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Towards a Process Reference Model for Business Process Outsourcing Providers in Customer Relationship Management

Master Thesis

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Any sufficiently advanced technology is indistinguishable from magic.

ARTHUR C. CLARKE

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Abbreviations

BPM	Business Process Management
CD	Corporate Design
ERCIS	European Research Center for Information Systems
KMU	Kleines und Mittleres Unternehmen
NPM	Node Package Manager
SQL	Structured Query Language
WWU	Westfälische Wilhelms-Universität

Symbols

⋈	Natural Join
Π	Projection
σ	Selection

Abstract

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

1   Motivation

Prozessorientierung ist eine nicht mehr wegzudenkende Maxime in der Gestaltung von Unternehmen. Sie ist ein wesentlicher Bestandteil der Forschung in der Be- triebswirtschaftslehre und der Wirtschaftsinformatik. As put by Thomas Friedman, "The world is flat". Globalization facilitates combinations value-creating activities in economic networks like never before. The key driver of it is information technology, which sets the base for the connectedness we take for granted today. Its implications on markets and businesses are described in the following section.

Process orientiation is a precept in business organization. It is an essential part of research in business adminstration as well as Information System (IS). To make use of it, models as the language of IS take an important part. In particular, the reference models support businesses in these reorganization projects. They guide the user and help to incorporate best and common practices so that there is solid foundation to customize the model for the businesse's originalities.

Outsourcing customer service to external providers is a common practice throughout many industries. Dialling a contact number for a service request often ends up with talking to a service agent anywhere around the world. Several companies have specialized to provide professional customer support using various contact channels. Providing customer relationship management (CRM) as service requires the careful and cost-efficient deployment of contact centres. Such centres are often staffed with hundreds of agents that must be hired and trained before customer contact. For years, special focus has been put on the voice channel (Loudhouse, 2013). Meanwhile digital trends have affected many areas of life, which implies new challenges in customer relationship management. A recent study revealed that 78.7% of call centre operations managers point out that their current systems fail to meet future needs, as they are telephone-centric and costs for an architecture overhaul are too high (Dimension Data, 2015). Nowadays consumers can use a plethora of devices and software applications to interact with organizations (Köffer, Ortbach and Niehaves, 2014). As a result, the number of used channels to reach organizations increases. More specifically, analysts have seen a move from the traditional voice channel to digital channels, such as chat or social media. For instance, private instant messengers offer faster and less complicated ways to interact with the company. Digital channels in contact centres now take 42% of overall interactions and are said to overtake voice by the end of 2016 (Dimension Data, 2016). To this end, multichannel CRM has become a "must-have" for customer service management providers (Agnischock et al., 2015). In this context, the term omnichannel CRM is increasingly dragging intention. Omnichannel CRM can be distinguished from multichannel CRM by not only providing multiple chan-

nels for customer interaction but also through seamless integrations of various channels and their underlying data (Verhoef, Kannan and Inman, 2015), which is a difficult task in CRM. At this point in time, omnichannel CRM is often not realized. However, customers more and more expect that they are able to switch between interaction channels without the loss of information. Contact centre interactions will often require the customer to repeat information again, although he or she has earlier written an email or a chat message to the same company. Omnichannel CRM also comes with important benefits for organizations. Integrated data throughout various channels allows getting a better understanding of the customer's profile and wishes through analytical support. Still, 40% of contact centres have no data analysis tool in place despite of being named the top factor to shape the industry in the next five years (Dimension Data, 2015). To this end, organizations can better target marketing campaigns or increase the quality of service provision. To realize this, organizations that use outsourcing need close relations to outsourcing providers, since the integration of channels affects various information systems both at the organization but also at the outsourcing provider. More specifically, CRM business processes need to be harmonized since they often span organizational boundaries.

Outsourcing processes have be

- Janina BA

- ECIS Paper

- Refmod motivation Püster?

- Omnichannel

- purpose statement

- research question and hyptoheses

- Crewsell: State problem,

- review studies that have addressed the problem,

- indicate definciencies in studies,

- advance significance,

- state purpose statement

2   Methodology

This chapter outlines the underlying methodology of this work and justifies that standards of research are applied.

While the research project, where this thesis is part of, has begun ahead of this work, the following approach puts emphasis on methodology employed in this thesis. Prior work in the project helped to create a foundation where this work can build up on. Design science research (DSR) is chosen as a research design, which is described in detail in the following sections, along with the epistemological aspects. Data was gathered in interviews with domain experts, supported by literature as well as documents from the research partner. Descriptions of these aspects complete this chapter.

2.1   Epistemological perspective

Stating epistemological view of this work helps to support the reader in understanding the author's statements. Furthermore, it demonstrates a systematical method, which is sometimes perceived as lacking in qualitative research. Drawing on a framework by **?**, that states five questions which help to structure the epistemological positioning of research.

(1)   What is the object of cognition? (Ontological aspect)

      Ontological Realism | Ontological idealism | Kantianism

(2)   What is the relationship between cognition and the object of cognition?

      Epistemological realism | **Constructivism**

(3)   What is true cognition? (Concept of truth)

      Correspondence | **Consensus** | Semantic theory of truth

(4)   Where does cognition originate?

      Empiricism | Rationalism | **Kantianism**

(5)   By what means can cognition be achieved? (Methodological aspect)

      Inductivism | **Deductivism** | **Hermeneutic**

Ad 1. Object of cognition

Ontology is the science of *what is* and *how it is*. The existence and nature of reality are subject matter. Ontological realism assumes a real world that exists independently

of cognition. Ontological idealism sees reality as a construct depending on human consciousness. Kantianism brings together the two mentioned views by distinguishing in things in themselves and the appearing of those things to an observer.

This work takes the view of ontological realism, as the construction of the reference model is intended to solve a real-world problem. Hence, this world should exist for every observer.

Ad 2. Relationship between cognition and the object of cognition

This question asks whether entities beyond human thought can be recognized as objective (in principle). Epistemological realism affirms this question. Constructivism deems cognition as subjective and hence makes understanding a private construct determined by the subject.

Because subjects that use the reference model will show different understandings and requirements, the constructivistic view is taken.

Ad 3. Concept of truth

The *true* cognition and how humans can achieve it is foci of this question. Correspondence theory of truth states that true statements refer to facts of the real world. This requires a realistic view in both ontology and epistemology. Consensus theory of truth bases on constructivsm: A statement is true *for a group*, only if all peers agree and true, if everyone agrees. Hence there can be no proof of truth. Thirdly, semantic theory of truth proposes that truth is always related to an object language where the possibly true statements are communicated in. Therefore there has to be a meta-language that is able to analyze the correctness of a statement in object language.

Following the constructivistic view, the consensus theory of truth is taken. The correctness of modeling is dependent on the group of reference model users and its designer. If they find a consensus, truth can be achieved within the group.

Ad 4. Origin of cognition

There are three origins of cognition. Cognition from experience falls under the school of empiricism. Rationalism puts intellect as the source of cognition. Kantianism again combines both views so that both experience and intellect can be origin of cognition.

Both intellect and experience are seen as integral parts of cognition in this research. Practical experience, as included by the later described interview component, is combined with the cognitive efforts and reflection of the author to design the artifact.

Ad 5. Methodological aspect

While inductivism describes the extension from individual cases to universal phrases, deductivism is the derivation of the individual from the universal. Hermeneutic assumes prior knowledge in an issue by a subject that is able to better its understanding of *the entire* by consumption of new knowledge.

The act of design within this work is characterized by a hermeneutic aspect. The model is shaped by the consumption of existing scientific concepts, as well as views from the case. As the approach towards interview topics was to increase detail over time, a repeating process emerged: Prior knowledge was used to design the model, while the next interview gave new input that related to additional knowledge. This additional knowledge closes the circle as it became preknowledge to the next repetition. In addtion, inductivism is focal in reference modeling, as the case needs to be abstracted to achieve the required universality in reference modeling. Deductivism is also part, as general business processes where applied to the domain of BPO and more specifically BPO in CRM.

2.2   Design Science

Research has to employ accepted methodology to be accepted in the community. Creswell names the selection of a research approach as the first of preliminary considerations **?**. Design science research (DSR), as conceptualized by **?** is getting more and more attention in the IS field and will be the leading paradigm for this thesis.

Motivating this choice is its overall goal, namely to create innovative artifacts to solve real-world problems. This addresses the often criticized limited practical relevance in IS research **?**, while still employing the relevant rigor that separates it as a research project from the practice of routine design **?**. The common understanding of DSR today is seen in the work of Hevner et al. (2004). It stands in contrast to behavioural science research, which takes a problem *understanding* approach by developing theories. However, their complementary nature justifies both paradigms, as IS artifacts (as an outcome of DSR) provide utility and are subject to behavioral science research, which in turn provides truth in form of theories to be used in DSR.

1 shows three research cycles, that should be identifiable in every DSR project **?**. The environment is origin of the wish to design an artifact that solves a particular problem. In
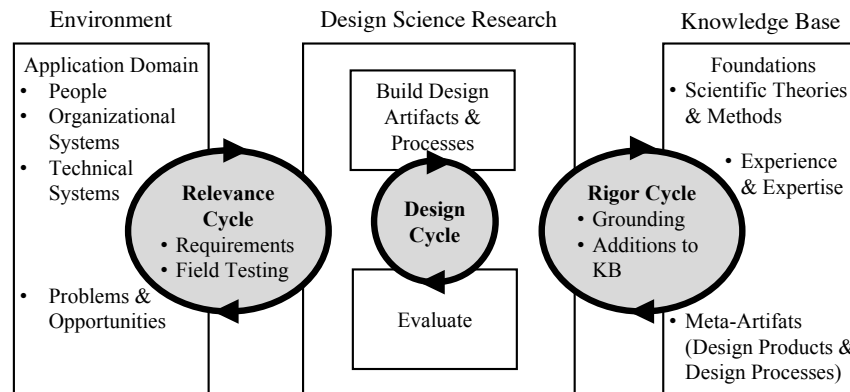
Figure 1   Design science research cycles Source: **?**

this thesis it is the absence of a process model that has referential character in the domain of BPO providers in CRM. The contextual environment of the partnering BPO provider is used to define requirements, which are transferred via the Relevance Cycle to the DSR component. Its inherent Design Cycle brings together the building of the artifact and its evaluation. An (IT)-artifact can be a model **?** like the reference model at hand. Evaluation of the design with help of the Relevance cycle ensures that the problem is addressed in a meaningful way by. The design itself is connected to the knowledge base via the Rigor Cycle. It draws from vast knowledge in form of scientific theories or experience and expertise. It grounds the design of the artifact to be in harmony with existing knowledge. By using proven methods and structures of reference modeling, a solid foundation is chosen. The application and transfer into the domain is supported by data from the literature, as well as by qualitative research in form of interviews with experts. Their experience and expertise is input to the design process. Through the reference character of the model, it is still of great importance to apply the required rigor to separate this research from routine design. This implies that a thorough examination is necessary in the design process, to ensure the universal applicability of the reference model artifact.

- Hefner, Peffers. Draw line complete the view of used research methods.

- item
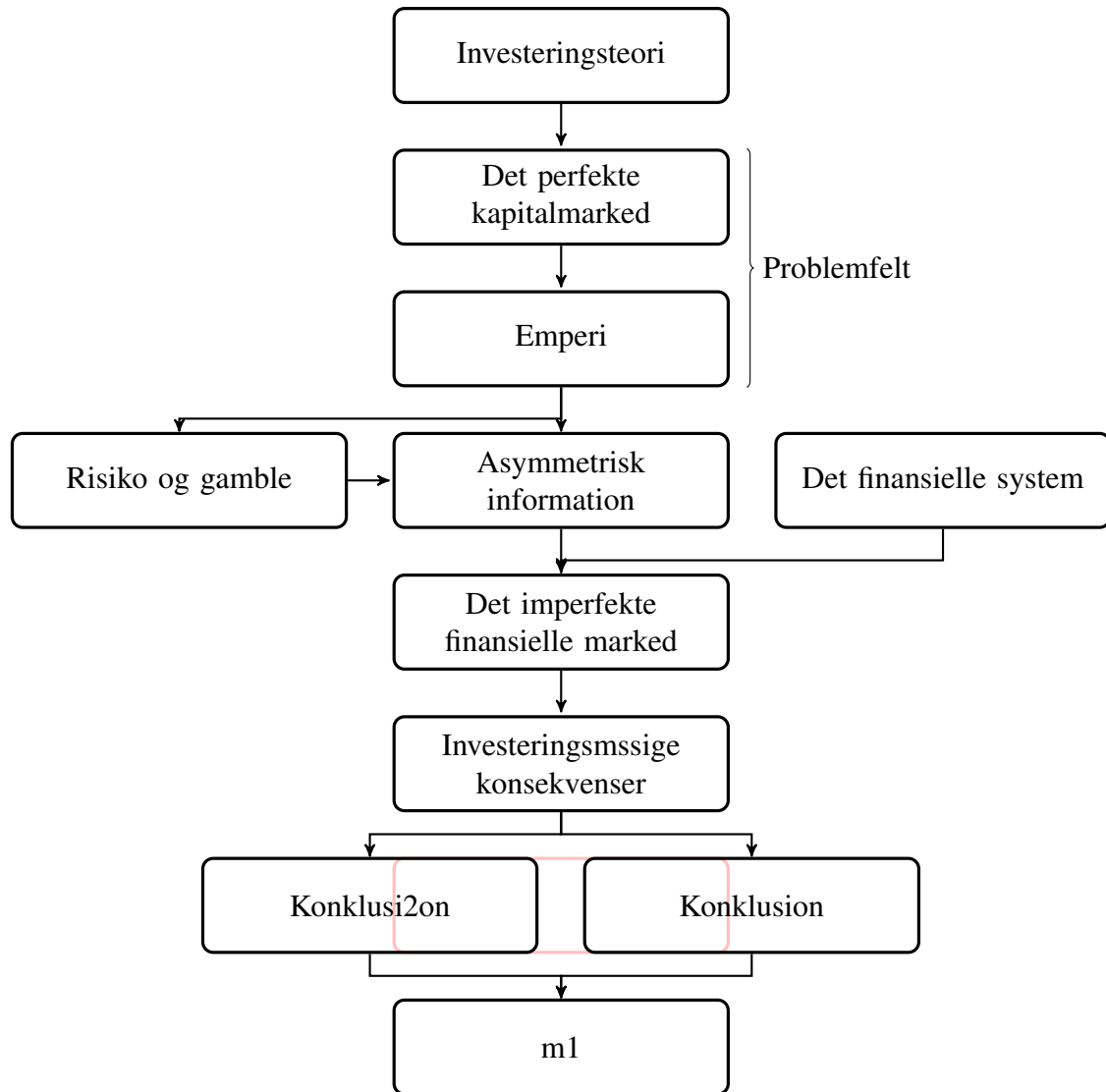
2.3 Literature Review

- Where, How, For what

- später: was wurde konkret durchsucht und wo?

2.4 Empirical Research

As stated in the epistemological positioning, a Kantianistic view with cognition from intellect and experience is taken. While the cognition from intellect is of special importance in design of the artifact, the transfer of knowledge from domain experts motivates the cognition from experience. Following **?**, the sequence of a research process is (1) Identify area, (2) Select research topic, (3) Decide on approach, (4) Formulate plan, (5) Collect

data, (6) Analyze data, (7) Present findings. This section especially reasons approach, plan and data aspects.

The communication with the research partner was key for gaining insights in the domain. As automated process modeling approaches, like process mining, is not possible due to lack of suitable data, manual techniques are used. These require a data basis, which builds on the school of empiricism. Qualitative research techniques in form of workshops, document analysis and interviews were used in the research project.

A plan for the selection of interview candidates was developed in collaboration with the research partner to ensure coverage of the application domain, which is a form of theoretical sampling [1]. In a top-down approach managers from core processes in the organization were interviewed face-to-face or by call. For this thesis, interviews with XXXX domain experts were conducted, transcribed and analyzed. Additional presentations and documents were provided by the interviewees and served as an additional source of information. Since the thesis is part of an ongoing research project, other data sources that were not directly connected to the thesis were used like the outcomes of a process modeling workshop.

Analysis of data started before all interviews were conducted, as coverage of fields of interest was necessary on the required detail level. With the last interview, the primary analysis started that lead to the designed artifact.

irgendwie diesen Zeitstrahl rein? doch eher bei Case oder?

- Qualitative Methods

- Interviews, how many, how long, with whom, sample

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[1] For more information about sampling in qualitative studies see **?**.

3   Research Background

DEFINITIONS DEFINITIONS DEFINITIONS

3.1   Domain

3.1.1   Business Process Outsourcing

The phenomenon of outsourcing can be explained by basic economic theory. The following section describes how the theory of the firm, the value chain, outsourcing and process orientation are interwoven.

Theory of the Firm

In theory, a firm exists because of transaction and production costs efficiencies. They are organizational innovations to reduce costs involved in market transacting. A transaction here means the transfer of a good or service across a technologically separable interface **??**, like the boundaries between firms. If the transaction costs across markets become larger than the costs of managing the firm, firms will substitute market transactions through internal execution. IT has drastically reduced these transaction costs and the IS field is applying transaction cost theory to explain its impact on the boundaries of the firm **?**. The theory of production cost efficiency states that production by multiple individuals is the characteristic of a firm **?** and it will exist as long as the output is sufficiently larger than the output under independent production, so that the costs of organizing individuals are justified. What economists describe as increasing returns, i.e., economies of scale or experience, follows a simple rule: the more you do of something, the better you get. `hä?`

As an asset's productivity increases with specialization, this in return explains why firms specialize in certain tasks: costs of managing the firm increase with size, benefits in productivity are reachable through focusing on their core business. When a firm makes its core business to parts that others do not choose to, they can provide these as a service on the market place - and decreasing transaction costs make it more and more attractive to make us of these. `servitization?`

The value chain

Drawing on the concept of the value chain by Porter **?**, the idea is to model each firm as a set of systems, which add value to a product or service. These chains can be concatenated,

as more and more actors are involved on the way to the end consumer to make a final product out of raw materials and components. Transaction costs are the glue that hold chains together. Within each chain for a firm lie different subsystems, which contribute to the created value through the consumption of resources - like money, labor or material. Strategy demands that firms build sustainable competitive advantages to be able to survive in the market. As firms cannot build these in all stages of their value chain Ramachandran and Voleti (2004), they choose to focus in certain activities and hence invest less resources in others.

As transaction costs are composed of costs for communication and information processing **?**, One can see how digitalization impacts these theories from the last century. Communication costs have fallen faster than processing costs since the mid 90s, which is manifested in the internet. With falling costs, value chains can easier break up and be more flexible.

Combining the previously mentioned theories of the firm and the value chain, organizations can easier transfer activities to other actors in the market that have specialized on it and can deliver it better and more efficient.

(Business Process) Outsourcing

The term outsourcing can be derived from **out**side re**sourcing** and dates back to 1981. It can be broadly defined by "the purchase of a good or service that was previously provided internally" (**?**, p. 74) or more narrow as "contracting with an external firm for the ongoing management and delivery of a defined set of services to a prescribed level of performance" (**?**, p. 2) . However, it does not necessarily mean relocating it to a foreign country (offshoring), which falsely gave the term a negative connotation in Germany in the past [2]. Outsourcing can be distinguished by other types of partnerships through a contract that clearly defines subject and duration of the cooperation .

? give an overview about theoretical foundations in outsourcing research. Three major views are identified:

- Strategic management view

- Economic view

- Social view

The first builds on the resource based view **?** and takes a merely internal view. Here, the firm's strategy is about its capabilities, captured in scarce resources, and reasons out-

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[2] "Outsourcing" was chosen the Un-word of the year 1996 http://www.unwortdesjahres.net/index.php?id=33

sourcing to focus on its core competencies. The economic view brings transaction cost theory into play and argues that specialized organizations (outsourcing providers) are able to achieve economies of scale. Lastly, apart from this cost efficiency focus, relationships between provider and client are also an issue worth explaining. Here, social exchange and power political theory **?** can be named. This view is justified by the fact that two mechanisms, namely trust and power, are explaining relationships between organizations. These play an important role in establishing and especially maintaining a relationship, which is leveraging economies of scale and scope provided by partnering organizations **?**.

Processes in which IT plays an important role became prime candidates for outsourcing, as transaction costs for information are negligible. More sharply, one can speak of IT enabled services (ITES) that can be outsourced using the power of IT (Ramachandran and Voleti 2004, p. 49). In addition, IT itself has become the most outsourced function (60% penetration **?** considering firms with more than 1 billion USD revenue) and is called IT Outsourcing (ITO). Next to IT, finance, legal, real estate and facility management, HR and customer service are popular outsourcing applications **?**.

> def out-sourc-ing

BPO is a special form of outsourcing. It is defined as BPO as the transfer of complete processes to an external service provider **?**. **?** add that it-enabled processes are subject to BPO. It is unquestioned that the reduction in transaction costs driven by IT permits the BPO business and that IT will expand its importance. One can argue that BPO, which requires more coordination and a more complex relationship between client and provider than outsourcing, is only possible through IT as an enabler: The transaction costs without the empowerment of IT for outsourcing complete processes are too high to be reasonable from an economic point of view. Groundedly, this work views BPO as "the delegation of one or more information technology enabled processes to an external service provider" (**?**, p. 39).

Process orientation

The concept of processes is a central part of this thesis. As it turns out, there are conflicts in the wording between the business process management and outsourcing domain. A process is defined a self-contained time-logical sequence of activities that work on a business relevant object. (**?**, p. 6). Drawing from the Architecture of Integrated Information Systems (ARIS), one could take four different perspectives on modeling of business from an IS perspective: organizational, functional, data and process. The process perspective integrates the other three views. A business process is a special process that is directed by the business objectives of a company and by the business environment (**?**, p. 6). This definition needs to be carefully separated from the notion of business process within BPO,

> ARIS

which only stresses the outsourcing of complete processes and does not necessarily limit its applicability to business processes as defined here. The author notes that BPO is a common term and it is therefore mandatory to use it to correctly describe the domain. However, for the act of process modeling, the distinction between processes and business processes is necessary. An example for this conflict is that outsourcing the payroll management process would be considered BPO, while the very nature of the process is clearly not directed by the business objectives of the company.

Porters value chain differentiates into primary and supporting activities. The former are directly contributing to the created product or service and therefore have impact on the economic outcome of the company. Logistics, Operations or Service are parts of these primary activities. Supporting activities on the other hand do not have a direct relatedness to the product or service, but are necessary to perform primary activities. Human resource management or IT can be named here. This distinction between primary and support activities may be flowing and leaves room for interpretation and is additionally dependent on the business domain and company itself. The concept of the two activities is borrowed and applied to processes that shall be distinguished in core and support processes.

A framework for BPO participants

There are at least two parties involved in an outsourcing setting. The business that is outsourcing a process is called *client*, while the business that is servicing the outsourced process is called *provider*. This thesis focuses on building a model for the provider and takes its perspective. Due to this view, it is also referred to as the focal company. With respect to the outsourced process, there additionally may be *customers* involved. These can be other businesses or private consumers. **??** shows an ERM among participants.
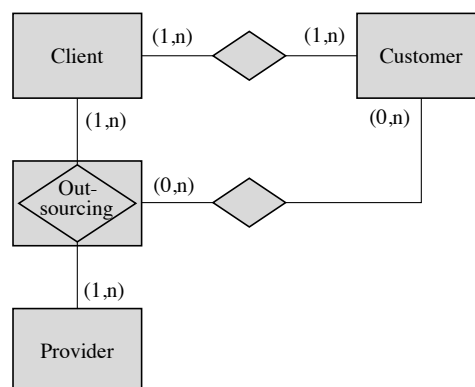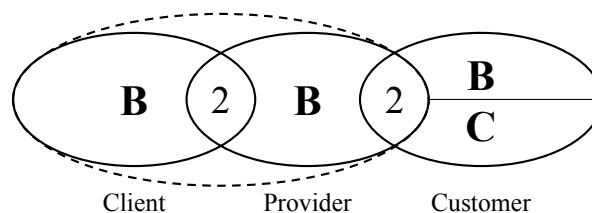

Figure 2   Outsourcing ERM

Client and provider are connected with their outsourcing agreement and a provider is very likely to have multiple of these relationships. Multi-Sourcing, i.e., the outsourcing of services to multiple providers even within a functional area is reflected in the *(1,n)* relation of the client to the provider. Clients and their customers are connected at least once. The outsourced process can involve client customer contact (for instance in CRM), but does not have to (accounts payable). In addition, a customer may be connected to multiple outsourcing services and every outsourcing service is likely to handle multiple client customers.

The outsourcing of customer facing processes is often not to the knowledge of the customer . This is due to the fact that clients do not have interest in confusing their customers or damaging their brand by bringing another party into their relationship with the customer . Hence, client and provider fuse to one unit from the customer's perspective. 3 visualizes the described B2B2B/C chain as an analogy on B2B and B2C as existing shorthands for business-to-business and business-to-consumer. The chain underlines the two critical intersections of the focal company (provider) with the other markets. As shown in the ERM, an outsourcing provider has multiple clients (each having customers that may be part of the outsourcing) and hence provider's businesses can be visualized as multiple chains with different client and customers attached to the provider. Consequently these form markets that the provider interacts with.

Figure 3   BPO B2B2B/C Chain

- process orientation ok

- DEF ok

- common processes that are outsourced - zahlen

- schewe 3: venn diagramm prozesoptimierung - bpo - outsourcing

- IT as an enabler ok

- offshore, nearshore, inshore - nur nennen und auf interessante Aspekte für case eingehen

- Model ? Matrix ?

Parent Company

Motivation for outsourcing of services is based on sound economic principles, as laid out in the section about the theory of the firm. From the previously described theories explaining outsourcing, especially the economic and strategic management view applies to justify outsourcing decisions. **?** names improved business focus, mitigate risks, build sustainable competitive advantage, extend technical capabilities and free resources for core business purposes **?**. Cost reduction is not included in this list (even though it was a primary driver at first), as the experience has shown that 80% of customer service outsourcing projects aimed for cost cutting are failing [3].

cost savings argument

zahlen zahlen zahlen

- reasons: focus on core competencies

- fields // processes no29 for India, Deloitte Outsourcing Paper

- challenges

-

Outsourcing Provider

- dienstleistungsstruktur : schewe

- no29: intro to firms, transaction costs so on

- no29: capabilities of Providers

3.1.2   Customer Relationship Management

"A company's most precious asset is its relationship with its customers" is a quote of Theodore Levitt, Harvard Business School professor emeritus, from 1983 (LEVITT). Following this idea, marketing has undergone a shift from a brand- or product-centricity to a

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[3]   See http://www.gartner.com/newsroom/id/492113

more customer-centered view. An absence of sharp definitions has lead to a considerable confusion in academic literature about the term customer relationship management **?**.

Essential terms surrounding CRM are marketing, relationship management and relationship marketing. Drawing on the taxonomy of **?**, a visualization of the fundamental relationships is given in Fig. **??**. Under the umbrella of marketing, relationship management describes the active and systematic analysis, planning, design, selection and control of all business relationships in the sense of a holistic concept of systems, activities and goals (**?**, p. 442). It has to be noted that not only relationship to customers, but also suppliers, communities, authorities, as well as internal relationship are enclosed by this term. Relationship marketing is a subset of relationship management and more strongly emphasizes customers as a target, but also comprises vertical relationships, i.e., relationships to suppliers. Within relationship marketing lies customer management or customer relationship management. Both terms are often used interchangeably by many authors **??**. This thesis therefore prefers the term customer relationship management.
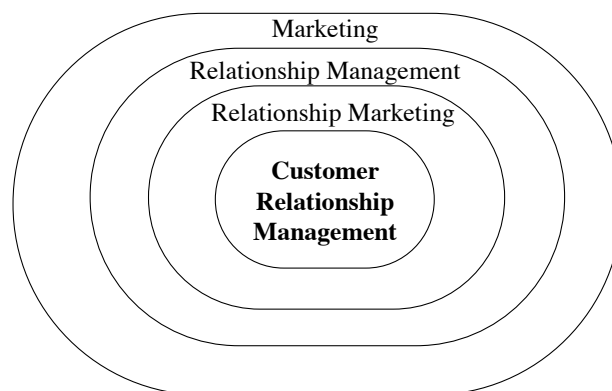
Figure 4   CRM in the field of marketing

? compile different standpoints and propose three views, that will be described in the following. As the name suggests, the building and sustaining of relationships to customers is always a defining characteristic of CRM, but the importance of the technological component is varying.

Narrowly and tactically defined, CRM refers to a technology solution and its implementation, which justifies the term's popularity in the technical field. With an increased scope, CRM can be seen as the implementation of an integrated series of customer-oriented technology solutions. Widely and strategically defined, CRM can be seen as a holistic approach to managing customer relationships to maximize customer value, corporate

profitability, and thus, shareholder value **?**. This value is realized through the developed of a relationship, that is profitable and preferably long-term.

For this thesis, a customer is defined as an individual or business that has entered the process of buying a good or service from another business. Hence, the customer has a relation to the latter, that is of interest in CRM. This relationship can be strengthened by a plethora of marketing instruments that businesses use to bind the customer. These are initiated from the businesses and directed towards the customer. The reverse way, i.e., a customer reaching to the company by considering a product is also possible.

For establishing the communication between the two parties, two terms have emerged: channels and customer touch points. Channels are considered to be the more general term and from a company perspective, while a customer touch point is more specific and from the customer's view. The term channel is preferred here in contrast to customer touch points, as customer touch points are changing more rapidly and stand in contrast to the intended broad applicability of this thesis for a BPO provider. For instance, social media as a channel will likely be a long-lasting medium in CRM, while a plattform, i.e., facebook, may or may not withstand the test of time. In that sense, a channel is seen here as a more abstract type and a touch point an instance of a medium of communication between company and customer.

Communication between the customer and company can be done through a number of channels which have grown in the past years. Integration of these channels is a central task of CRM and shows increasing complexity. **?** propose six categories: (1) sales force, (2) outlets,i.e., stores and the alike, (3) telephony, (4) direct marketing,i.e., mail, radio, television, (5) e-commerce,i.e., e-mail and internet, (6) mobile-commerce,i.e., text messaging, mobile telephony. Applying the mutually exclusive; collaborative exhausting (MECE)-rule, one faces problems with this definition. With the advent of smart phones technology, mutually exclusion of (3),(5) and (6) is hardly possible. In addition, social networks have become increasingly important for customer interaction. This necessitates another view, which conforms to today's channel landscape and is forearmed for new channels that might emerge in future.

This thesis takes a two-dimensional views on different interaction channels in CRM. Building on the framework by **?**, the digital component gets more emphasis, as it is of striking importance today. The matrix displayed in **??** positions different channels with respect to their personal or universal way of communication, as well as their orientation towards IT. The aforementioned categories (1) sales force, (2) outlets and (4) direct marketing are located in the matrix with no further change of meaning to the primary liter-

ature. Especially in the digital sphere, a more diverse view on the remaining problematic categories is taken.

EXPLOSION IN TOUCH POINTS (LEMON VORHOEF 2016).

Digital channels are characterized by a strong IT-component and hence the web as an underlying technology for communication. Non-digital channels on the other hands rely on real world interaction. In general, a shift towards digital channels can be observed. For consumers they are a convenient way of communication, as their devices enable them to do interact with less effort. A stop at a retail store is more effortful than a lookup of information on the company website. Nevertheless, non-digital channels will always be part of channel portfolio, as complicated issues reason interaction with another human being face-to-face especially in the B2B-sphere.

The customer-centric view underlines the shift to personal marketing activities. This is enabled by IT and the ever increasing amounts of data that is available and possibly attributable to a single consumer. While the more personal approach is standard practice in B2B-relationships, mass media direct marketing has been the only way to target private customers in the past decades through the use of radio or television. In a data-driven world personalized relationships with consumers is an imperative to stay competitive. However, an anonymous way of retrieving information is also demanded, even though this way will likely increase the effort due to a less tailored presentation of information.

The two trends in the dimensions renders the personal / digital quadrant as an strategic priority. The identification of single customers is a requirement for a customer-centric view, which is only efficiently possible by information technology. This again can be mapped back to the work of **?**: They name information management and multichannel integration as strategic processes.

Not every channel is used by every company. Coming from a pre-digital age, digital channels were integrated gradually and often in a heterogeneous information system landscape (chen popovich 2003). The following paragraphs shortly describe all channel categories that are not named in **?**. A special focus is put on customer service provision.

DEF CUSTOMER SERVICE INBOUND OUTBOUND SELF SERVICE

Voice

Coming from traditional, non-digital telephony, voice is a very important service channel. While non-voice channels are said to overtake by the end of 2016, it is still accounting for half of the customer service volume on its own Dimension Data (2016). However,

voice is becoming more and more digital for example through Voice over IP (VOIP) technology, which is one reason for the renaming. Defining characteristic is the synchronous communication and interaction with a customer service representative (CSR). A channel's popularity is reasoned by customer's expectation to explain their problem easily(35.2%) and get a fast response (46.4%) according to **?**. Voice is well suited here, but is also a costly option for customer service through the one-to-one interaction. CSRs are not able to process multiple calls simultaneously. Outsourcing call centers has therefore become a major application across industries (SRC) as low-wage countries like India offer significant savings.

Regarding data, the shift towards digital call processing enabled the tracking of numbers, efficient routing and conversation recording for instance. Identification of callers is often possible through the caller's phone number (if not suppressed), another problem arises in outsourcing: When the client provides call routing systems and uses outsourcing as a means to process first level support for instance, the phone number might not reach the provider's systems. This renders a customer identification before start of the call impossible. Audio recordings also need to be automatically transformed into a processable format through sophisticated text-to-speech tools before using them for analytical purposes. Due to privacy reasons, these activities are restricted in many countries.

E-Mail

By 2020, 50% of the world's population is expected to have an email address **?**. In the developed world this number will be significantly higher. The convenience of electronic mail is the asynchronous communication from various devices, with attachments, at any time of the day and without the need to personally interact with the receiver. In customer service it is ranked second in terms of volume. 90.1% of call centers support e-mail Dimension Data (2016) today. Traditional mail or fax is included in this category, as it is plays an subordinate role: 1.4% of customers call it their preferred channel **?**. It also offers significant obstacles for customers through its slowness, costs and effort of creation and sending.

As the message content is directly processable, analytical support plays an important role in routing mails. The sender can be identified by the address, that can not be suppressed.

Direct Messenger

whatsapp, social

Video

merge with voice but digital roots. Video shares several characteristics with voice: It is synchronous, two human beings are involved and the communication is based on a common spoken language. In some sense, it is voice+, as it adds the visual representation of communication partners, which is why one can argue that they will ultimately merge into one channel category. The reason for the split here is that voice has its roots in the non-digital world, while video is clearly a digital channel. It offers advantages in customer service for example through the ability to perform legally binding identification or show objects of interest live during the conversation. Adoption however remains very low //SRC, as customers need a camera in their device and the anonymity of a voice call is preferred.

Social

fb, twitter, changing

Web site

janina

Non-Digital Channels

janina

42: stems from mid 90s, IT community. can be seen as informatin-enabled relationship marketing. 3 perspectives: narroly and tactical: implementation of a specific technology solution project. mid: implementation of a series of integrated customer-oriented tech solutions. broadly: crm is a holsitc approach to manage customer relationships to create shareholder value. channel split is old eCommerce does not make sense anymore. process view of payne frow helps, as it is not limited by organizational aspects.

- CSM or CM or CRM?

- Value Chain - GoM PDF – könnte man auch bei RefMod / Ordnungsrahmen machen.

- Importance for businesses

- characteristics, developments

- payne/frow

Multi-Channel CRM

Omni-Channel CRM

3.1.3 Customer Relationship Management Business Process Outsourcing Providers

- ECIS Paper...

- Strategy, Capabilities from voleti concretized.

- one face to the customer

- B2B2X

- virtual company

3.2 Reference Modeling

Conceptual models are representations of an application domain used to capture the important features to be incorporated into a specific information system (Batani et al. 1992; Bodart et al. 2001). –37 vom brocke

3.2.1 Concept

The Model as a construct

- kurz geschichte

- eigenes subheading für modellbegriff?

-

Reference Models can be seen as theory of information systems Schütte (1998). A model itself is defined as an "immaterial representation of an original for the purposes of a subject" (Becker et al. 2012, p. 1). Based on the work of Stachowiak (1973), three characteristics of models are identified: mapping, reduction and pragmatism. Mapping describes the representation of natural or artificial originals, which can be models themselves. Reduction underlines the omission of certain elements of the original in a model. Pragmatism means that the selection of parts of the original is dependent on the intent of the model. Based on this notion, models of information systems (or information models in short) are explicit models that have information systems as subject matter.

conceptual models paragraph

Modeling purpose of this thesis is the design of organizational

and application systems, which can be put together as information systems. Information modeling, the act of creating these, is a complex task, which is why reference models are a useful means to reduce this effort Becker et al. (2007) to create application models.

Reference Models and Application Models

An information model can be specified on a certain company, which is here denoted as an application model. Reference models on the other hand are not firm-specific and as the name suggests provide guidance in a defined modeling scenario. There is no accepted definition of reference model in the literature. Thomas compiles various definitions for reference models Thomas (2006). **?** brings in the notion of reusable conceptual models, where conceptual models are the representations of an application domain used to capture the important features to be incorporated in a specific information system (**?**, p. 584), as the term reference model is predominantly used in the German literature. It is agreed that a reference or application model of German understanding is a conceptual model. However it is refrained to use the terms reference conceptual model and application conceptual model over Application model (RM) or Reference model (AM) . As an conceptual model's purpose is the representation of features of an information system, it is an information model.

Schütte puts "universal validity" and "recommending characteristics" as defining for a reference model. Universal validity expresses that a reference model can only be valid for a class of companies, so that it can be used for creating application models. The recommending aspects states that a reference model should capture a wanted to-be state, which is in the modeler's intention. These two combined enable the wanted re-usability, which is planned by the modeler (**?**, p. 36). However, achieving a recommending characteristic is a subjective judgment and universal validity can always be achieved by shrinking down the target class of companies **?**. The other option, namely encompassing a large target class of companies to create *one* reference model stands in contrast to practical use, as the creation of application models gets increasingly complicated the more general (and hence abstract and theoretical) (Schütte 1998, p. 79) the reference model is. Striking a balance between these trade-offs is known as the reference modeling dilemma.

For this thesis, a reference model is defined as an information model with content that is reused in the construction of other application models. The relationship between a

reference and application model is characterized by reuse of reference model components in application model construction (cf. **??**).

To capture the complexity in business, a data, organizational, functional or process perspective can be taken (cf. 3.1.1). As only process models are subject matter in this thesis, the term process reference model is used interchangeably with reference model from here on.
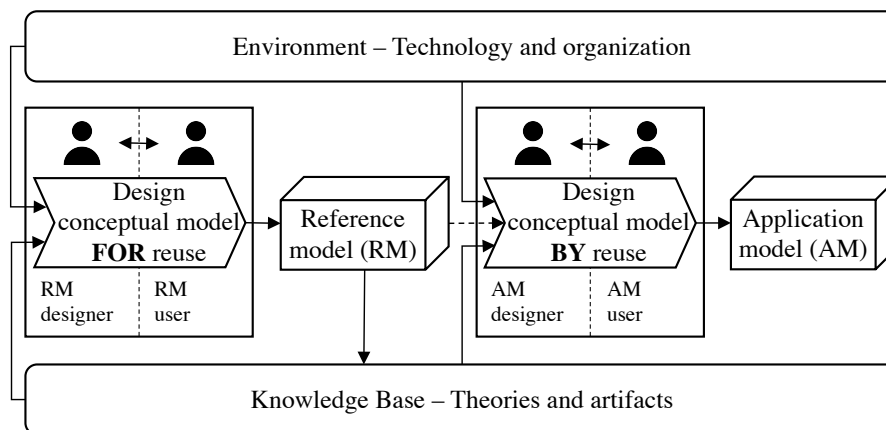
generisches Ref-Mod-Vari-anten-man-age-ment

Figure 5   Design Process of Reusable Conceptual Models

(**?**, p. 587)

A model is created by one or multiple subjects called designers and utilized by users **?**. Model designers in context of reference modeling responsible for creating the RMl itself. Their intention is to design *for* reuse, i.e. creating an artifact that is to be reused. The other involved stakeholder in this modeling process in the reference model user which collaborates with the designer and defines requirements for use. This first process is visualized in the left chevron in Fig. 5 and takes input from the knowledge base as well as the environment. The output is the RM which itself contributes to the knowledge base as an artifact.

The right chevron is similarly structured w.r.t. the stakeholders, but designs an application model on base of the now existing RM which can be labeled as design *by* reuse. Akin to the reference model designer, the application model designer takes requirements from the application model user. By doing this, the AM can represent characteristics of the application environment (i.e. one organization), while still being conformable to the reference model.

3.2.2 Construction

A construction of an AM on basis of a RM requires the construction of the latter beforehand. Fig. 5 lists the knowledge base (theories and artifacts) and the environment (technology and organization) as inputs for reference modeling. For knowledge acquisition, one can differentiate in an inductive and deductive approach **?**. Induction describes conclusions from particular cases to the general case. In this context these might be organizational settings that are observed or existing AMs of organizations in the domain. Deduction infers a special from a general case and is especially employed when drawing on existing theories from the knowledge base. Loosely, these two approaches refer to the two inputs for design *for* reuse in Fig. 5.

The reader is referenced to **?** for an overview about different construction techniques. These show conformance with the design science approach (**?**, p. 10) which is taken here.

Selected Reference Models

As mentioned, a reference model is suited to fit requirements of a certain domain. The purpose of this section is to briefly present two different reference models that are used in practice: The Supply Chain Operations Reference (SCOR) Model and the Retail-H. Both show a layer structure to manage complexity and both encompass a process reference model.

SCOR allows modelling of supply chains. It is a process reference model with three detail layers. It was developed in 1996 and is now maintained by the Association for Operations Management APICS (2015). On the highest level, typically called regulatory framework, SCOR is based on six distinct management processes: Plan, Source, Make, Deliver, Return and Enable. While the regulatory framework assists in defining scope, the second configures the type of supply chain (Make-to-Order, Build-to-Order, Engineer-to-Order). On the thirds level these are decomposed into generic process steps (e.g., issue product). Even more detailed processes are considered company specific and therefore no part of the model. Furthermore, performance metrics are also defined on each level.

In the domain of retail, the Retail-H is a reference model that includes process, function and data models. Developed by Becker and Schütte (2004), it has been adapted to suit special segments of the domain [4]. It is structured with four layers of detail: the regulatory framework, main processes, detail processes and process building blocks. The core of the regulatory framework is made up of three parts that form the H (a connection to the German word for retail: "Handel"). While the left part of the H describes the supply side, the

---

[4]   for instance eCommerce, Central Clearance, Central Settlement. cf. **?**
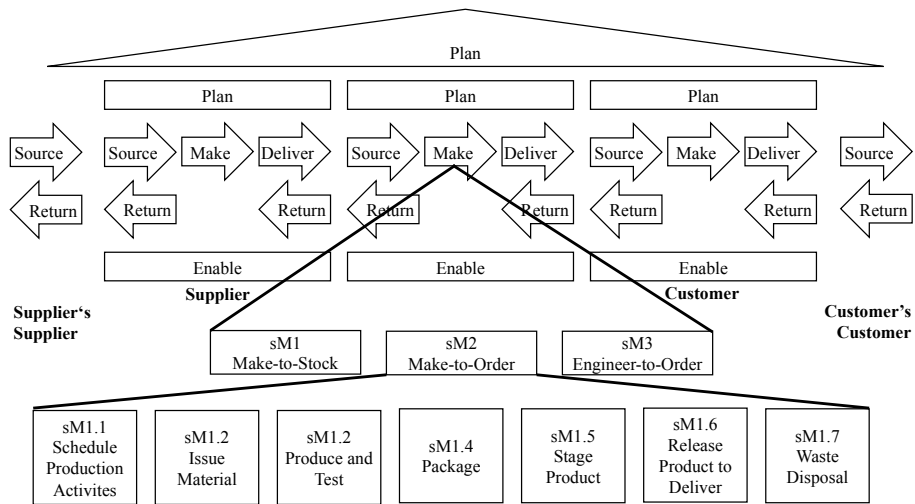
Figure 6 SCOR Model

right covers the distribution side. Both are connected through logistics. All of these core processes are business processes, the roof and foundation consist of support processes thereby making use of the framework reference design as proposed in Meise (2001) while simultaneously capturing domain-specific aspects in the set-up of the framework. Each segment on the regulatory framework is a main process, that has several main process steps and each of these is a detail process. The detail process steps are process building blocks and show the highest level of detail.
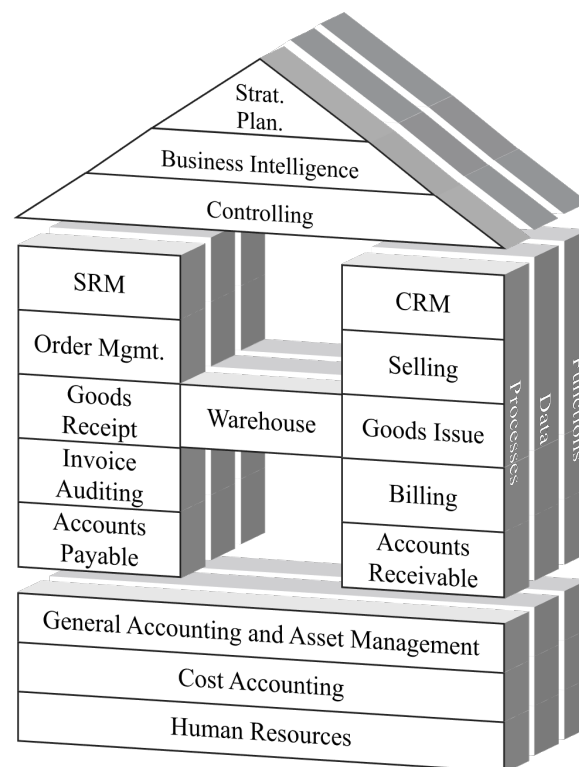
Figure 7   Retail-H

3.2.3   Benefits

- ECIS paper part!

- TODO: Fragen ob man hier schon auf bpo crm aspekte eingeht... eigentlich schon. was bringen die allgemeinen denn.

- auch vom Brocke checken

3.2.4   icebricks as a Process Modeling Language

Fundamental for a language is the ability to communicate through use of it (SRC). While reference models are formulated in various languages, several options may arise. There are reference models like SCOR, which avoid the use of a defined modeling language to ensure wide industry adoption through not interfering with used modeling languages. However, this necessitates an increased complexity in adoption, as an application within a company requires the translation into a sound process modeling language. While the framework level does not need to comply to a formalized language, more detailed layers of the reference model without clearly defined syntactical guidance increase the risk

of misunderstanding among users. This reasons the choice of using a defined process modeling language for this undertaking.

The next step is to decide what language to use. Traditional modeling languages like EPCs, Petri-Nets or BPMN show similarities. Being syntactical languages, they offer large degrees of freedom in usage. What might look like an advantage at first sight, turns out to be disadvantageous. As process management approaches have increased number and variety of model designers and users enormously, more and more non-experts get in contact with process models and thus create models of less quality. The definition of modeling conventions becomes necessary to help the modeler to conform certain standards. A way to confront this challenge are the Guidelines of Modeling (GOM) **?**, which are an analogy to the Generally Accepted Accounting Principles (GAAP). However, conforming to these guidelines will lead to increased resource requirements in these undertakings. Semantic process modeling languages avoid this by enforcing additional rules that models have to follow. icebricks **?** is one example that realizes this concept and has been used for reference modeling. In addition to syntactical correctness, i.e. conforming to the language's meta model, other aspects are also considered which would otherwise be taken care of by combining GOM and syntactical languages. Because the additional check for guideline compliance is unnecessary in semantic languages, they are more efficient. After a short summary of the language, the GOM are described and it is argued why icebricks conforms to the aspects.

icebricks has a four layer architecture, which consists of four layers of abstraction: (1) process framework, (2) main process, (3) detail process and (4) process building blocks. Each lower layer is an element of the higher layer, i.e. an element on the framework layer is a main process. Each part of a main process is a detail process and so on. A glossary ensures unambiguous terminology and meaning of processes, especially important for providers with a decentralized structure as well as to manage client vocabulary. Variants are integrated in the layer concept, so that every main or detail process can have different variants to model different peculiarities within a process. One example can be the three variants make-to-stock, make-to-order or make-to-engineer as variants of a production process.

Correctness

Correctness can be seen from a semantical and syntactical point of view. The latter can be assured when the model conforms to a meta-model of the language, which is shown in 8. On the other hand, semantical correctness refers to the correct display of content inside the model. This correctness is hard to prove, but can be supported by a clear and simple structure that minimizes misunderstanding (which negatively impacts semantical

correctness). While the other named languages tend to generate very complex models, the strict four layer structure of icebricks limits model complexity.
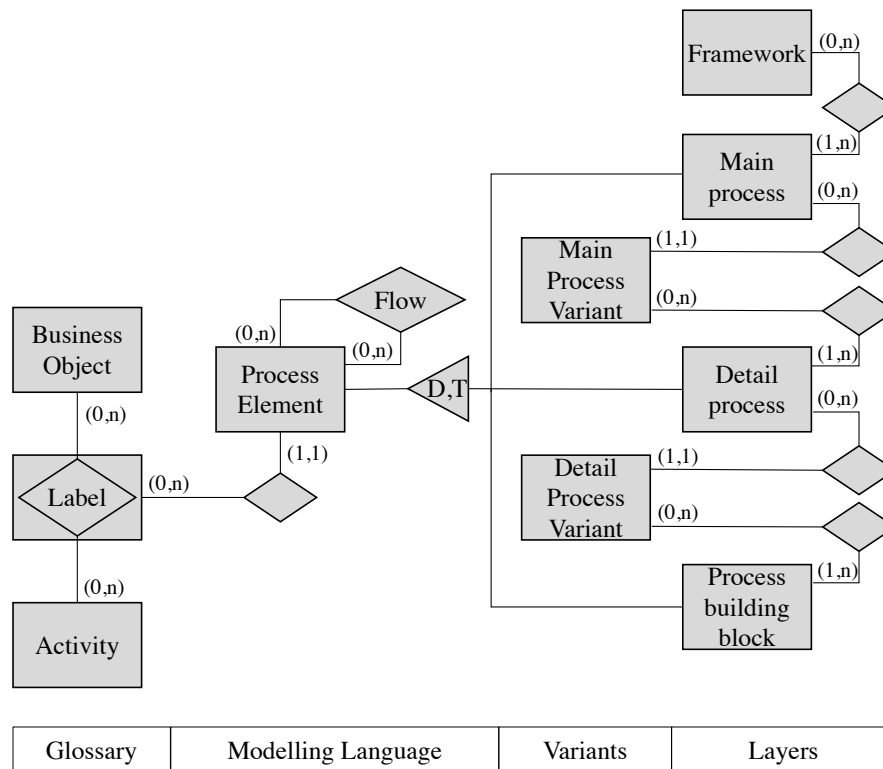
Figure 8 icebricks meta model

src püster

Relevance

Relevance refers to the depiction of elements inside the model, which are necessary for the modeling purpose. This causes two boundaries: On the one hand, no element should be included in the model that has no connection to the real world. On the other hand, no aspect of the real world should be part of the model, which does not comply with the modeling purpose. Again, a simple structure of processes helps to guide the modeling procedure.

Economic efficiency

Syntactical languages are more error prone than semantical languages, because defects occur a posteriori, i.e., after modeling. As a semantical language ensures more guidance and strictness to its modeler, less errors exist in the model because they are identified

during model creation. This reduces corrections on the outcome, which benefits the economic goal of successfully creating a model for the intended purpose with minimal effort (efficiency). In addition, icebricks as a reference modeling language has the ability to translate into other languages, because it only uses activities and control flow on every level. This enables a more efficient application of the reference model in companies.

Clarity

Clarity aims at a clear structure within a model and a simple navigation through different process models. The four layer approach, variant modeling and limited use of branches addresses a clear and consistent structure in an icebricks process model. Furthermore, the glossary ensures a labeling of processes, that conforms to the proposed verb + object construct **?** and tackles the problem of naming conflicts.

Comparability

With respect to different modeling languages, comparability describes the transfer of content inside a model in language A to another language B without sacrificing information. icebricks was designed to provide this ability, as the application of a reference model in multiple companies consequently leads to contact with different process modeling languages.

Systematic Design

The scope of reference models necessitates different layers of detail to manage complexity. Consistence between different layers is a challenge when separate models are built for each layer. By applying a layer structure, variant modeling and the use of a glossary, icebricks guides the modeler during model creation to create well-structured models in the first place.

4 Case

This thesis comes into being as part of the *ERCIS Omni-channel lab powered by Arvato*. This cooperation fosters research in omni-channel CRM through cooperation with Arvato, a leading European outsourcing provider. The focus is set on the CRM services division, which is one of four *solution groups*. While the focus is on the German market, Arvato operates international. The organizational structure can be described as decentralized in the past, but it is intended to integrate the independent country organizations more deeply within the solution group. As clients intensify international outsourcing of customer services to Arvato, a need to deliver an orchestrated outsourcing concept across borders arises. The solution group CRM therefore needs more alignment in their three constituents

- Sales & Business Development,

- Portfolio Management & IT and

- Operations.

A discussion of organizational structures is not in scope of this work, but this view on the business helps to derive a process structure that is later used in the reference model. As an analogy to the domain of retail, one can see its supply and distribution side in form of Sales & Business Development and Operations, respectively. The *Sales & Business Development* organization is oriented towards the outsourcing company, e.g., client. It is the main channel of communication to manage existing and potential clients and hence enables the *supply* of outsourcing contracts and therefore business to the organization. *Portfolio Management & IT* organizes available service products and their technological foundation. Especially CRM platforms, their selection and implementation is part of their capabilities. With a decentralized orientation in the past, Arvato faces the problem of a heterogeneous system landscape in client business, as there was no guidance for platform selection. The aspired product orientation at Arvato demands standardization in platforms, so that a managed portfolio becomes necessary. As it is a characteristic of CRM outsourcing that clients dictate parts of the environment, e.g., technology or processes, a BPO provider needs to be flexible to react to these requirements. Interface to Sales & Business Development are the product portfolio, which is marketed to the client. In addition, it supports in design and instantiation of products for a specific client. An internal view of products constituents, namely people, process, platform, is directed towards implementation of services and their use operational use. *Operations*, on the distribution side in the retail analogy, is oriented towards the customer. It delivers value to the customer. With call center business as core of BPO in CRM, it becomes clear that human

resources are one key ingredient of the service delivery.

Drawing from the three described constituents of the Arvato CRM solution group, one can identify three stakeholders in the BPO provider organization. Recalling the BPO Outsourcing chain (Fig. 3), one part of the provider is linked to the client, another to the customer and the third is located in the center. Applying this logic to the three aforementioned units of Arvato CRM and taking a perspective that is scoped on the essential task of the unit, Sales & Business Development targets clients and Operations is oriented towards the customer. Distancing from Arvato terminology, one can name these two stakeholders simply *Sales* and *Operations*.

Portfolio Management & IT influences both sides, as well as it acts between the two interfaces. Besides, the central part of the chain can be used to model the stakes of the BPO provider as a whole. With the taken perspective that factors out coordinating activities in the three units, the overall interest in terms of alignment across client businesses and country organizations can be captured in an isolated way. The definition of this stakeholder is necessary, as client or operations act with focus on their objectives within the organizations and put less emphasis on the provider organization as a whole. This third stakeholder is named *Management*.

4.1 Use of a Reference Model for BPO providers in CRM

Applying the aforementioned benefits of reference modeling 3.2 to the domain in combination with the three stakeholders, one can map these together as in Tab. **??**.

The reference model is also driven by the business model of CRM outsourcing providers. Since the outsourcing service is provided for several clients, the provider's internal organization has to cope with this kind of diversity. Each client has its own contract and different parts of customer service process outsourced. While in general the business objects to work on (e.g., schedule in workforce management) or process steps (e.g., route incoming call) apply to all clients, they will differ on detail level (e.g., Client A will have a different routing logic as Client B and Client C has routing still in- house and outsources only after this process step). The process differences between distinct client types of CRM outsourcing providers motivate to provide adaptive aspects in the CRM reference model as described in (Delfmann, 2007). In a configurable model the outsourcing provider can configure multiple client models based on the provided services that stay compatible and are linked with the provider model. By doing so, the provider model itself gets a refer-

		Stakeholder		
		Sales	**Management**	**Operations**
Designer	Knowledge	Applicable only to researchers, not to stakeholders in the organization		
	Economic benefits from applications			
User	Cost reduction	Faster client approach	Reduced coordination effort	More efficient processes
	Profit aspects	Organized preparation of client meetings	Standardization facilitates better management	Usage of new concepts leads to improvement of operational processes
	Risk reduction	Lower risk of incorrect modelling through reference processes		
	Analysis	Customized offering for approached clients	Organization-wide benchmarking	Benchmarking
	Information Exchange	Structured communication of value proposition to client	Communication of best practices within organizatino	Exchange between client operations

Table 1   Benefits of Reference Modelling for BPO-providers in CRM

ence character in the organisation. Figure 4 visualizes the model levels of the adaptive reference model. Each model uses the aforementioned four-layer structure.

4.2 Reference Modeling Approach

research project. arvato. decentralized to centralized. product orientation? "BPO" organizational structure. no repetition of background. stakeholders

- Arvato talk in general ok

- servitization

- numbers todo

- history ok

- DSR applied here todo

- Refmodel use case in bpo crm todo

- vom Brocke grafik begründet mein Vorgehen + DSR

4.3 DSR Application for Arvato

- wie wende ich DSR hier an?

- warum wende ich DSR hier an?

4.4 Problem Identification

- Kraume interview, process interviews

- historisch gewachsen

- verschiedener sprech

4.5 Solution Objective and Stakeholders

- Kraume interview

- Stakeholders

    Sales

    PSD / IT

    Ops

4.6   Limitiations

- only core processes specified, as also done in retail-h

- core processes partly on lowest level

- process refmod, not data

- specified later

5 Reference Model Construction

- Approach from Case advanced to the model itself

- ECIS model schemata

- type / instance : hybride leistungsbündel

A proposed Architecture for Reference Models in BPO

deloitte W14: managing change dispute:::: innovation und so... wichtig für begründung des frameworks

5.1 Process Framework

- meise 2001

5.2 Internal Services

5.2.1 ...

5.3 Client Services

5.3.1 ...

5.4 Customer Services

Self Service: Servitization paper 1988!

5.4.1 ...

- Approach from Case advanced to the model itself

- ECIS model schemata

- type / instance : hybride leistungsbündel

A proposed Architecture for Reference Models in BPO

5.5 Process Framework

- meise 2001

5.6   Internal Services

5.6.1   ...

5.7   Client Services

5.7.1   ...

5.8   Customer Services

Self Service: Servitization paper 1988!

5.8.1   ...

6 Evaluation

7   Conclusion

8 Sample

This LATEX template has been developed as an alternative to the well-known Microsoft Word "Becker-Vorlage". `00_thesis.tex` is the master file.

It is build by Jan Betzing and Dominik Lekse and draws from the DBIS template by Till Haselmann and Florian Stahl, as well as from the IS template by Stephan Dlugosz.

This document is work-in-progress and provides instructions on how to use the template. It does not give advices on scientific writing.

Please feel free to contribute to this template. Members of the WWU Münster can request access to the template by contacting the author at jan.betzing@ercis.uni-muenster.de. Afterwards you will be able to clone the template from `https://wiwi-gitlab.uni-muenster.de/lsis/isthesis.git`, and create push-requests with their new features.

TODO

- Configuration switch for having \chapter{} begin on a new page

- Replace `kvoptions` with `pgfkeys`

8.1 Elements

This chapter gives examples on what you can do with this template. It's just a brief overview. Please consult the common sources on how to write sicentific documents and documents with LATEX.

8.2 Structure

This template provides three structural levels that appear in the table of contents, viz., `\chapter`, `\section`, and `\subsection`. Chapters will always start on a new page. Additionally, you can use `\subsubsection` and `\paragraph` as non-hierarchical means to structure your thesis.

8.2.1 Lists

You can use the default LATEX functions for writing lists, viz., `\enumerate` for numbered lists and `\itemize` for bullet point lists. Again, the `\subsubsection` and `\paragraph` can be used as structural elements, e.g., when listing definitions of terms.

8.2.2 Footnotes

Footnotes are contiguously numbered throughout the whole document. Use the `\footnote{text}` command. They appear on the page their reference is on [5]. Footnotes have to be placed without whitespace behind the word and within the sentence boundaries, i.e., before the period.

8.2.3 ToDo-Notes

You can use ToDo notes using the `\todo{text}` command. Please make sure to remove any ToDo notes before handing in your thesis!

ToDo: Remove me before publishing

8.3 Formatting Text

LaTeX provides `\textit{text}` for *italics*, `\textbf{text}` for **bold face**, `\texttt{text}` for `typewriter`, `\textsc{text}` for SMALL CAPS, `\underline{text}` for underline. Additionally, the template provides `\texthl{text}` for highlighted text. Please remove any highlighted text before handing in your thesis!

Please use the `\enquote{text}` command for "direct quotes".

8.3.1 Colors

This template comes with the colors defined in the Corporate Designs (CDs) of the ERCIS and WWU. Tab. 2 lists the color names. You can apply them to text by using the `\textcolor{color name}{text}` command.

---

[5] This is an exemplary footnote.

Color Name	Result
ercis-black	Exemplary Text and 0123456789
ercis-grey	Exemplary Text and 0123456789
ercis-red	Exemplary Text and 0123456789
ercis-lightred	Exemplary Text and 0123456789
ercis-blue	Exemplary Text and 0123456789
ercis-darkblue	Exemplary Text and 0123456789
ercis-cyan	Exemplary Text and 0123456789
ercis-orange	Exemplary Text and 0123456789
ercis-green	Exemplary Text and 0123456789
wwu-black	Exemplary Text and 0123456789
wwu-green	Exemplary Text and 0123456789
wwu-lightgreen	Exemplary Text and 0123456789
wwu-blue	Exemplary Text and 0123456789
wwu-lightblue	Exemplary Text and 0123456789

Table 2   Colors defined by the template

8.4   Figures

The `figure` environment is wrapped around images. These images should either be included as PDF-file via `\includegraphics`, or created via *TikZ/PGF*. For included images, make sure to use high-resolution images, preferably vector images.

Figures float, i.e., they do not necessarily appear at exact the same position you have defined them. Make sure to set a *caption* and an optional *label* as figure parameters.

Figure 9   Relationship of students and theses

8.4.1   Subfigures

Sometimes it might be handy to contrast figures, i.e., by placing them next to each other. The template uses the *subcaption* package to provide subfigures. The following example contains two figures, where each subfigure has its own `\label` and `\caption`. Additionally, the whole figure has its own *caption* and *label*. That means, you can reference subfigures fig. 10a and fig. 10. Only the whole figure will be listed in the table of figures.

Subfigures are not limited to images, but may also include listings or tables. Fig. 10 shows a sample database query expressed in Structured Query Language (SQL) (fig. 10a) and as query plan in relational algebra (fig. 10b).

$$\Pi_{b,d}$$

$$\bowtie_{r.c=s.c}$$

$$\sigma_{r.a='c'} \qquad \sigma_{s.e=2}$$

```
SELECT b, d FROM
  EXAMPLE.RELATION1 r,
  EXAMPLE.RELATION2 s,
WHERE
  r.a = 'c'
AND
  s.e = 2
AND
  r.c = s.c;
```

(a) SQL select statement   **(b)** Sample evaluation plan
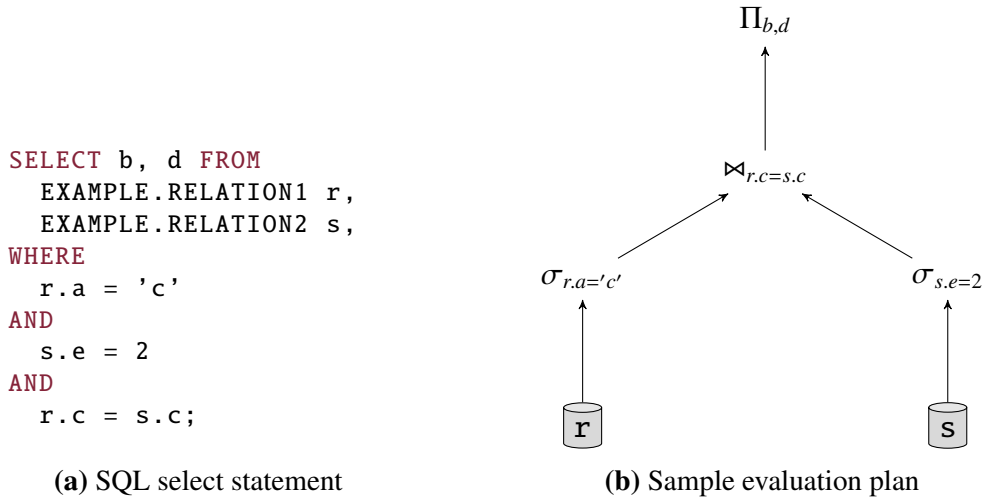
Figure 10   Exemplary use of subfigures

8.5   Listings

You can use listings to typeset source code. This template uses the *listings* package. Wrap code inside the `lstlisting` environment and set the *language* (e.g., Java, SQL), *caption*, and optional *label* parameters. If the source code highlighting highlights the wrong keywords or misses keywords, use the *deletekeywords* resp. *morekeywords* parameters. Consult the package documentation for further information.

```java
public class Euclid {

  public static int gcd(int p, int q) {
    if (q == 0) return p;
    else return gcd(q, p % q);
  }

}
```

Listing 1   Euclid's GCD algorithm implemented in Java

8.6   Algorithms

Some users might require specifying algorithms. This template uses the *algorithm*, *algorithmicx*, and *algopseudocode* packages. Consult the respective manuals for further information. Algorithms do not appear in a table at the beginning of the document, i.e., there is no list of algorithms.

Algorithm 1 Euclid's GCD algorithm in pseudocode

Require: nonnegative integer a, nonnegative integer b
  function EUCLID(a, b)
    if $b = 0$ **then**   ▷ comment
        return a;
    else
        return EUCLID($b, a \mod b$);

8.7   Acronyms and Abbreviations

This template provides comprehensive support for acronyms and abbreviations. The template uses the *glossaries* package. Please do only define abbreviations and symbols that are uncommon. That means, common abbreviations such as "e.g. " or "i.e. " should not be listed. Abbreviations and symbols are sorted automatically by their label.

8.7.1   Common Abbreviations

Please note that each full stop in a common abbreviation should be followed by a non-breaking space. This template comes with a variety of macros for common abbreviations, that can be used throughout your theses. The macros differ for English and German theses. Please see the tables below.

Command	Result
\apprx	approx.
\as	a.s.
\cf	cf.
\eg	e.g.
\Eg	E.g.
\esp	esp.
\etal	et al.
\fig	fig.
\Fig	Fig.
\ie	i.e.
\Ie	I.e.
\iid	i.i.d.
\p{4711}	p. 4711
\pf{4711}	p. 4711 f.
\pp{11--47}	pp. 11–47
\resp	resp.
\sect	sec.
\tab	tab.
\Tab	Tab.
\viz	viz.
\wrt	w.r.t.

Table 3   Common abbreviation macros for English theses

Command	Result	Command	Result
\aaO	a. a O.	\oE	o. E.
\Abb	Abb.	\oEdA	o. E. d. A.
\bspw	bspw.	\OEdA	O. E. d. A.
\bzgl	bzgl.	\oV	o. V.
\bzw	bzw.	\OV	O. V.
\ca	ca.	\resp	resp.
\dgl	dgl.	\S{123}	S. 123
\dsgl	dsgl.	\Sf{123}	S. 123 f.
\dh	d. h.	\Sff{123}	S. 123 ff.
\etc	etc.	\siehe	s. o.
\eV	e. V.	\sog	sog.
\evtl	evtl.	\sS{123}	s. S. 123
\fs	f. s.	\sSf{123}	s. S. 123 f.
\gdw	g. d. w.	\sSff{123}	s. S. 123 ff.
\ggf	ggf.	\stu	st. u.
\hc	h. c.	\su	s. u.
\iAllg	i. Allg.	\Tab	Tab.
\iBa	i. B. a.	\tw	t. w.
\idR	i. d. R.	\ua	u. a.
\ieS	i. e. S.	\etal	et al.
\inkl	inkl.	\uae	u. ä.
\insb	insbes.	\uAe	u. Ä.
\Prof	Prof.	\uiv	u. i. v.
\Dr	Dr.	\usw	usw.
\PD	PD.	\uU	u. U.
\Ing	Ing.	\va	v. a.
\iV	i. V.	\vgl	vgl.
\iW	i. W.	\Vgl	Vgl.
\iwS	i. w. S.	\vs	v. s.
\Nr{123}	Nr. 123	\zB	z. B.
\nW	n. W.	\zT	z. T.
\oa	o. a.	\zz	zz.
\oAe	o. Ä.	\zzgl	zzgl.
\oae	o. ä.		

Table 4   Common abbreviation macros for German theses

8.7.2 Custom Abbreviations

Custom abbreviations are defined in the `acronyms.tex` file, using the `\newacronym[longplural={<long plural>}, shortplural={<short plural>}] {<label>}{<short>}{<long>}` command. The *longplural* and *shortplural* parameters are optional. The abbreviations are sorted by their labels. The label is furthermore used to reference the abbreviations in your text. You can do so using commands listed in tab. 5. In most cases, you just use \gls{<label>}. On the first occurrence, the full version is displayed, e.g., European Research Center for Information Systems (ERCIS). Afterwards, the short version will be displayed, e.g., ERCIS.

You pluralize your abbreviation by adding a `pl` to the resp. command. This will add a small s to the abbreviation, e.g., CDs. Tab. 5 shows custom short and long plural versions of the abbreviation KMU. You might need this esp. for more complex German abbreviations that do not have a "s" plural form.

Command	Result
\gls{<label>}	\acrfull on first occurence, \acrshort otherwise
\glspl{<label>}	\acrfullpl on first occurence, \acrshortpl otherwise
\acrshort{<label>}	KMU
\acrshortpl{<label>}	KMUen
\acrlong{<label>}	Kleines und Mittleres Unternehmen
\acrlongpl{<label>}	Kleine und Mittlere Unternehmen
\acrfull{<label>}	Kleines und Mittleres Unternehmen (KMU)
\acrfullpl{<label>}	Kleine und Mittlere Unternehmen (KMUen)

Table 5 Commands for printing abbreviations

Only referenced abbreviations will be added to the list of abbreviations.

8.7.3 Symbols

If required, you can define symbols in the `symbols.tex` file, using the `\addsymboltolist{<symbol>}{<label>}{<name>}` command. The symbols are sorted by their labels. Please note, regardless of using the symbols in the text, all symbols defined in the symbols file will be output to the list of symbols.

8.8   Citations and Bibliography

This template uses BibTeX for bibliographies. It comes with the MISQ style that takes care of proper formating and sorting of your references. Of course, you have to maintain a clean `.bib` file that caters all necessary attributes. References will appear in the alphabetical order of the surname of the first author. In case of several works by the same author, they are sorted by year.

Citing in the text is done with the \citep[<before>][<after>]{<citekey>} command. Citations without parenthesis are done with \cite{<citekey>}. You can reference authors with \citeauthor{<citekey>}. However, we suggest typesetting authors in SMALL CAPS, e.g., HAMMER is one father of Business Process Management (BPM).

Exemplary citations

- BPM is an integral management paradigm for building and running effective and efficient organizations (Hammer 2015; vom Brocke et al. 2014).

- A holistic approach to BPM goes beyond process modeling and workflow management systems (vom Brocke et al. 2014, p. 530).

- See vom Brocke et al. (2014) for a comprehensive review on BPM best practices.

- HAMMER lists organizational capabilities for BPM (cf. Hammer 2015, p. 9 f.), while VOM BROCKE et al. give principles of good BPM (cf. vom Brocke et al. 2014, pp. 530–546).

- Two authors are automatically divided by an "and" in English or an "und" in German, e.g., (Becker and Kahn 2011).

- "BPM can provide a solid set of capabilities essential to master contemporary and future challenges" (vom Brocke et al. 2014, p. 534).

8.8.1   Misc

The name and matriculation number of the student will automatically be displayed on the header of every page when the thesis type *seminar* is selected.

9 Compiling the document

In order to generate a PDF-file from your TEX-file you have to run the following commands. We assume you have a master file `00_thesis.tex` that you want to typeset.

```
pdflatex 00_thesis
pdflatex 00_thesis
makeglossaries 00_thesis
bibtex 00_thesis
pdflatex 00_thesis
pdflatex 00_thesis
```

Listing 2   Commands to compile this document

Alternatively, you can use your favorite task runner. This thesis comes with a *Grunt* file to kick-start your LATEXwriting.

When running, Grunt will monitor your thesis and on file changes, the PDF-file is automatically rebuild using the commands from listing 2.

Please make sure to have node.js and the Node Package Manager (NPM) installed. Now you can open a command prompt at the document root and run the commands in listing 3.

```
# Install Grunt via npm (use sudo on Unix-based OS)
npm install -g grunt-cli

# Install Grunt plugins / dependencies
npm install

# Run the Grunt listener
grunt
```

Listing 3   Installing and running Grunt

9.1   Known Issues

Under some configurations on Windows machines, the `makeglossaries` command silently fails, which results in empty lists of accronyms and symbols. Same goes for the implicitly called `makeindex` command. In this case, you have to install `Perl`[6] on your machine.

---

6   https://www.perl.org/get.html

Appendix

A   Customer relationship management

brenneckes crm defs und so Appendices provide only two structural levels, viz., `\section`, and `\subsection`.

The numbering of figures, listings, tables, and footnotes is not reset. Thus, it continues as usual in the appendix.

A.1   Some Appendix Subsection

Suspendisse vitae elit. Aliquam arcu neque, ornare in, ullamcorper quis, commodo eu, libero. Fusce sagittis erat at erat tristique mollis. Maecenas sapien libero, molestie et, lobortis in, sodales eget, dui. Morbi ultrices rutrum lorem. Nam elementum ullamcorper leo. Morbi dui. Aliquam sagittis. Nunc placerat. Pellentesque tristique sodales est. Maecenas imperdiet lacinia velit. Cras non urna. Morbi eros pede, suscipit ac, varius vel, egestas non, eros. Praesent malesuada, diam id pretium elementum, eros sem dictum tortor, vel consectetuer odio sem sed wisi.

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Declaration of Authorship

I hereby declare that, to the best of my knowledge and belief, this Master Thesis titled "Towards a Process Reference Model for Business Process Outsourcing Providers in Customer Relationship Management" is my own work. I confirm that each significant contribution to and quotation in this thesis that originates from the work or works of others is indicated by proper use of citation and references.

Münster, 31st March 2017

Markus Heuchert