are desired by the organisation. To create this framework and to have the possibility to interact with others and to improve the organisation's degree of innovation." |
| EF8: ORT | C8a6 Sufficient time resources for innovation outside-in management. | P04 | (DV) = "That purchasing can initialise approaches that enable the company to become successful on the mid and long-term, for example, innovation workshops […] |
| | | P05 | (IH) = "If one has too little time for maintenance of relations (…)" |

EF8: Causal mechanism ‘Open-minded Relations based on Trust (ORT)’

| **EF** | **Causal mechansim** | **RP** | **Selected quotes in English, translated from German** |
|---|---|---|---|
| EF8: ORT | Trust and open-minded relations activate non-biased/open exchange of information between stakeholders | P03 | “A good contact to other departments, no aloofness, simple way of communication with each other, on the same eye-level, to say openly what you want to say.” |
| | | P07 | “Innovations can only be recognised and promoted, if there is an open exchange of information. This is not merely a matter of the purchasing department, I have to say, this is also a topic of all involved departments.” |

## Annex IV Validation interview form (face validity - phase a)

**Research Topic:**

# EXPLORING ENABLING FACTORS FOR PURCHASING INTEGRATION INTO THE INNOVATION PROCESS IN A GERMAN MEDIUM-SIZED SYSTEM INTEGRATOR OF CONSUMER ELECTRONICS PRODUCTS

Validation Interview form

This research is being conducted in accordance with the guidelines of the Handbook of Research Ethics of the University of Gloucestershire. The research plan has been approved by the University, but the contents and opinions expressed in this research instrument are those of the researcher and in no way represent those of the University of Gloucestershire.

Interviewee:

Department: Purchasing

Company: Loewe

Interview date:

Planned duration: 90 minutes

Actual duration:

Location: Loewe, E35

Interviewer: Ralf Vogt

**Background**

Based on a detailed Literature Review and a series of semi-structured interviews conducted with strategic purchasing managers of the German TV set manufacturer Loewe, this study identified 8 Enabling Factors, 8 related causal mechanisms and 32 different drivers relevant for the effective integration of Loewe's PO into the innovation outside-in process.

Concerned with the previously identified Enabling Factors, related causal mechanism and drivers, this study intends to understand the level of achieved face validity with the research participants. For this reason, a structured interview form has been devised which will be completed during face-to-face interview meetings (parts A and B)

Furthermore, the study intends to identify direct relations between the Enabling Factors (part C).

**List of terms:**

| | | |
|---|---|---|
| EI | = | External Interconnectedness |
| EIP | | Early Integration of the PO into product planning |
| II | = | Internal Interconnectedness |
| IMS | = | Information Management System |
| MC | = | Management Commitment |
| OI | = | Open Innovation |
| PCP | = | Preferred Customer status Process |
| PDP | | Degree of Professionalisation of the PO |
| PO | = | Purchasing Organisation |
| Q | = | Question |
| SI | = | System Integrator |

**Topic area 1: External Interconnectedness (EI)**

**PART A**

Statement 1:

If there is a high level of External Interconnectedness, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

| strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| TENDENCY CONFIRMED | | | TENDENCY NOT CONFIRMED | | | |

➔ If tendency is confirmed: go to part B.
➔ If tendency is not confirmed: go to the next topic area.

**PART B**

Q2: Please rate the following sub-conditions.

The causal power 'External Interconnectedness' is supported by:

| | strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|---|
| Short spatial distance (to innovation suppliers) | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Good company image and story | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Sufficient time resources for innovation outside-in management | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Integration (of innovation suppliers) into mid and long-term product planning | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Sufficient financial resources for innovation outside-in management | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Domestic (on-site) support in case of cultural differences/language barriers | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Access to innovation networks leads to generation of knowledge, cross-fertilisation and tapping of innovations | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

Further comment:

**Topic area 2: Preferred Customer status Process (PCP)**

**PART A**

Statement 2:

If the purchasing function establishes an assessment process concerning the actual and prospective preferred customer status granted by the supplier, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

| strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| TENDENCY CONFIRMED | | | TENDENCY NOT CONFIRMED | | | |

➔ If tendency is confirmed: go to part B.
➔ If tendency is not confirmed: go to the next topic area.

**PART B**

Please rate the following sub-conditions.

The causal power 'Preferred Customer status Process' is supported by:

| | strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|---|
| Attractive purchasing volume | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Good company image and story | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Good relationship-management to innovation suppliers | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Integration into mid and long-term (product planning) | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Sound (good) management skills | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Living systematic / value-based supplier selection (process) | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| PCP process leads to prioritised resource allocation (passed by the supplier to the customer) | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

Further comment:

**Topic area 3: Management Commitment to the PO (MC)**

**PART A**

Statement 3:

If there is a high level of Management Commitment to the purchasing function, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

| strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| TENDENCY CONFIRMED | | | TENDENCY NOT CONFIRMED | | | |

➔ If tendency is confirmed: go to part B.
➔ If tendency is not confirmed: go to the next topic area.

**PART B**

Q2: Please rate the following sub-conditions.

The causal power 'Management Commitment' to the PO is supported by:

| | strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|---|
| Clear process description with PO-responsibility | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Management shows positive attitude to the PO involvement into the innovation outside-in-process | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Management complies with agreed innovation process | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Clear innovation strategy and innovation targets | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Management approves necessary resources (financial, personnel) | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| PO has direct reporting line to the top management | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| MC authorises the PO and leads to acceptance by other stakeholders | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

Further comment:

**Topic area 4: Internal Interconnectedness (II)**

**PART A**

Statement 4:

If a high level of Internal Interconnectedness is achieved by the purchasing function, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

| strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| TENDENCY CONFIRMED | | | TENDENCY NOT CONFIRMED | | | |

➔ If tendency is confirmed: go to part B.
➔ If tendency is not confirmed: go to the next topic area.

.

**PART B**

Please rate the following sub-conditions.

The causal power 'Internal Interconnectedness' is supported by:

| | strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|---|
| PO accepted by other innovation stakeholder | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| PO members (are) willing to work in cross-functional teams | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Process thinking (orientation) and short reporting/decision lines | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Short spatial distances (between innovation stakeholder) | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Sufficient technical knowledge of PO members | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Sufficient (on-site) domestic support in case of cultural differences/language barriers | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Internal Interconnectedness leads to free flow of innovation related information between stakeholder | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

Further comment:

| |
|---|
| |

**Topic area 5: Early Integration of the PO into product planning (EIP)**

**PART A**

Statement 5:

If the purchasing function is integrated early into the product planning process, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

| strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| TENDENCY CONFIRMED | | | TENDENCY NOT CONFIRMED | | | |

➔ If tendency is confirmed: go to part B.
➔ If tendency is not confirmed: go to the next topic area.

.

**PART B**

Please rate the following sub-conditions.

The causal power 'Early Integration' of the PO is supported by:

| | strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|---|
| Early PO involvement (integration) is common and living practice | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Detailed product descriptions (are available) | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Ideas from purchasing members are desired | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Purchasing members have detailed knowledge about supplier capabilities | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Living systematic and value-based supplier selection (process) | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| (The) Integration into product planning increases the knowledge of the purchasing function concerning required product features as basis for the efficient/effective utilisation of supplier capabilities | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

Further comment:

**Topic area 6: Degree of Professionalisation of the PO (PD)**

**PART A**

Statement 6:

If the purchasing function has gained a high Degree of Professionalisation, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

| Strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| TENDENCY CONFIRMED | | | TENDENCY NOT CONFIRMED | | | |

.

- ➔ If tendency is confirmed: go to part B.
- ➔ If tendency is not confirmed: go to the next topic area.

**PART B**

Please rate the following sub-conditions.

The causal power 'Degree of Professionalisation' of the PO is supported by:

| | strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|---|
| Purchasing members have a detailed knowledge about supplier capabilities | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Sound (good)management skills | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Sufficient technical knowledge | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Good leadership skills | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Sufficient time resources for innovation outside-in management | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Willingness to learn | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A high Degree of Professionalisation of the purchasing function enables the purchasing members to drive and co-ordinate the innovation outside in process. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

Further comment:

| |
|---|
| |

**Topic area 7: Innovation Management System (IMS)**

**PART A**

Statement 7:

If there is a companywide accepted and practiced innovation management-system in place, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

| strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| TENDENCY CONFIRMED | | | TENDENCY NOT CONFIRMED | | | |

➔ If tendency is confirmed: go to part B.
➔ If tendency is not confirmed: go to the next topic area.

.

**PART B)**

Please rate the following sub-conditions.

The causal power 'Innovation Management System' is supported by:

| | strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|---|
| Clear process description with purchasing responsibility | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Easy access and (pragmatic) submission, monitoring of innovation outside-in subjects | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Innovation process, tools are practiced by stakeholders | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| A real-life, pragmatic Innovation Management System (IMS) ensures the efficient and effective processing of outside-in innovations | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

Further comment:

| |
|---|
| |

**Topic area 8: Open-minded Relations based on Trust between innovation stakeholders (ORT)**

Statement 8:

If there is a high degree of Open-minded Relations based on Trust among the stakeholders of the innovation process, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

| strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| TENDENCY CONFIRMED | | | TENDENCY NOT CONFIRMED | | | |

➔ If tendency is confirmed: go to part B.
➔ If tendency is not confirmed: go to the next topic area.

.

**PART B**

Please rate the following sub-conditions:

The causal power 'Open-minded Relations based on Trust between innovation stakeholder' of the PO is supported by:

| | strongly agree | agree | somewhat agree | neither agree nor disagree (neutral) | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|---|
| Approachable and courteous nature of innovation-stakeholders | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Living cross-functional communication between innovation stakeholders | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Co-ordinated actions of innovation-stakeholders | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Process thinking (orientation) goes in line with short reporting and decision lines | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Clear innovation strategy and innovation targets | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Sufficient time resources for innovation outside-in management | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Trust and open-minded relations activate non-biased/open exchange of information between innovation stakeholder | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

Further comment:

| |
|---|
| |

# Annex IV Validation interview form (Exploration of direct relations between Enabling Factors – phase b)

Example: Statement 1: External Interconnectedness is directly linked to:

**Statement 1: External Interconnectedness is directly linked to:**

| | No direct linkage | as pre-condition of → | Interaction with ↔ | Depend. from ← | Comment/reason |
|---|---|---|---|---|---|
| External Interconnectedness | NA | NA | NA | NA | |
| the Preferred Customer status Process | ☐ | ☐ | ☐ | ☐ | |
| the Management Commitment | ☐ | ☐ | ☐ | ☐ | |
| the Internal Interconnectedness | ☐ | ☐ | ☐ | ☐ | |
| the Early Integration into product planning | ☐ | ☐ | ☐ | ☐ | |
| the Degree of Professionalisation of Purchasing | ☐ | ☐ | ☐ | ☐ | |
| An Innovation Management System | ☐ | ☐ | ☐ | ☐ | |
| Open-minded and Trustful relations | ☐ | ☐ | ☐ | ☐ | |

**Further facts / remarks of the purchaser concerning other factors:**

……

……

……

……

……

……

……

……

Thank you for participating in the interview and for your time!

# Annex V Validation results drivers and causal mechanisms

EF1: External Interconnectedness

| Interviewee / Driver /T/CM | P01 | P04 | P05 | P06 | P 07 | Average value | Accepted |
|---|---|---|---|---|---|---|---|
| Short spatial distance [to innovation suppliers] | 6 | 6 | 6 | 7 | 6 | 6.2 | Yes |
| Good company image and story | 7 | 7 | 7 | 6 | 5 | 6.4 | Yes |
| Sufficient time resources for innovation outside-in management | 6 | 7 | 7 | 6 | 6 | 6.4 | Yes |
| Integration [of innovation suppliers] into mid and long-term product planning | 6 | 7 | 7 | 6 | 6 | 6.4 | Yes |
| Sufficient financial resources for innovation outside-in management | 6 | 7 | 6 | 5 | 6 | 6.0 | Yes |
| Domestic (on-site) support in case of cultural differences/language barriers | 7 | 6 | 6 | 6 | 6 | 6.2 | Yes |
| CM1 Access to innovation networks leads to generation of knowledge,cross-fertilisation and tapping into innovations | 6 | 7 | 7 | 7 | 6 | 6.6 | Yes |

EF2: Preferred Customer status Process (PCP)

| Interviewee / Driver /T/CM | P01 | P04 | P05 | P06 | P 07 | Average value | Accepted |
|---|---|---|---|---|---|---|---|
| Attractive purchasing volume | 7 | 7 | 7 | 6 | 6 | 6.6 | Yes |
| Good company image and story | 6 | 7 | 7 | 7 | 6 | 6.6 | Yes |
| Good relationship-management with innovation suppliers | 6 | 7 | 6 | 7 | 6 | 6.4 | Yes |
| Integration into mid and long-term product planning | 6 | 6 | 7 | 6 | 6 | 6.2 | Yes |
| Sound (good) management skills | 6 | 7 | 6 | 5 | 6 | 6.0 | Yes |
| Real-life systematic / value-based supplier selection process | 6 | 7 | 7 | 6 | 7 | 6.6 | Yes |
| CM2 PCP process leads to prioritised resource allocation passed by the supplier to the customer | 6 | 7 | 6 | 6 | 6 | 6.2 | Yes |

EF3: Management Commitment (MC)

| Interviewee / Driver /T/CM | P01 | P04 | P05 | P06 | P 07 | Average value | Accepted |
|---|---|---|---|---|---|---|---|
| Clear process description with PO responsibility | 7 | 7 | 6 | 7 | 6 | 6.6 | Yes |
| Management shows positive attitude to the PO involvement into the innovation outside-in-process | 6 | 7 | 6 | 7 | 6 | 6.4 | Yes |
| Management complies with agreed innovation process | 6 | 7 | 7 | 6 | 6 | 6.4 | Yes |
| Clear innovation strategy and innovation targets | 6 | 7 | 7 | 7 | 6 | 6.6 | Yes |
| Management approves necessary resources (financial, personnel) | 6 | 7 | 6 | 6 | 7 | 6.4 | Yes |
| PO has direct reporting line to the top Management | 7 | 7 | 7 | 7 | 6 | 6.8 | Yes |
| CM3 MC authorises the PO and leads to acceptance by other stakeholders | 6 | 7 | 7 | 6 | 6 | 6.4 | Yes |

EF4: Internal Interconnectedness (II)

| Interviewee / Driver /T/CM | P01 | P04 | P05 | P06 | P 07 | Average value | Accepted |
|---|---|---|---|---|---|---|---|
| PO accepted by other innovation stakeholder | 7 | 7 | 7 | 5 | 7 | 6.6 | Yes |
| PO members are willing to work in cross-functional teams | 7 | 7 | 6 | 6 | 6 | 6.4 | Yes |
| Process thinking (orientation) and short report-ing/decision lines | 7 | 7 | 7 | 7 | 6 | 6.8 | Yes |
| Short spatial distances (between innovation stakeholder) | 6 | 6 | 6 | 6 | 6 | 6.0 | Yes |
| Sufficient technical knowledge of PO members | 6 | 6 | 7 | 6 | 6 | 6.2 | Yes |
| Sufficient (on-site) domestic support in case of cultural differences/language barriers | 6 | 7 | 6 | 5 | 6 | 6.0 | Yes |
| CM4 Internal Interconnectedness leads to free flow of innovation related information among stakeholders | 7 | 7 | 7 | 6 | 6 | 6.6 | Yes |

EF5: Early Integration of the PO into product planning (EIP)

| Interviewee / Driver /T/CM | P01 | P04 | P05 | P06 | P 07 | Average value | Accepted |
|---|---|---|---|---|---|---|---|
| Early PO involvement (integration) is common and real-life practice | 7 | 7 | 7 | 7 | 6 | 6.8 | Yes |
| Detailed product descriptions are available | 7 | 5 | 7 | 7 | 6 | 6.4 | Yes |
| Ideas from purchasing members are desired | 6 | 7 | 6 | 6 | 6 | 6.2 | Yes |
| Purchasing members have detailed knowledge about supplier capabilities | 6 | 6 | 7 | 6 | 6 | 6.2 | Yes |
| Living systematic and value-based supplier selection process | 6 | 7 | 7 | 7 | 6 | 6.6 | Yes |
| CM5 The integration into product planning increases the knowledge of the purchasing function concerning required product features as basis for the efficient/effective utilisation of supplier capabilities | 7 | 7 | 7 | 7 | 6 | 6.8 | Yes |

EF6: Degree of Professionalisation of the PO (PDP)

| Interviewee / Driver /T/CM | P01 | P04 | P05 | P06 | P 07 | Average value | Accepted |
|---|---|---|---|---|---|---|---|
| Purchasing members have a detailed knowledge about supplier capabilities | 6 | 7 | 7 | 7 | 6 | 6.6 | Yes |
| Sound (good) management skills | 6 | 7 | 6 | 6 | 6 | 6.2 | Yes |
| Sufficient technical knowledge | 6 | 7 | 6 | 6 | 6 | 6.2 | Yes |
| Good leadership skills | 7 | 7 | 7 | 7 | 6 | 6.8 | Yes |
| Sufficient time resources for innovation out-side-in management | 6 | 7 | 6 | 6 | 6 | 6.2 | Yes |
| Willingness to learn | 7 | 7 | 7 | 7 | 6 | 6.8 | Yes |
| CM6 A high Degree of Professionalisation of the purchasing function enables the purchasing members to drive and co-ordinate the innovation outside in process. | 6 | 7 | 7 | 6 | 6 | 6.4 | Yes |

EF7: Innovation Management System (IMS)

| Interviewee / Driver /T/CM | **P01** | **P04** | **P05** | **P06** | **P 07** | **Average value** | **Accepted** |
|---|---|---|---|---|---|---|---|
| Clear process description with purchasing responsibility | 6 | 7 | 6 | 7 | 6 | 6.4 | Yes |
| Easy access and **pragmatic** submission, monitoring of innovation outside-in subjects | 6 | 7 | 6 | 6 | 6 | 6.2 | Yes |
| Innovation process, tools are practiced by stakeholders | 6 | 7 | 7 | 6 | 7 | 6.6 | Yes |
| CM7 A lived and pragmatic Innovation Management System (IMS) ensures the efficient and effective processing of outside-in innovations | 6 | 7 | 6 | 7 | 7 | 6.6 | Yes |

EF8: Open-minded Relations based on Trust between innovation stakeholders (ORT)

| Interviewee / Driver /T/CM | P01 | P04 | P05 | P06 | P 07 | Average value | Accepted |
|---|---|---|---|---|---|---|---|
| Approachable and courteous nature of innovation stakeholders | 6 | 7 | 6 | 7 | 6 | 6.4 | Yes |
| Living cross-functional communication between innovation stakeholders | 6 | 7 | 7 | 7 | 5 | 6.4 | Yes |
| Co-ordinated actions of innovation stakeholders | 6 | 7 | 7 | 6 | 6 | 6.4 | Yes |
| Process thinking (orientation) in line with short reporting and decision lines | 7 | 7 | 7 | 4 | 6 | 6.2 | Yes |
| Clear innovation strategy and innovation targets | 6 | 7 | 7 | 5 | 6 | 6.2 | Yes |
| Sufficient time resources for innovation out-side-in management | 6 | 7 | 6 | 7 | 6 | 6.4 | Yes |
| CM8 Trust and open-minded relations activate non-biased/open exchange of information among innovation stakeholder | 6 | 7 | 7 | 6 | 6 | 6.4 | Yes |

# Annex VI Structured questionnaire (external validation)



UNIVERSITY OF GLOUCESTERSHIRE
at Cheltenham and Gloucester

Research Topic:

**Exploring Enabling Factors for purchasing integration into the innovation process**

This research is being conducted within the guidelines of the Handbook of Research Ethics of the University of Gloucestershire. The research plan has been approved by the University, but the contents and opinions expressed in this research instrument are those of the researcher and in no way represent those of the University of Gloucestershire. Background to the research: Background of the research:

The generation of attractive innovations is one of the most important and complex tasks companies undertake - the process of open innovation has been used to support this endeavour. In particular, small and medium sized companies (SME) of consumer electronic products are (1) highly dependent on close collaboration with technology-/innovation suppliers and have (2) to cope with turbulent technology markets as well as (3) the continuous shortening of innovation-cycles. These facts require that SME of electronic consumer products build up their dynamic capability to inno-vate, which subsequently forms the basis for sustainable competitiveness. The effective embedding of the purchasing function into the innovation outside-in process can potentially become a major driver in improving the overall innovation process and company performance.

This research aims to explore decisive Enabling Factors for the effective integration of the purchasing function into the outside-in innovation-process. The study hitherto identified eight (8) Enabling Factors, eight (8) related causal mechanism and thirty two (32) indicators which are deci-sive for the effective integration of the purchasing function into the out-side-in innovation process.

Via a validation interview survey conducted with a purposive selected sample of purchasing representatives who have working experience in companies with high dependency on technology-/innovation suppliers, the study intends to get initial insights as to the generalisability of the devised Enabling Factors. This structured questionnaire has been developed to collect the respective data.

**Definitions:**

**Valuable outside-in innovations**

Valuable outside-in innovations are technology- and service-innovations which are tapped by a customer from third party organisations, for exam-ple, suppliers, service providers, licensor or universities. An outside-in in-novation is only valuable in case that it has the potential to leverage a company's competitiveness due to increased product differentiation and/or the reduction of product-/service cost..

**Enabling Factors**

Enabling Factors make it possible for the purchasing function and its -members to actively co-ordinate and drive the outside-in innovation man-agement process of technology suppliers and/ or service

providers. In general, the Factors refer to the characteristics that facilitate or impede the capability of the purchasing function to co-ordinate and drive the in-novation outside-in process. Enabling Factors have dedicated underlying causal mechanisms.

**Causal mechanism**

A causal mechanism explains possible effects caused by an activated Enabling Factor.

**Indicator**

Indicators are observable variables which reflect or define an Enabling Factor. An indicator can also be viewed as a condition which needs to be realised in order to achieve a high maturity level of a certain Enabling Factor. Therefore, indicators are suitable as measurements for the as-sessment of the achieved maturity level/degree of realisation. Based on the assessed degree of realisation, appropriate measures/actions can be defined and realised by the purchasing function.p>

---

**2/12**

**General data:**

**0.1 – Company and branch**

Please fill in your company name and -branch:

| | |
|---|---|
| Company name | |
| Branch (in English or German) | |

**0.2 Work experience**

How long have you been working in the field of purchasing?

[Please choose]

**0.3 Job position**

What is your job position in the purchasing field? Please select the most appropriate description.

[Please choose]

**0.4 Interviewee partner**

Please fill in the initials of your first and second name (e.g. Ralf Vogt = RV)

| | |
|---|---|
| Initials first and second name | |

---

**3/12**

Topic area **[1]**: **External Interconnectedness**

The term **External Interconnectedness** reflects how closely a purchaser is connected with a network of relevant technology suppliers. In this vein, the term External Interconnectedness further summarises all actions conducted by the purchasing function to build up and maintain a functioning network to existing

and prospective suppliers from purposively selected industrial sectors. External Interconnectedness pursues the best possible barrier free access of the purchasing function to innovation technologies, for example, via strategic and long term partnerships to suppliers or the implementation of listening posts located within technology clusters..

### 1.1 Indicators (conditions)

External Interconnectedness of the purchasing function is supported by:

| | strongly agree | agree | somewhat agree | neither agree nor disagree | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|---|
| Short spatial/physical distance to innovation suppliers | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Good company image and –story [of the purchasing company] | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Sufficient **time** resources for innovation outside-in management | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Integration of innovation suppliers into mid- and long-term product planning | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Purchasing has a sufficient **financial** budget for innovation outside-in management (e.g. business meetings, purchasing office located in the technology cluster) | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Sufficient on-site domestic support in case of cultural differences/language barriers | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

### 1.2 Tendency

How strongly do you agree with the following statement?

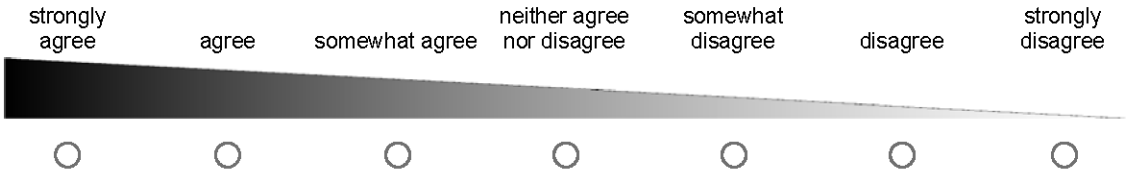
If there is a high level of External Interconnectedness, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

| strongly agree | agree | somewhat agree | neither agree nor disagree | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ | ○ | ○ |

**1.3 Causal mechanism**

How strongly do you agree with the following statement?

Access to innovation networks leads to the generation of knowledge, cross-fertilisation and tapping into innovations.




**Further comment concerning External Interconnectedness (optional):**

---

**4/12**

Topic area **[2]**: **Preferred Customer status Process**

The term **Preferred Customer status Process** relates to a purchasing process with which the purchasing functions judges the current and achievable customer status granted by a certain technology supplier. Furthermore, the Preferred Customer status Process shall induce and monitor proper actions with which the purchasing function pursues to gain and maintain a preferred customer status. The customer status indicates to what extent a supplier is willing to integrate its customer into the development of new technologies. Customers with a high customer status (preferred customers) are regularly earlier integrated into new technologies and enjoy a higher resource allocation for their new product development projects. .

**2.1 Indicators (conditions)**

The Preferred Customer status Process is supported by:

| | strongly agree | agree | somewhat agree | neither agree nor disagree | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|---|
| Attractive purchasing volume | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Good company image and -story [of the purchasing company] | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Good relationship-management to innovation suppliers | | | | | | | |
| Integration of innovation suppliers into mid and long term product planning | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Good management skills [of strategic purchasers] | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Real-life systematic and value-based supplier selection process | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

**2.2 Tendency**

How strongly do you agree with the following statement?

If the purchasing function establishes an assessment process concerning the actual and prospective preferred customer status granted by the supplier, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

| strongly agree | agree | somewhat agree | neither agree nor disagree | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ | ○ | ○ |

**2.3 Causal mechanism**

How strongly do you agree with the following statement?

A Preferred Customer status Process leads to prioritised resource allocation passed by the supplier to the customer.

| strongly agree | agree | somewhat agree | neither agree nor disagree | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ | ○ | ○ |

**Further comment concerning Preferred Customer status Process (optional):**

Topic area **[3]**: **Management Comittment**

The term **Management Commitment to the purchasing function** expresses the degree to which the management holds the purchasing function responsible as the key driver and -co-ordinator for the strategic supplier and outside-in innovation-/technology management. Depending on a company's dependency on external technology sources, the responsibility of the purchasing function can be scaled by the management from just being responsible for operational procurement up to an organisational unit which co-ordinates and drives the advanced technology-/innovation supplier management

### 3.1 Indicators (conditions)

The Management Comittment to the purchasing function is supported by:

| | strongly agree | agree | somewhat agree | neither agree nor disagree | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|---|
| Clear process description of the innovation management process with purchasing responsibility | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Management shows positive attitude to the purchasing involvement into the innovation outside-in process | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Management complies with the agreed innovation process | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Clear company innovation strategy and innovation targets | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Management approves necessary resources (financial, personnel) | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Purchasing has a direct reporting line to the top management | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

### 3.2 Tendency

How strongly do you agree with the following statement?

If there is a high level of Management Commitment to the purchasing function, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

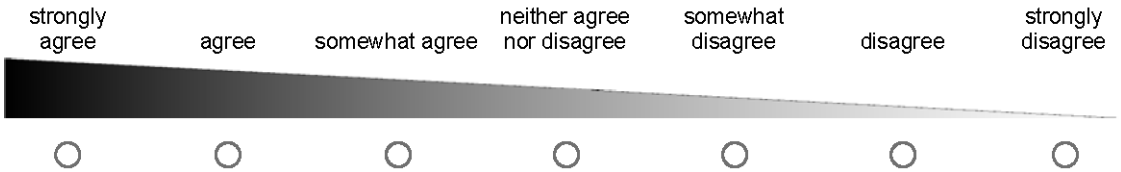
| strongly agree | agree | somewhat agree | neither agree nor disagree | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|

○ ○ ○ ○ ○ ○ ○

**3.3 Causal mechanism**

How stronlgy do you agree with the following statement?

The Management Commitment authorises the purchasing function and leads to acceptance by the other innovation stakeholders.




○ ○ ○ ○ ○ ○ ○

**Further comment concerning Management Commitment (optional):**

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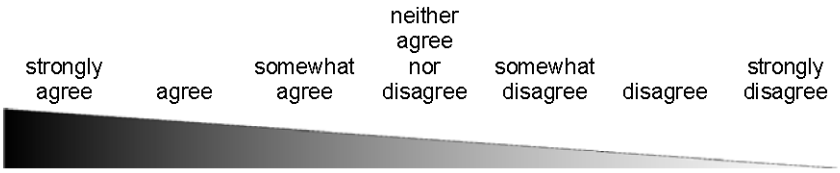
**6/12**

Topic area **[4]**: **Internal Interconnectedness**

The term **Internal Interconnectedness** subsumes the degree of integration of the purchasing func-tion into the formal and informal exchange of information with the company's innovation stakeholder and contributor (R&D, Marketing, Quality, Finance). Internal Interconnectedness aims to realise, as best as possible, the bi-directional and project independent free flow of innovation- and technology information/s with other specialist departments within or after the official working hours.br>

**4.1 Indicators (conditions)**

Internal Interconnectedness of the purchasing function is supported by:



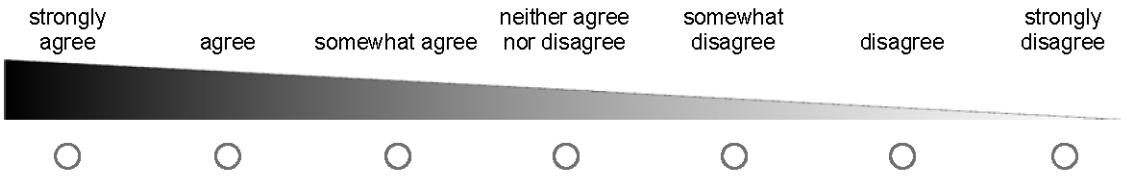

Purchasing is accepted by other innovation stakeholder ○ ○ ○ ○ ○ ○ ○

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Purchasing members are willing to work in cross functional teams | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Process orientation and short reporting- and decision lines | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Short spatial/physical distances between innovation stakeholder | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Sufficient technical knowledge of purchasing members | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Sufficient on-site domestic support in case of cultural differences/language barriers | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

**4.2 Tendency**

How strongly do you agree with the following statement?

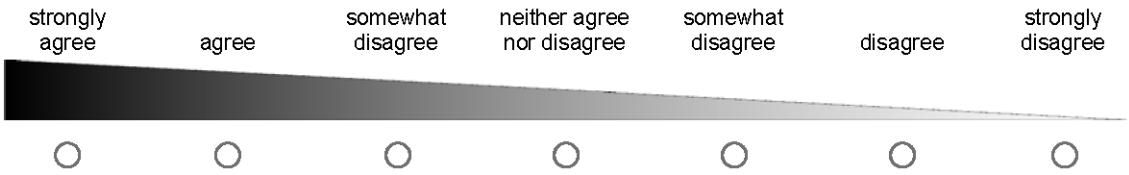
If a high level of Internal Interconnectedness is achieved by the purchasing function, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.




**4.3 Causal mechanism**

How strongly do you agree with the following statement?

Internal Interconnectedness leads to free flow of innovation related information between innovation stakeholders.




**Further comment concerning Internal Interconnectedness (optional):**

**7/12**

Topic area **[5]**: **Early Integration of purchasing into product planning**

The term **Early Integration into product planning** refers to the early and timely integration of the purchasing function into the strategic product planning process. Based on the early availability of knowledge concerning targeted product characteristics, the purchasing func-tion can efficiently and effectively build up and maintain the related supplier network.

**5.1 Indicators (conditions)**

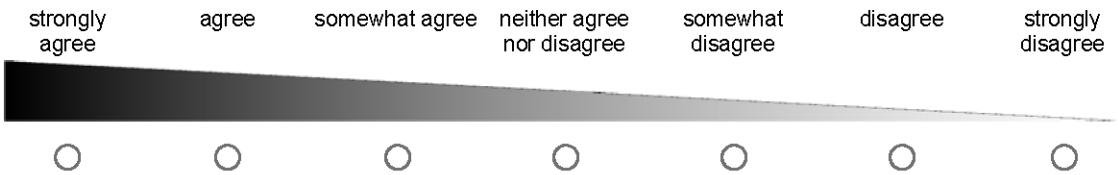
Early Intergration of the purchasing function into the product planning process is supported by:

| | strongly agree | agree | somewhat agree | neither agree nor disagree | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|---|
| Early Purchasing integration is a common and living practice | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Detailed product descriptions (characteristics, functions) are available | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Ideas from purchasing members are desired | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Purchasing members have detailed knowledge about supplier capabilities | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| A living systematic and value based supplier selection process | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

**5.2 Tendency**

How strongly do you agree with the following statement?

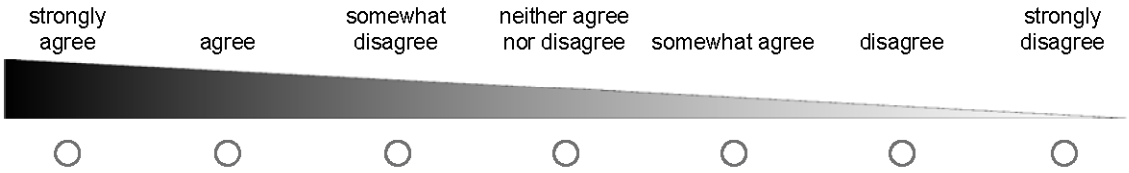
If the purchasing function is integrated early into the product planning process, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.




**5.3 Causal mechanism**

How strongly do you agree with the following statement?

The integration into the product planning process increases the knowledge of the purchasing function concerning required product features as a base for the efficient/effective utilisation of supplier capabilities.




**Further comment concerning Early Integration of purchasing into product planning (optional):**

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**8/12**

Topic area **[6]**: **Degree of Professionalisation of the purchasing function**

The term **Degree of Professionalisation of the purchasing function** subsumes the capability and willingness of the purchasing function/-members to take over the strategic outside-in innovation/technology management process. A high Degree of Professionalisation of the purchasing function goes in line with the utilisation of advanced purchasing tools (e.g. material group management), sufficiently qualified purchasing members who have good leadership skills and the general willingness to learn.subsumes the capability and willingness of the purchasing function/-members to take over the strategic outside-in innovation/technology management process. A high degree of professionalisation degree of the purchasing function goes in line with the utilisation of advanced purchasing tools (e.g. material group management), sufficiently qualified purchasing members who have good leadership skills and the general willingness to learn.

**6.1 Indicators (conditions)**

The Degree of Professionalisation of the purchasing function is supported by:

| | strongly agree | agree | somewhat agree | neither agree nor disagree | somewhat agree | disagree | strongly disagree |
|---|---|---|---|---|---|---|---|
| Purchasing members have a detailed knowledge about supplier capabilities | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Good management skills [of strategic purchasers] | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Sufficient technical knowledge [of strategic purchasers] | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Good leadership skills [of strategic purchasers] | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Sufficient time resources for innovation outside-in management | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Willingness to learn [of strategic purchasers] | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

**6.2 Tendency**

How strongly do you agree with the following statement?

If the purchasing function has gained a high Degree of Professionalisation, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

| strongly agree | agree | somewhat agree | neither agree nor disagree | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ | ○ | ○ |

**6.3 Causal mechanism**

How strongly do you agree with the following statement?

A high Degree of Professionalisation of the purchasing function enables the purchasing members to drive and co-ordinate the innovation outside in process.

| strongly agree | agree | somewhat agree | neither agree nor disagree | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ | ○ | ○ |

**Further comment concerning Degree of Professionalisation of purchasing (optional):**

**9/12**

Topic area **[7]**: **Innovation Management System (IMS)**

The term **Availability of an Innovation Management System** (IMS) subsumes the companywide implemented and, by internal innovation stakeholders and -suppliers, actually applied tools, methods and real-life processes targeted to efficiently and effectively collect, prioritise and process innovation/technology approaches offered and provided by third parties. .

### 7.1 Indicators (conditions)

The companywide innovation management system (IMS) is supported by:

| | strongly agree | agree | somewhat agree | neither agree nor disagree | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|---|
| Clear process description with purchasing responsibility | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Easy access and pragmatic submission, monitoring of innovation outside-in subjects. | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Innovation process and -tools are actually practised by internal innovation stakeholders and technology suppliers. | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

### 7.2 Tendency

How strongly do you agree with the following statement?

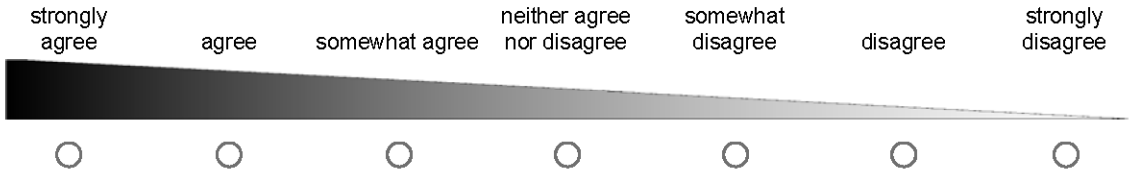
If there is a companywide accepted and practised Innovation Management-System in place, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.

| strongly agree | agree | somewhat agree | neither agree nor disagree | somewhat disagree | disagree | strongly disagree |
|---|---|---|---|---|---|---|

### 7.3 Causal mechanism

How strongly do you agree with the following statement?

A tried and tested, pragmatic innovation management system (IMS) ensures the efficient and effective processing of outside-in innovations.




**Further comment concerning the Innovation Management System (optional):**

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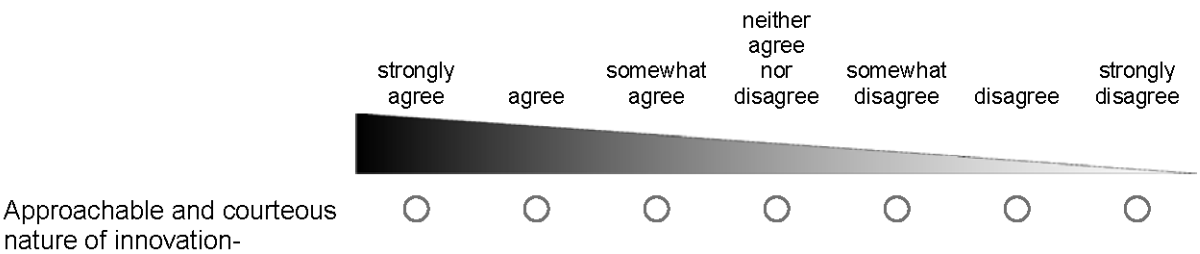
**10/12**

Topic area **[8]**: **Open-minded Relations based on Trust**

The term **Open-minded Relations based on Trust** refers to the manner how the company's innovation stakeholders socially interact with each other, for example, cool and aloof **or** open minded/approachable, timely **or** someday, courteous nature **or** noncommittal .

### 8.1 Indicators (conditions)

Open-minded Relations based on Trust among innovation stakeholders are supported by:

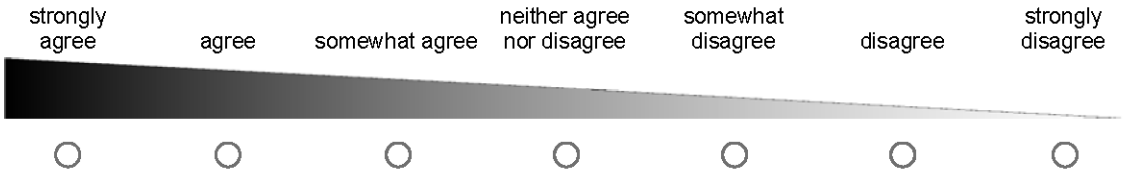


| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Living cross-functional communication between innovation stakeholders | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Co-ordinated actions of innovation-stakeholders | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Process orientation is in line with short reporting and -decision lines | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Clear innovation strategy and innovation targets | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Sufficient time resources for innovation outside-in management | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

**8.2 Tendency**

How strongly do you agree with the following statement?

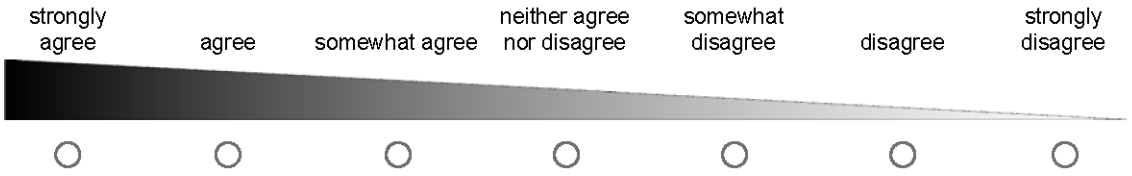
If there is a high degree of Open-minded Relations based on Trust among the stakeholders of the innovation process, there is the tendency that the purchasing function has the capability to generate valuable outside-in innovations.




**8.3 Causal mechanism**

How strongly do you agree with the following statement?

Trusting, open minded relations activate the non-biased/open exchange of information among innovation stakeholder.




**Further comment concerning Open-minded Relations based on Trust (optional):**

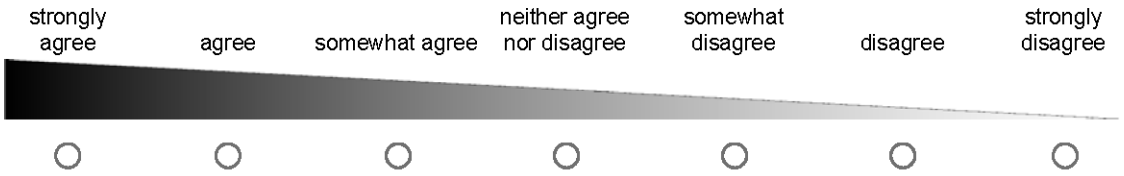
**11/12**

Topic area **[9]**: **Relations between factors**

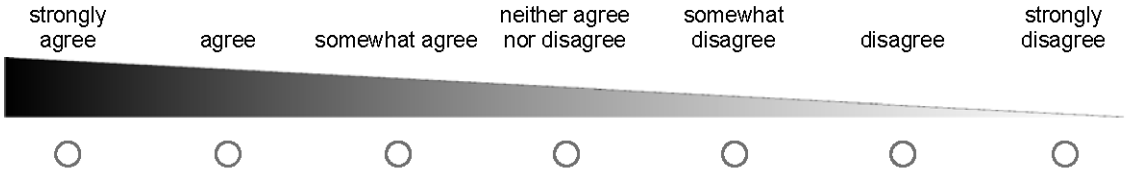
**Relation between factors**

How strongly do you agree with the following statements?

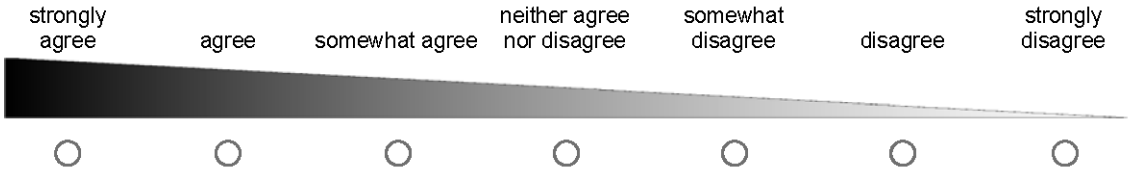
The greater the **Management Commitment** to the purchasing function, the greater the tendency that the purchasing function gains a **high Degree of Professionalisation.**



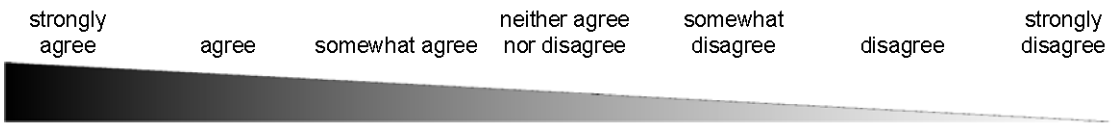

The greater the **Degree of Professionalisation** of the purchasing function, the greater the tendency towards **Internal Interconnectedness** of the purchasing function.




The greater the **Degree of Professionalisation** of the purchasing function, the greater the tendency towards **External Interconnectedness** of the purchasing function.

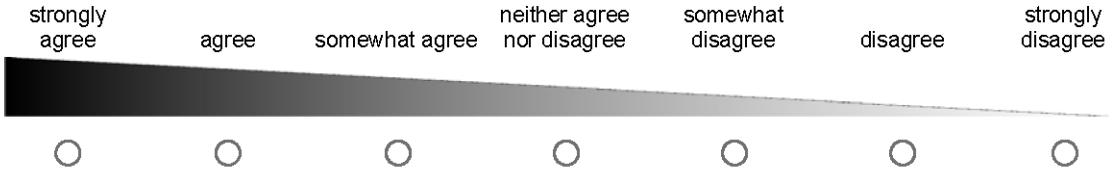



The greater the **Degree of Professionalisation** of the purchasing function, the greater the tendency towards the **Early Integration** of the purchasing function into the **strategic product planning process**.



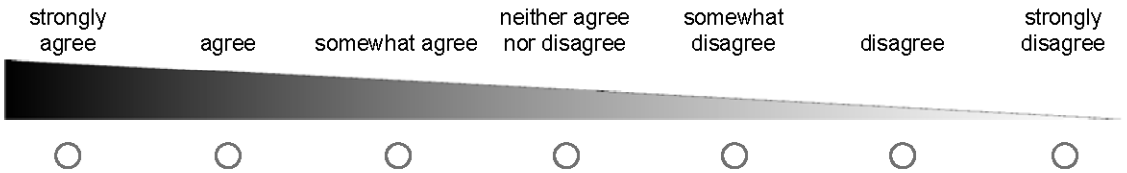
○ ○ ○ ○ ○ ○ ○

The greater the **Degree of Professionalisation** of the purchasing function, the greater the tendency that the purchasing function **rates** the actual and the achievable **Preferred Customer status** granted by a supplier.



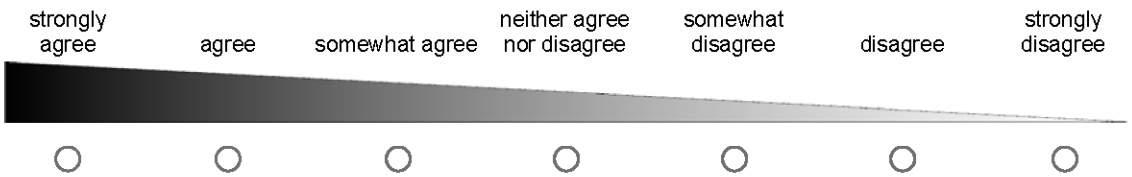

○ ○ ○ ○ ○ ○ ○

The greater the **Internal Interconnectedness** of the purchasing function, the greater the purchasing function's capability to **co-ordinate** the innovation outside-in process.



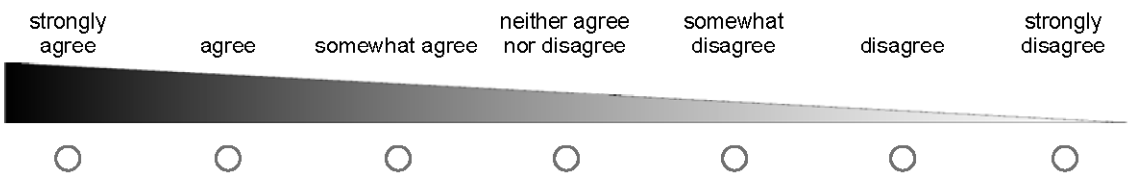

○ ○ ○ ○ ○ ○ ○

The greater the **External Interconnectedness** of the purchasing function, the greater the purchasing function's capability to **co-ordinate** the innovation outside-in process.



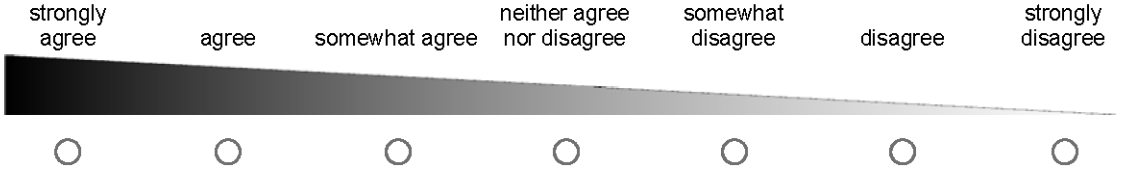

○ ○ ○ ○ ○ ○ ○

The greater the **Early Integration** of the purchasing function into the product planning process, the greater the purchasing function's capability to **co-ordinate** the innovation outside-in process.



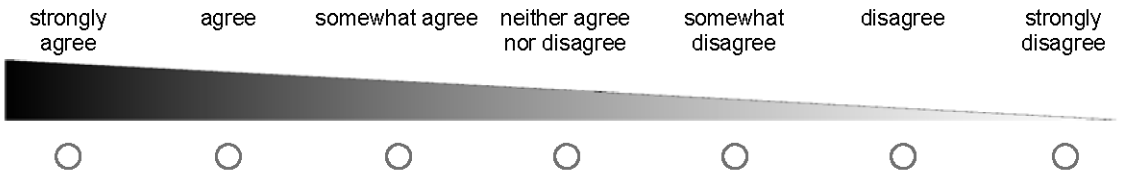

○ ○ ○ ○ ○ ○ ○

The better the purchasing function **rates** the actual and achievable **Preferred Customer status** granted by the supplier, the greater is the purchasing function's capability to **co-ordinate** the innovation outside-in process.

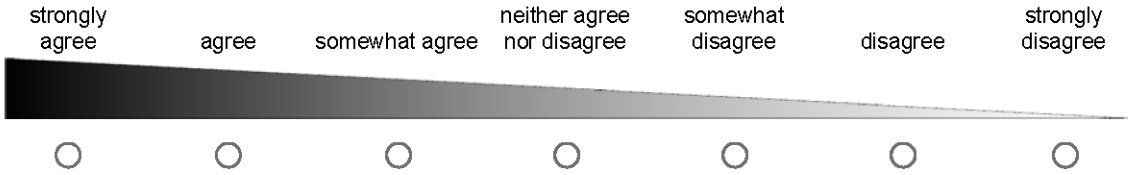



○ ○ ○ ○ ○ ○ ○

The greater a lived and pragmatic **Innovation Management System (IMS)** is companywide practised, the greater the purchasing function's capability to **co-ordinate** the innovation outside-in process.




The greater the degree of **Open-minded Relations based on Trust** among innovation stakeholders, the greater the purchasing function's capability to **co-ordinate** the innovation outside-in process.




The greater the capability of the purchasing function to **co-ordinate** the innovation outside-in process, the greater the tendency that the purchasing function **generates** valuable outside-in innovations.


**12/12**

# Thank you for completing this questionnaire!

We would like to thank you very much for helping us.

Your answers were transmitted, you may close the browser window or tab now.