2 Research Foundations

This section reviews the major research foundations of this thesis. Section 2.1 introduces the software industry as context of the study. The economic relevance of the software industry is increasingly remarkable and it is shaped by some specific economic properties. The following three sections comprise literature reviews covering three research streams being most relevant to this thesis. Firstly, in Section 2.2 research results in the area of business model concepts are presented. This review contains both, generic as well as software industry-specific business model concepts. The proposed constituent components are analyzed and synthesized. Next, in Section 2.3, literature is reviewed that deals with firm performance. Starting with an analysis of generic research results the main focus is on studies focusing on the software industry. In Section 2.4, finally, research results in the area of M&A performance are presented. Likewise to the previous two literature reviews, generic as well as software industry-specific studies are analyzed and synthesized. The literature search process in all three studies is based on Vom Brocke et al. (2009, p. 7-10), Fettke (2006, p. 259-261) , and Webster and Watson (2002, p. 15-18).

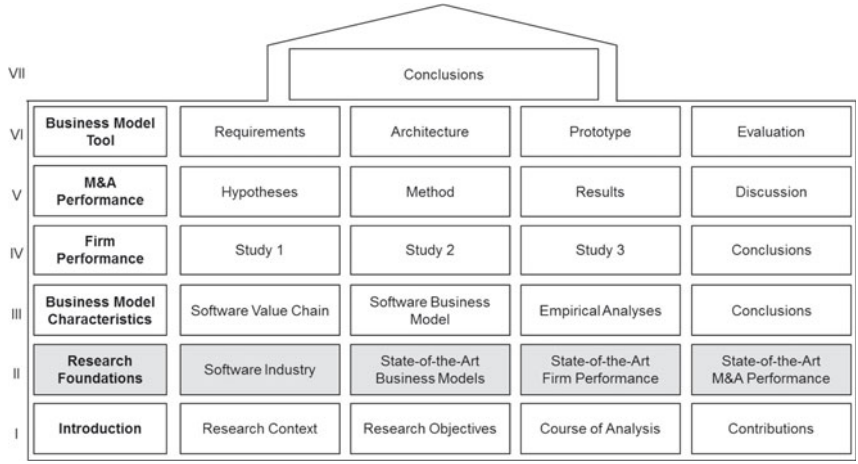

Fig. 5: Course of analysis: Chapter 2

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2.1 Software Industry as the Context of the Study

This thesis focuses on the software industry, which is defined as the sum of all enterprises whose core business is closely related to the development of software products in its broadest sense and complementary services (Pussep et al. 2011, p. 2). The **economic relevance** of the software industry is gradually increasing demonstrated by its influence on the transformation of various industries (Hoch 2000, p. 5-11). The importance is emphasized by the success and growth of software firms such as Google Inc. and Facebook Inc.. The explicit treatment of the software industry is also justified by the size and growth of this sector. According to a study by market research institute Gartner, overall IT spending has reached US$ 3.588bn in 2012 (Lovelock 2013). Thereof, US$ 278bn are assigned to the enterprise software segment and US$ 927bn to the IT services segment (Lovelock 2013). Both segments hence represent about one third of the global IT spending. Beyond absolute numbers growth rates are also remarkable. While the overall IT spending is expected to increase 3.4 percent in 2013, growth rates in enterprise software (6.0 percent) and IT services (4.5 percent) are even higher (Lovelock 2013). With respect to the boundaries between the software and services segments, it needs to be considered that they are increasingly hybrid in light of cloud computing, which supports offerings comprising software products and services[1] (Klosterberg 2010, p. 258). Hence, absolute size and growth rates of the software industry are remarkable and it is an interesting setting for this thesis.

The software industry is considered to be a highly **dynamic sector** characterized by fast innovation rates and short product lifecycles (Klosterberg 2010, p. 258). This setting is highly attractive to start-up firms (Klosterberg 2010, p. 263). Established market players are hence also challenged to keep up high levels of agility and innovation (Klosterberg 2010, p. 258). As response to that challenge firms invest in corporate takeovers as external sources of innovation. Mergers and acquisitions intensity is particularly high as incumbent firms consolidate the market in response to the ongoing challenges by the new ventures (Léger and Quach 2009, p. 704). A comparison among 49 industries shows that the number of M&A transactions in the software industry dominates all other sectors in the U.S. and in Europe. With regard to the cumulated transaction volume the software industry ranks second in the U.S. and sixths

[1] Due to the hybrid nature of software products and services, both terms are sometimes used interchangeably.

in Europe (Mergerstat 2009; Buxmann et al. 2013, p. 68-70). Particularly, the size and number of acquisitions performed by large companies have reached a remarkable level. For instance, Autonomy was bought by Hewlett-Packard for US$ 10.3bn, Skype by Microsoft for US$ 8.5bn, Sun Microsystems by Oracle for US$ 7.4bn, Sybase by SAP AG for US$ 5.8bn and Cognos by IBM for US$ 4.9bn. These transactions accentuate the strategic importance of M&A transactions in the software industry. The industry is hence a highly dynamic and innovative sector characterized by a high number of start-up firms as well as corporate takeovers. Notably, innovations are often attributed to the business model concept (Hamel 2002, p. 72; Johnson et al. 2008, p. 2). Accordingly, Chesbrough (2010, p. 354) claims that "technology by itself has no single objective value. The economic value of a technology remains latent until it is commercialized in some way via a business model. The same technology commercialized in two different ways will yield two different returns." Thus, the software industry presents an interesting setting for the analysis of business models.

According to the importance and dynamic of the software industry, the sector is of particular interest to researchers and practitioners. The interest in the software industry is also justified by the specific economic characteristics of the software industry. Michael Cusumano claims that "software is not like other businesses" (Cusumano 2004, p. 1). Software products and markets are inherently different compared to other industries. They are characterized by a number of specific economic properties providing a unique setting for research. In light of the resource and market-based view theory (see Section 1.1), the **economic properties** of the software industry refer to the software firm resources and software markets (Buxmann et al. 2013, p. 19-54). Tab. 1 presents 28 economic properties that are assigned to different groups. The economic properties have been mainly retrieved from a literature review covering five literature sources covering economic properties of the software industry (Stelzer 2004; Messerschmitt and Szyperski 2005; Engelhardt 2008; Klosterberg 2010; Buxmann et al. 2013).

Software firm resources can be differentiated into three groups, namely *Hardware*, *Human Resources*, and *Intellectual Property*. While *Hardware* refers to tangible characteristics, the latter two groups are intangible.

	Group	EP	Economic Property
Software Firm Resources	Hardware	EP1	Cheap storage of increasing data
		EP2	Increasing computing power
		EP3	Secondary role of performance
		EP4	Tradeoff between availability and capactiy utilization
		EP5	Development with information systems
		EP6	System dependency
	Human Resources	EP7	High complexity
		EP8	High need for good product- and systemarchitecture
		EP9	Possibility of standardization of software
		EP10	Special requirements for security and authenticity
		EP11	Iterative development
	Intellectual Property	EP12	Intangibility
		EP13	Ease of replication
		EP14	Ease of modification
		EP15	High requirements for technology and innovation management
Software Markets	Financials	EP16	High economies of scale
		EP17	High economies of scope
		EP18	New pricing models
	Customer	EP19	Integration of external factor
		EP20	Software as an experience good
		EP21	Utility dependent value
		EP22	Custom oriented design of goods and services
		EP23	Opportunities for differentiation
		EP24	High importance of broad user basis
	Relation	EP25	High change barriers for customers
		EP26	Customer involvement during product development
		EP27	Support of users during information processing
		EP28	Portability by information systems

Tab. 1: Economic properties of the software industry

With respect to ***Hardware***, six economic properties need to be considered. The first three are based on Moore's law (Moore 1965) stating that "the performance per unit cost of material information technologies increases exponentially with time" (Messerschmitt and Szyperski 2005, p. 29). In other words, the IT sector is characterized by an exponential growth of hardware performance. Accordingly, increasing data can be stored at low costs (EP1), strong computing power is not only available to an exclusive circle but to a broad mass (EP2), and developers can focus increasingly on requirements, design, and usability (EP3) as performance is supported by computing power (Messerschmitt and Szyperski 2005, p. 29-36). Nevertheless, a certain tradeoff between availability and capacity utilization (EP4) still needs to be consid-

ered (Messerschmitt and Szyperski 2005, p. 27). A high number of parallel users increases capacity utilization, but may also cause longer response times. This property particularly needs to be considered with respect to cloud computing offerings, where providers offer shared capacities to multiple customers. Besides, software can only be developed with the help of information systems (EP5) and is hence system dependent (EP6) (Stelzer 2004, p. 11). For instance, a compatible hardware and operating system is needed to run specific software.

The first intangible group refers to ***Human Resources***. Software embraces a high complexity (EP7) through its complex structure and its dynamic and context specific behavior (Engelhardt 2008, p. 14). To cope with complexity, developers need to focus on good product and system architectures (EP8) (Stelzer 2004, p. 14). For instance, a flexible product and system architecture may reduce efforts in case of modifications and enhancements. Also standardization of software (EP9) can provide benefits and a provider must consider the optimal degree of standardization (Buxmann et al. 2013, p. 33). The architecture also has to deal with special requirements for security and authenticity (EP10) due to the transmission via information systems, the ease of change, and customer involvement (Engelhardt 2008, p. 14). Besides, software is usually developed in iterations (EP11) reflecting evolving requirements through customer involvement (Messerschmitt and Szyperski 2005, p. 49).

Intellectual Property covers four economic properties. Software is an immaterial good (EP12) that can be easily replicated (EP13) and modified (EP14) (Stelzer 2004, p. 10; Engelhardt 2008, p. 18). If a copy of a software product is publicly available, disposition and copyrights can only be enforced at great expense (Buxmann et al. 2013, p. 3). Accordingly, the requirements for technology and innovation management (EP15) are high (Stelzer 2004, p. 15).

Likewise to the economic properties of software firm resources, **software markets** can also be differentiated into groups, namely *Financials*, *Customer*, and *Relation*.

With respect to ***Financials*** three specific economic properties need to be considered. Investments in the development infrastructure are comparably low to the development of material goods (Klosterberg 2010, p. 259). Nevertheless, usually high fix costs are related to the initial software development mostly generating personal costs (Klosterberg 2010, p. 259). The software usually first needs to be developed before it can be sold to customers. After the product release the initial fix costs can be amortized through the low replication costs implying high economies of scale (EP16)

(Klosterberg 2010, p. 259). Further synergies can be achieved by the reuse of software components in other software products leading to economies of scope (EP17) (Engelhardt 2008, p. 12). Besides, the software industry is characterized by new pricing models (EP18) (Messerschmitt and Szyperski 2005, p. 327). Lehmann and Buxmann (2009, p. 2) provide a comprehensive pricing parameter overview. For instance, usage based pricing models can be established addressing the utility-dependent value of software.

Six economic properties deal with the ***Customer***. Software integrates an external factor (EP19), the consumer, during product development and usage (Stelzer 2004, p. 13). It is an experience good (EP20) causing uncertainty of customers as the value of the products can hardly be judged in advance (Engelhardt 2008, p. 16). In this light, a utility dependent value (EP21) can be constituted (Messerschmitt and Szyperski 2005, p. 344-346). Therefore, value depends on the combination of the customer-specific context (e.g., data) and the software product. Accordingly, the design of products and services is often customer-specific (EP22) (Messerschmitt and Szyperski 2005, p. 48-49). The customer-specific value proposition hence also builds the foundation for opportunities for differentiation (EP23) (Messerschmitt and Szyperski 2005, p. 326). Last but not least, a broad user basis is very important (EP24) on software markets characterized by network effects (Katz and Shapiro 1985, p. 424). Compatibility and standards determine the market adoption of software through direct network effects (Messerschmitt and Szyperski 2005, p. 53-55). Beyond direct effects, indirect network effects can be achieved through complementarity. Products then benefit from the market penetration of complementary solutions (Gao and Iyer 2006, p. 122). For instance, the broad user basis of Microsoft Windows supports the adoption of Microsoft Office. The network effect character of software markets finally often leads to winner-takes-it-all-markets with customer lock-in effects (Buxmann et al. 2013, p. 21). The successful penetration of a broad customer basis hence often yields exponential profit margins (Buxmann et al. 2013, p. 20-32). M&A transactions are often considered to drive network effects through increasing the customer basis and the penetration of a certain standard (Izci and Schiereck 2010, p. 69).

Finally, the ***Relation*** to customers is important. Often high change barriers for customers (EP25) can be perceived; for instance, through the presented network effects or a product's high degree of customer-centricity (Buxmann et al. 2013, p. 27). High switching costs result in a lock-in and therefore a high dependence on a once-implemented product, making other solutions and providers inefficient (Shapiro and

Varian 1999, p. 103-104). The relation between the vendor and its customers is particularly intense if customers are involved during product development (EP26) (Messerschmitt and Szyperski 2005, p. 48-49). Reflecting the complexity of software products, users need to be supported during information processing (EP27) (Messerschmitt and Szyperski 2005, p. 20). Finally, the portability of software by information systems (EP28) is important (Klosterberg 2010, p. 261). Software can easily be distributed via the Internet, leading to low distribution costs. This also drives internationalization in terms of development and provisioning. Software can be developed and sold all over the world leading to global competition (Buxmann et al. 2013, p. 3).

2.2 Prior Literature on Business Model Characteristics

2.2.1 Generic

Before investigating the software industry-specific work, generic (i.e. non-industry-specific) work is summarized. The rationale behind this is that a review of generic business model concepts can serve as a valuable foundation for industry-specific analyses. Furthermore, the number of generic business model publications is comparably large to software industry-specific work.

The business model literature review by Burkhart et al. (2011, p. 14) provides an overview of research areas addressed by scientific publications. The overview shows that many publications deal with the components of business models. Though a vast amount of research has been published, a lack of consensus can be constituted with respect to the detailed business model components (Morris et al. 2005, p. 727; Krumeich et al. 2012, p. 1). Nevertheless, a convergence of **four key component areas** can be constituted that are commonly addressed (Frankenberger et al. 2013):

- Value Proposition (What is offered?)
- Financials (How to earn money?)
- Value Creation (How is value created?)
- Customers (Who is the customer?)

These four key component areas are commonly addressed in publications dealing with business model components. Exemplarily, **three research studies** are presented in detail. The work by Osterwalder (2004) is chosen due to its high visibility in academia and practice. In addition, two literature reviews (Morris et al. 2005; Krumeich

et al. 2012) provide a synopsis of the research results concerning business model components. Next, the results of the three studies are presented.

Osterwalder (2004) was one of the first proposing the constituent components of a business model. The concept consists of nine components grouped into four areas (Tab. 2), namely product, customer interface, infrastructure management, and financial aspects (Osterwalder 2004, p. 43). Comparing these components to the presented four key business model component areas, it can be concluded that both have a similar scope.

Area	Component	Key Business Model Component Areas
Product	Value Proposition	Value Proposition
Customer Interface	Target Customer Distribution Channel Relationship	Customer
Infrastructure Management	Value Configuration Capability Partnership	Value Creation
Financial Aspects	Cost Structure Revenue Model	Financials

Tab. 2: Generic business model components by Osterwalder (2004, p. 43)

Morris et al. (2005) were the first synthesizing the business model literature to draw conclusions concerning the components of business models. They summarize 19 literature sources and derive a framework comprising six central components (Tab. 3). In essence, a business model must address the value proposition, the customer, internal processes and competencies, a competitive strategy, how the firm makes money, and growth, scope and size objectives (Morris et al. 2005, p. 729-731). Three components are further defined by subcomponents (“select from each set”). For all components and subcomponents choice options are proposed that can be selected (Morris et al. 2005, p. 730). They serve as guidelines to operationalize the components and hence to characterize a business model. By comparing them with the four key component areas, it turns out that again a similar scope is addressed. Only component 6 cannot be assigned and can be considered as an additional aspect beyond the core component areas.

Components by Morris et al. 2005	Key Business Model Component Areas
Component 1 (factors related to the offering): How do we create value? (select from each set)	Value Proposition
offering: primarily products/primarily services/heavy mix	
offering: standardized/some customization/high customization	
offering: broad line/medium breadth/narrow line	
offering: deep lines/medium depth/shallow lines	
offering: access to product/ product itself/ product bundled with other firm's product	
offering: internal manufacturing or service delivery/ outsourcing/licensing/ reselling/ value added reselling	
offering: direct distribution/indirect distribution (if indirect: single or multichannel)	
Component 2 (market factors): Who do we create value for? (select from each set)	Customer
type of organization: b-to-b/b-to-c/ both	
local/regional/national/international	
where customer is in value chain: upstream supplier/ downstream supplier/ government/ institutional/ wholesaler/ retailer/ service provider/final consumer	
broad or general market/multiple segment/niche market	
transactional/relational	
Component 3 (internal capability factors): What is our source of competence? (select one or more)	Value Creation
production/operating systems	
selling/marketing	
information management/mining/packaging	
technology/R&D/creative or innovative capability/intellectual	
financial transactions/arbitrage	
supply chain management	
networking/resource leveraging	
Component 4 (competitive strategy factors): How do we competitively position ourselves? (select one or more)	Value Proposition
image of operational excellence/consistency/dependability/speed	
product or service quality/selection/features/availability	
innovation leadership	
low cost/efficiency	
intimate customer relationship/experience	
Component 5 (economic factors): How we make money? (select from each set)	Financials
pricing and revenue sources: fixed/mixed/flexible	
operating leverage: high/medium/low	
volumes: high/medium/low	
margins: high/medium/low	
Component 6 (personal/investor factors): What are our time, scope, and size ambitions? (select one)	n/a
subsistence model	
income model	
growth model	
speculative model	

Tab. 3: Generic business model component overview by Morris et al. (2005, p. 730)

In 2012, **Krumeich et al. (2012, p. 5)** published a further literature review of generic business model conceptualizations. They select 34 literature sources and review the proposed business model components (Krumeich et al. 2012, p. 2). Though the semantic meaning of the components is often similar, the naming of the components may vary in the literature sources (Krumeich et al. 2012, p. 1). Heterogeneous naming of semantically-linked components is hence harmonized. The resulting framework (Tab. 4) consists of 20 components grouped into five areas: Value capturing model, value offering model, value creation model, cooperation model, and financial model (Krumeich et al. 2012, p. 5).

These five areas again fit very well to the four proposed key component areas, with the exception of the Cooperation Model. This area can be considered part of the Value Creation area integrating the external context of a firm. For each literature source, Krumeich et al. (2012, p. 5) indicate if a component is included in the concepts under study. For that, the authors differentiate between those ones that are explicitly or partly/implicitly proposed by authors. As a consequence, these components can be considered as core components of business models. In contrast, eight components are included in less than 50 percent of the literature sources: competitive advantage (44 percent), customer relationship (41 percent), competitive model (41 percent), profit model (29 percent), coordination (26 percent), funding model (24 percent), distribution model (15 percent), and maturity (12 percent) (Krumeich et al. 2012, p. 5). These components can hence be interpreted as rather optional business model components. The definition of relevant components hence depends on the research purpose and the required level of detail.

Beyond the definition of business model components, the **operationalization** of components is a challenge. Among the presented studies, only Morris et al. (2005, p. 730) proposes choice options for each component and subcomponent. The concept proposed by Osterwalder (2004, p. 43) and the literature review by Krumeich et al. (2012, p. 5) do not provide any choice options for the proposed components. The operationalization of the components hence remains unspecified. If the operationalization of components is not predefined, a comparison between studies may be difficult, even if studies apply the same business model components.

Components by Krumeich et al. 2012	Value Capturing Model	Customer & Market Segment	Communication & Distribution Channel	Customer Relationship	Value Offering Model	Value Proposition	Product & Service Offerings	Competitive Model	Competitive Advantage	Value Creation Model	Organizational Structure	Resource Model	Competence Model	Activities & Processes	Cooperation Model	Structure & Position	Coordination	Maturity	Financial Model	Pricing Model	Funding Model	Revenue Model	Cost Model	Profit Model	Distribution Model
Key Business Model Component Areas		Customer				Value Proposition					Value Creation					Value Creation				Financials					
		88%	71%	41%		97%	74%	41%	44%		53%	79%	65%	79%		91%	26%	12%		65%	24%	91%	56%	29%	15%
Biegler and Reinhold (2011)		●	●	○		●	●		●			●	●			●	●			○		●			●
Osterwalder et al. (2010)		●	●	●		●	○					●	●	●		●				○		●	●		
Onetti et al. (2010)			○								●	●	●	●		●									
Demil and Lecoq (2010)		●	○			●	○	○			○	●	●	●		●						○	○	○	
Al-Debei and Avison (2010)		●	●	○		●	●				○	●	●			●	●			●		●	●		
Shi and Manning (2009)		○	○			●	○				●	●		●		○				●	●	●	●		
Richardson (2008)		●	●			●	●		●		●	●	●	●		●					●	●	●	●	
Lambert (2008)		●	●			●	○		○		●	●	●	●		●						●			
Johnson et al. (2008)		●	●			●	●					●		●		●				○		●	●	●	
Ballon (2008)		●	○	●		●	●	●			○	○	○	●		●						●	●		●
Aziz et al. (2008)		○		●		●		●	●		●	●	●	●		●				○		○	●	●	
Kallio et al. (2006)		●	●	○		●	●				○			○		○				○		●			
Gimscheid (2006)						●			●			●	●	●		●									○
Shafer et al. (2005)		●	○	●		●	●	●	●			●	●	●		●	○			●	○	●	●	●	
Schweizer (2005)		●	●			●		●	●			●	●	○		●						●			
Osterwalder et al. (2005)		●	●	●		●	●				○	●	●	●		●	●			○		●	●		
Morris et al. (2005)		●	●	○		●	●	●	●			○	●			○				●		●	●	●	
Yip (2004)		●	○			●	●				●	●		●		●									
Haaker et al. (2004)		●	○	●		●					○	●	●			●	●			●	●	●	●		●
Pateli and Giaglis (2003)		●				●			●			●	●	●		●				●		●	●		
Hedman and Kalling (2003)		●				○	●	●			●	●		●		●				○		○	○		
Bouwman (2003)		○	●			●	○				○	●	●	○		○				●	●	●			
Zu Knyphausen-Aufseß und Meinhardt (2001)		●				●	●		●					●		●	●			●		●			
Dubosson-Torbay et al. (2002)		●	●	●		●	●					●	●	●		●		○		●		●	●	●	
Chesbrough and Rosenboom (2002)		●				●		○	●			○		●		●						●	●	●	
Biegler et al. (2002)		●		●		●	●	○	●		●		●			●	●	●		○		●			
Wirtz (2001)		●	●			●	●	●				●		●						○	●	●			
Stähler (2001)		●	●	●		●	●					●	●	●		●	●	●		○		●	○	○	
Petrovic et al. (2001)		○	●	●		●	○	●				●	○	●							●	●			
Alt and Zimmermann (2001)		●				●	●	●	●					●		●	○					●			
Afuah and Tucci (2001)		●				●	●	●	●		●	●	●	●						●		●	●		
Mahadevan (2000)						●										●						●			
Linder and Cantrell (2000)			●			●					●					○				●		●			
Slywotzky (1996)		●	○			○	●	●	○		●			○		○		●		●	○	●	○	○	○

● is (explicitly) proposed by author(s) ○ is partially/implicitly proposed by author(s)

Tab. 4: Generic business model component overview by Krumeich et al. (2012, p. 5)

2.2.2 Software Industry-Specific

In addition to the research literature on the nature of business models in general, researchers have also looked at business models in the context of different domains. The majority of research has been concerned with eBusiness and eCommerce. For instance, Rappa (2004, p. 32) introduces the utility business model emphasizing the future of computer services. Amit and Zott (2001, p. 500) explore the theoretical foundation of value creation by examining 59 e-business models. Beyond e-business models, dedicated research has addressed the software industry. The **goal of this section** is to summarize publications that define software business model conceptualizations (not typologies, see Section 1.1) by proposing their constituent components. Furthermore, they should be applicable to a broad set of software firms. Highly specific publications (e.g., focusing on software-as-a-service details only) are not in scope. Finally, publications that apply generic business concepts to software firms without adapting the concept to the software industry are also not considered. For instance, Wessa (2009, p. 186-191) applies the business model concept by Osterwalder (2004, p. 43) to open source software firms.

For the software industry-specific approaches a thorough and extensive **literature review process** is conducted according to the guidelines of Vom Brocke et al. (2009, p. 7-10). The process starts with a search on four literature databases: EBSCO Business Source Premier and Econlit, Thomson Reuters Web of Knowledge, and AISeL. The in-title search for the search term “software and “business model”” yields 19 academic publications. After removing two redundant publications, titles and abstracts of 17 publications are analyzed. Out of these, only five publications are in line with the goal of this literature review. For the five publications a reference-based back- and forward search is conducted via Google Scholar and reveals twelve additional publications. Out of these 17 literature resources ten studies are removed as these studies are often based on the same business model concept and published by same authors. Thus, in summary, seven publications are identified proposing business model concepts specific to the software industry.

Tab. 5 summarizes the **study details** of the seven publications (Rajala et al. 2003; Kontio et al. 2005; Bonaccorsi et al. 2006; Rajala and Westerlund 2007; Rönkkö and Valtakoski 2009; Valtakoski and Rönkkö 2010; Rajala et al. 2012). The first approach dates back to 2003, when Rajala et al. (2003, p. 12) pioneered to develop a framework for analyzing software business models. The most up-to-date work was published in 2012. While all studies refer to primary data sources, three conduct case studies and four empirical surveys. Accordingly the sample size ranges from one to

six in the case studies and from 136 to 612 in the surveys. The primary region under investigation is Finland. Only one survey analyzes business models in Italy and one case study is located in the United States. With respect to the origin of components two methods can be differentiated. The deductive approach conceptually derives components from theory or expert knowledge (Bonaccorsi et al. 2006; Rajala and Westerlund 2007; Valtakoski and Rönkkö 2010; Rajala et al. 2012). The inductive approach empirically explores components from the study findings (Rajala et al. 2003; Kontio et al. 2005). Notably, the deductive studies hardly refer to the economic properties of the software industry (see Section 2.1). Only Bonaccorsi et al. (2006, p. 1092-1095) explicitly emphasizes certain characteristics such as network effects. The operationalization of components in the studies is heterogeneous. Some ask for qualitative judgments based on Likert scales (Likert 1932), others differentiate between bipolar options. One study (Valtakoski and Rönkkö 2010, p. 4-5) measures the components based on a proxy calculation covering the revenue distribution. Finally, two studies provide content-based choice options (product or revenue strategy types). The statistical analyses applied are mostly descriptive in nature. Only Bonaccorsi et al. (2006, p. 1087-1089) and Rönkkö and Valtakoski (2009, p. 7) apply clustering methods to identify similar configurations. Finally, the case studies provide practical examples for their software business model concepts. Nevertheless, all case studies do not disclose firm names. So, none of the studies apply their business model concept to well-known public business model examples.

	Rajala et al.	Kontio	Bonaccorsi et al.	Rajala & Westerlund	Rönkkö & Valtakoski	Valtakoski & Rönkkö	Rajala et al.
Year	2003	2005	2006	2007	2009	2010	2012
Sample size	5	163	146	6	315	612	1
Region	Finland	Finland	Italy	Finland	Finland	Finland	U.S.
Data source	Primary data	Primary data	Primary data	Primary data	Primary data	Primary data	Primary data
Method	Case Study	Survey	Survey	Case Study	Survey	Survey	Case Study
Origin of components	Inductive	Inductive	Deductive	Deductive	Mixed	Deductive	Deductive
Reference to economic properties of software industry	Low	Low	Medium	Low	Low	Low	Low
Operationalization of components	Choice options	Bipolar	Choice options / bipolar	Bipolar	Likert / Bipolar	Measured as revenue shares	n.a.
Statistical analyses applied	Descriptive	Descriptive	Clustering	Descriptive	Clustering	Descriptive	n.a.
Praxis examples	Yes	No	No	Yes	No	No	Yes

Tab. 5: Overview: Software industry-specific business model component studies

While the presented publications offer first insights on software industry-specific business model concepts, **limitations** arise as they largely differ in scope and depths. Reflecting the properties of the studies, various white spaces can be identified. First and foremost, the regional scope should be extended beyond Finland. Besides, a mixed method approach covering different methods as well primary and secondary data sources could reveal further insights. With respect to the highly specific economic properties of the software industry (see Section 2.1), it may be valuable to link the proposed software business model concepts to these properties. In addition, the operationalization of components varies. To facilitate the comparison among different empirical data sets, a comparable set of business model components and a respective operationalization needs to be ensured. Finally, examples from practice disclosing the firms can provide further means to practitioners.

Tab. 6 presents a synopsis of the components proposed by the seven publications. Though the semantic meaning of the components is often similar, the naming of the components varies in the literature sources (please refer to App. 2) for the original component terms). The heterogeneous naming of semantically-linked components is hence harmonized in this analysis. The resulting framework consists of 17 components grouped into the four key business model component areas introduced in Section 2.2.1.

Reflecting these conceptualizations of software industry business model components, a lack of consensus can be identified. The number and the kind of components differ strongly. Nevertheless, the aggregated view reveals some interesting insights. First and foremost, the proposed software industry-specific concepts are not that different compared to the generic business model concepts. While components can still be assigned to the four key component areas, the level of detail and the naming of the components are mainly software industry-specific. The service and product offering and degree of standardization are the most cited components. Both aspects are particularly relevant to the software industry being a sector where the trade-of between custom-specific and standardized solution as well as product and services needs to be addressed through hybrid solutions (see Section 2.1). With respect to financial aspects, mainly the license model is proposed as important component. For other revenue aspects, components can only be implicitly derived from choice options. The publications do not offer specific components in this area. A further focus is on the activities (e.g., distribution, implementation etc.) that are relevant for software business models. In this regard, components dealing with the degree of vertical integration and the value network imply that some activities can be out-

sourced to partners. Notably, the customer is scarcely in the focus of the presented concepts. Only one study proposes customer relationship as an important component of a software firm's business model.

	Rajala et al.	Bonaccorsi et al.	Kontio	Rajala & Westerlund	Rönkkö & Valtakoski	Valtakoski & Rönkkö	Rajala et al.	Sum
	2003	2006	2005	2007	2009	2010	2012	
Value Proposition								
Value Proposition							x	1
Service and Product Offerings		x	x		x	x	x	5
Product Type		x			x			2
Standardization	x	x	x	x	x			5
Financials								
License Model		x			x		x	3
Revenue Source	(x)					(x)	(x)	3
Pricing Assessment Base	(x)							1
Payment Flow Structure	(x)							1
Revenue Distribution Model	(x)							1
Value Creation								
Degree of vertical Integration		x			x	x		3
Value Network						x	x	2
Distribution	x	x						2
Implementation	x	x			x			3
Hosting		x			x			2
Maintenance		x			x			2
Support		x			x			2
Customers								
Customer Relationship				x				1

Entries with (x) are only implicitly derived from proposed choice options

Tab. 6: Overview: Software industry-specific business model components

All in all, the presented software business model concepts propose some important industry-specific components that provide means beyond the generic business model concepts. Some components (such as the licensing model) are highly industry-specific and hence not covered in the generic concepts. Nevertheless, two main shortcomings become apparent. Compared to the comprehensive generic concepts proposed in the literature reviews by Krumeich et al. (2012, p. 5) and Morris et al. (2005, p. 730) the proposed software industry-specific business model concepts are limited in scope. The characteristics for software business models do neither incorporate all generic business model characteristics (e.g., *customers*) nor account for all

the specific economic properties of the software industry. Furthermore, the operationalization of proposed components varies strongly. If the operationalization of components is not predefined and consistent, a comparison between studies may be difficult, even if studies apply the same business model components.

2.3 Prior Literature on Firm Performance

2.3.1 Generic

The question what drives firm performance has received considerable research attention and remains of continuous interest in strategic management (Short et al. 2007) and other disciplines such as information systems (Grover and Saeed 2004; Leidner et al. 2011). In the beginnings of the field, researchers examined the impact of economic and industry factors on firm performance (Porter 1985). Then, researchers extended the scope of analysis and emphasized that firms can make discretionary choices (Nelson 1991, p. 61-62). Research results have demonstrated that firm performance is affected at three levels: firm strategy, strategic group, and industry (Short et al. 2007, p. 149-152). Short et al. (2007, p. 147) conducted a simultaneous analysis of the industry, group, and **firm level** and found that, when examined together, the impact of factors on the firm level is the strongest. Multiple further studies have also shown that the firm level has a higher impact on performance (Jacobsen 1988, p. 415; Rumelt 1991, p. 167; Mehra 1996, p. 318-319; Ketchen et al. 1997, p. 223; McGahan and Porter 1997, p. 15). Consequently, a firm's discretionary strategic choices have been found to be the main driver of firm performance.

A **broad set of firm characteristics** has been analyzed thus far in order to identify the determinants of firm performance. Nevertheless, no final consensus has been reached on most important factors as previous studies have used very different sets of these characteristics. Capon et al. (1990, p. 1149-1151) provide an overview of investigated determinants. While some characteristics have been studied extensively, others have been scarcely covered.

Recently, **business models** have emerged as a further unit of analysis on the firm level. There is increasing consensus that business models can impact firm performance (Lambert and Davidson 2012, p. 8-10). Their characteristics can thus be considered as additional potential determinants of firm performance.

Lambert and Davidson (2012) conduct a literature overview covering business model performance studies. The results show that most studies concentrate on an **indus-**

try-specific setting (Lambert and Davidson 2012, p. 8) offering the opportunity to analyze domain-specific business model concepts and variables. Strategic management research also acknowledges that an industry-specific setting supports meaningful conclusions (Mehra 1996, p. 308-310). One reason is that industry-specific variables are more meaningful in delineating firms. Another reason is that researchers require deep knowledge of the particular industry under study to derive conclusions.

Firm performance studies can hence be differentiated with respect to the context of the study (industry-specific or generic) and the type of analyzed variables (business models or other firm characteristics). These two dimensions result in **four areas of firm performance research** illustrated in Fig. 6. Area I covers studies analyzing a broad set of firm characteristics without focusing on a particular industry. Literature assigned to Area II investigates the impact of firms' business model characteristics on enterprises in general. In contrast, Area III and Area IV focus on the performance of software firms. While Areas III covers studies investigating a broad set of variables, Area IV comprises literature that particularly deals with the performance effects of software firms' business models. While all four areas represent broad areas for research, the main focus in this literature review is limited to Area IV consisting of the software business model performance studies.

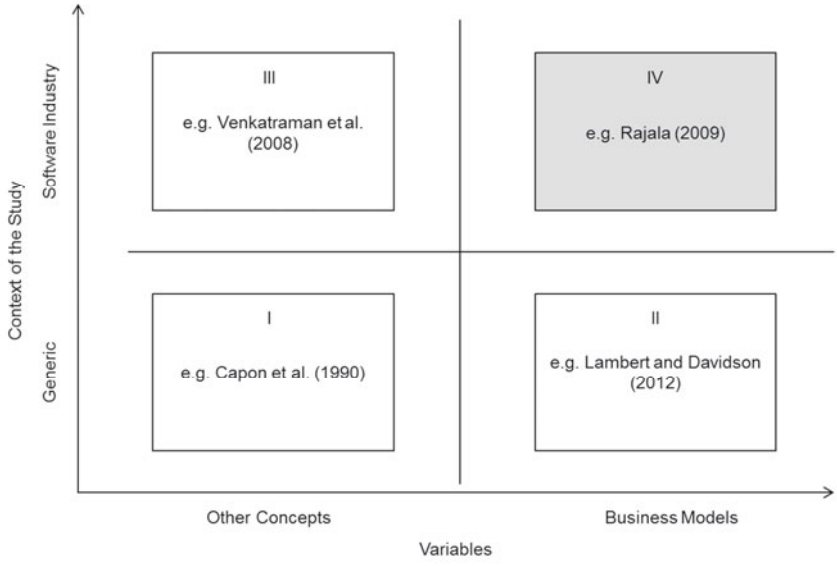

Fig. 6: Classification of firm performance literature

Area I covers studies that analyze a broad set of firm characteristics without focusing on a particular industry. This area has been of long and continuous interest to many researchers and research fields. Capon et al. (1990, p. 1149-1151) provide a comprehensive literature review of 320 studies. They summarize the investigated variables and their impact on firm performance. Interestingly, in no case all studies report the same sign for an explanatory variable (Capon et al. 1990, p. 1148). As a result, there is no simple prescription involving just one or a few factors that always hold true. In contrast, the results indicate that firm performance is driven by many different factors (Capon et al. 1990, p. 1157) and may depend on the specific context. This finding goes in line with the contingency theory (Hoffer 1975; Miller 1981) claiming that there is no general dominant strategy (see Section 1.1). To provide meaningful conclusions there is need for integrated studies covering a broad set of variables (Capon et al. 1990, p. 1157).

Business models have been found to provide a promising research field of firm performance drivers (**Area II**). In their literature review, Lambert and Davidson (2012, p. 6) summarize empirical business model studies and reveal publications investigating the impact of business models on enterprise performance. They identify and review 40 studies and conclude that there is "growing evidence for the support of the business model as a unit of analysis" (Lambert and Davidson 2012, p. 9-10). Notably, most studies analyze business model concepts that are rather narrow in scope. For instance, the study by Malone et al. (2006) is often cited, though limiting their analysis to two business model characteristics, type of product and rights sold. While a narrow business model concept facilitates the study design and data gathering, these studies may fall short in addressing the comprehensive nature of business models (see Section 2.2). Reflecting the results of Capon et al. (1990, p. 1157) claiming that multifaceted and integrated studies are needed, these studies may only explain a limited degree in firm performance variance.

2.3.2 Software Industry-Specific

Lambert and Davidson (2012, p. 8) report that most empirical studies concentrate on a specific context such as electronic markets or the biotechnology sector. Strategic management research also acknowledges that an industry-specific setting is required for meaningful conclusions. **Area III** covers literature that investigates the impact on firm performance in the software industry based on various firm characteristics. While these studies hence examine the performance of software firms, they do not analyze

business model characteristics as explanatory variables. For instance, Venkatraman et al. (2008, p. 395) analyze how a firm's business strategy (product scope and market scope) and network position (alliance degree and structural holes) impact performance. They report that the combination of business strategy and network position have a significant impact on firm performance. Tanriverdi and Lee (2008, p. 381) examine the impact of complementary diversification strategies in light of the software industry's network effects. They report that the combination of complementary operating system platforms and software product-markets improve sales growth and market share. Engelhardt (2004, p. 397) investigates four different software types, namely general software and services, business software, specialized software, and internet software. He reports significant performance differences in terms of sales growth and productivity growth among these four software types. Many characteristics explored in these studies refer to the economic properties of the software industry. Particularly, software product type, network effects, and complementary benefits are examined. The software industry thus seems to provide a special setting that should be considered in variable definition and operationalization of firm performance studies.

Area IV comprises literature that particularly deals with the performance effects of software firm's business models. To identify relevant publications, this literature overview builds upon the results of the review on software business models in Section 2.2.2 and on the publications listed in the empirical business model literature review by Lambert and Davidson (2012, p. 8).

To date, **only few studies** have analyzed business model performance in the software industry. As industry boundaries are increasingly fluent in this dynamic sector (see Section 2.1), studies are included that analyze firms being highly associated to software business. In total, six relevant publications can be identified. For each study six properties are analyzed, namely the sample, data sources, independent variables, dependent variables, statistical analyses applied, and main significant results. Tab. 7 provides a respective overview.

With respect to the **sample**, only two studies focus on pure software firms (Rajala 2009; Valtakoski and Rönkkö 2010, p. 5). Three studies aim at Internet firms (Zott and Amit 2007; Kauffman and Wang 2008; Zott and Amit 2008), and one study on IT firms (Redis 2009). Both firm types are often closely associated to software. Nevertheless, it cannot be concluded that each of the sample firms is necessarily a software company. Furthermore, only Rajala (2009, p. 175-176) and Valtakoski and Rönkkö (2010, p. 5) concentrate on established firms, whereas the other four studies deal with initial public offerings (IPOs). The timeframes of the IPO studies date back

to the area of the dot-com bubble in 2000. In this timeframe many internet and IT-IPOs were started.

	Zott & Amit (2007)	Zott & Amit (2008)	Kauffman & Wang (2008)	Rédis (2009)	Rajala (2009)	Valtakoski & Rönkkö (2010)
Sample						
Focus	Internet firms (IPOs)	Internet firms (IPOs)	Internet firms (IPOs)	IT firms (IPOs)	Software firms	Software firms
Year of data	1996-2000	1996-2001	1996-2006	1998-2002	2008-2009	2009
Size	170	190	130	112	197	612
Region	Europe+U.S.	Europe+U.S.	U.S.	France	Finland	Finland
Data sources	Secondary data	Secondary data	Secondary data	Secondary data	Primary data	Primary data
Independent variables						
Analyzed constructs	Characteristics	Characteristics	Characteristics	Characteristics	Characteristics	Classification
Business model variable 1	Novelty	Novelty	Interaction platform	Value chain positionin	Customer proximity	Software product firms
Business model variable 2	Efficiency	Efficiency	New technology	Target customer	Customer participati	Deployment project firms
Business model variable 3			Digital products / services	Income model	Collaboration density	Development service firms
Business model variable 4			Transaction broker		Focus on relationshi	ASP and SaaS firms
Business model variable 5			Revenues from advertisting		Product uniformity	not software firms
Business model variable 6					Focus on new products/services	Content and ads firms
Business model variable 7					Capabilities for new products/services	Software consulting firms
Business model variable 8					Products/services that are new to industry	Hardware firms
# of control variables	10	10	4	1	0	0
Performance measures						
Measurement timeframe	1 year	1 year	10 years	5 years	3 years	1-3 years
Performance KPI 1	Market Value	Market Value	Survival status	Time to profit	Market performance	Revenue
Performance KPI 2			Survival duration	Level of turnover	Market share	Total personnel
Performance KPI 3				Venture capital raised	Changes the firm has induced in the market	Growth of revenue
Performance KPI 4					Growth relative to competitors	Growth 3 year CAGR
Performance KPI 5					Firm performance	Willingness to grow
Performance KPI 6					Improved profitability	Profitability
Performance KPI 7					Increased product/service sales	Productivity
Statistical analyses applied	OLS Regression	OLS Regression	Cox Regression	OLS Regression	Structural Equation Modelling	Mean Value Comparison
Main results	Novelty-centered business models improve performance	Novelty-centered business models improve performance	Interaction platform, transaction broker, and (partly) advertising support firm survival	Value chain positioning and Target customer impact time to profit and level of turnover	Customer proximity impacts market and financial performance; product uniformity impacts market performance only	For each performance KPI some business model classes vary significantly

Tab. 7: Overview: Software business model performance studies

In contrast, the studies by Rajala (2009, p. 175-176) and Valtakoski and Rönkkö (2010, p. 5) cover more recent data. However, they only investigate Finish software firms, while the other four studies (Zott and Amit 2007; Kauffman and Wang 2008; Zott and Amit 2008; Redis 2009) expand their geographic coverage. A broad geographic coverage can only be attributed to the studies by Zott and Amit (2007, p. 186-187) and Zott and Amit (2008, p. 10-11).

The studies refer to primary and secondary **data sources**. Only Rajala (2009, p. 175-176) and Valtakoski and Rönkkö (2010, p. 5) collect primary data. They conduct large-scale industry surveys to retrieve business model information and performance data. The other four studies (Zott and Amit 2007; Kauffman and Wang 2008; Zott and Amit 2008; Redis 2009), in contrast, refer to financial databases and content analyses of public data (such as IPO prospectuses and annual reports) for their analyses.

With respect to **independent variables**, all studies, except one, investigate business model characteristics based on continuous variables. Only Valtakoski and Rönkkö (2010, p. 5-7) explore the impact of a limited number of business model classes. They apply clustering algorithms in order to derive eight business model classes. All studies analyze between two and eight business model variables. Rajala (2009, p. 176-179) and Valtakoski and Rönkkö (2010, p. 5-7) apply the most comprehensive business model concepts by collecting primary data supporting such fine granular analyses. The other four studies (Zott and Amit 2007; Kauffman and Wang 2008; Zott and Amit 2008; Redis 2009) analyze fewer business model variables. With respect to the nature of the business model variables under study, only Kauffman and Wang (2008, p. 221), Redis (2009, p. 299), and Valtakoski and Rönkkö (2010, p. 5-7) focus on industry-specific variables, whereas the other three studies (Zott and Amit 2007, p. 187; Zott and Amit 2008, p. 12; Rajala 2009, p. 176-179) apply very generic business model variables (such as efficiency or customer proximity). Furthermore, the two primary data studies (Rajala 2009, p. 175-176; Valtakoski and Rönkkö 2010, p. 5) do not include control variables. A simultaneous analysis of business model and control variables allows analyzing the relevance and magnitude of business model variables compared to other firm characteristics.

To analyze the impact of the independent variables, several **performance measures** are examined. The number of performance measures ranges from one to seven. Again the primary data studies analyze more variables than the secondary data studies. This is surprising, as secondary data studies often allow access to a broader set of performance measures. For instance, for public firms various financial data (e.g., revenue) and market data (e.g., stock data) can be collected. The measurement

timeframe varies between one and ten years in the studies. Therefore, some of the studies account for a certain time lag between decisions and performance effects. By conducting a multiple period analysis the lagged influence on firm performance is reflected through averaging the performance data over a time period.

With respect to **statistical analyses applied**, Rajala (2009, p. 181) applies structural equation modeling, Valtakoski and Rönkkö (2010, p. 9) compare mean values, and four studies (Zott and Amit 2007; Kauffman and Wang 2008; Zott and Amit 2008; Redis 2009) conduct regression statistics. The regression analyses allow identifying the relevance and impact of competing variables.

The **main results** of the studies provide first interesting insights. Notably, all studies show a significant impact of business model variables on at least one of the performance measures under study. The results hence confirm the conclusion that business models qualify as unit of analysis for performance studies in the software industry.

All in all, the studies confirm the relevance of the business model for firm performance analyses. Nevertheless, the presented studies largely differ with respect to the underlying business model concepts as well as the study design. Further research is hence needed to provide robust results. This literature review reveals the main research gaps. First and foremost, more studies should particularly concentrate on software firms, as other samples may comprise firms that compete under different economic properties (see Section 2.1). Furthermore, the geographic coverage needs to be broadened, particularly beyond Finland. With respect to the data sources, secondary data studies should also be conducted for established firms as these studies allow access to a broader set of performance measures. For instance, detailed and multiple years performance data (e.g., stock performance) can be analyzed. In addition, a mixed method approach and the comparison of findings is a promising white space. Last but not least, more software industry-specific and comprehensive sets of variables should be examined. To data, only a few software industry-specific characteristics have been analyzed (see Section 2.2). Then, a simultaneous analysis of multiple variables can reveal the most important business model characteristics. As a result, this literature review reveals various avenues for further research that need to be addressed.

2.4 Prior Literature on M&A Performance[2]

2.4.1 Generic

The question what drives M&A performance has received considerable research attention and remains of continuous interest in strategic management and corporate finance. This literature review covers a classification of research papers in the generic (i.e. non-industry-specific) and software industry-specific M&A research discipline. The goal is to investigate success drivers of mergers and acquisitions in the software industry. To categorize the M&A success drivers the framework in Fig. 7 is applied. It is derived from Haleblian et al. (2009, p. 473).

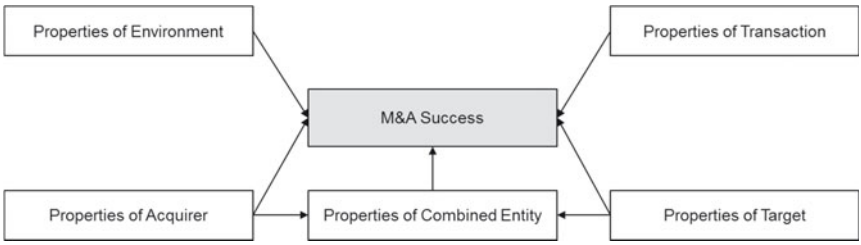

Fig. 7: M&A success driver framework (Schief et al. 2013a)

The **success drivers** are classified in five categories. *Properties of Environment* cover exogenous factors (e.g., legal regulations) that can be considered as constants for merging companies. *Properties of Transaction* describe characteristics specific to an M&A transaction (e.g., payment type). *Properties of Acquirer* consist of characteristics that are specific to the transaction's acquirer (e.g., acquisition experience). Likewise, *Properties of Target* are specific to the target (e.g., form of organization). *Properties of Combined Entity*, finally, specify characteristics that emerge when comparing acquirer's and target's properties (e.g., relative size).

Before investigating the software industry-specific work, **generic work is summarized**. The rationale behind this is that only few studies focus on the software industry, while the number of generic M&A publications is enormous. A review of generic M&A studies can hence serve as a valuable foundation for subsequent industry-specific analyses. Since the amount of research in this area is too large, this literature review examines only the effects proposed in M&A literature reviews.

[2] Some of the content presented in this section was published in Schief et al. (2013a)

The **goal** is to identify generic literature reviews that summarize other M&A studies without focusing on a specific aspect (e.g., a specific region or industry sector). The title search for the key words “and(or(review, survey, state, synthes*, literature, meta, SOTA), or(acquisition, merger, takeover, M&A))“ in the Ebscohost Business Premier und Econlit databases resulted in 386 hits. The result list was restricted to publications that have been published after double blind reviews in academic journals since 1990. An analysis of titles and abstracts reduced the number of potential relevant hits to 41. After a detailed analysis of these 41 publications, six papers could be identified (Datta et al. 1992; Bruner 2001; Bruner 2004; King et al. 2004; Tuch and O'Sullivan 2007; Haleblian et al. 2009). A forward and backward search in these papers did not reveal further relevant publications.

M&A success can be analyzed from three perspectives: the **success of the acquirer**, the target, and the combined success. While the latter two are positive according to the six literature reviews, the success of acquirers is subject to debate. Therefore, it remains unclear if buyers can realize the expected value of takeovers. It turns out, that the M&A success depends on various success factors (Datta et al. 1992, p. 79). By analyzing these success drivers it can be concluded which transactions yield positive effects for acquirers. Tab. 8 summarizes the M&A success drivers and their effect on the performance of acquirers.

In total, **20 determinants** are examined with respect to their impact on the M&A success of acquirers. While two literature reviews (Datta et al. 1992; King et al. 2004) conduct quantitative analyses of the examined studies, four literature reviews only provide qualitative judgments (Bruner 2001; Bruner 2004; Tuch and O'Sullivan 2007; Haleblian et al. 2009).

By **comparing the results** of the literature reviews it can be concluded if factors are classified consistently or controversially. Out of the 20 analyzes determinants, for ten factors inconsistent findings are reported. As a result, no generic conclusion can be derived. For the remaining ten factors consistent results are reported or they are covered by only one study (printed in bold). With respect to *Properties of Environment*, it turns out that a low M&A intensity in the market is rather beneficial. In terms of *Properties of Transaction*, multiple bidders seem to be counterproductive, whereas hostile takeovers are preferable. Moreover, the use of earnouts is positive. With regard to *Properties of Acquirer* the initiation of M&A programs is beneficial.

			Datta et al. (1992)	King et al. (2004)	Bruner (2002)	Bruner (2004)	Tuch and O'Sullivan (2009)	Haleblian et al. (2009)	Summary
Data and Method	**Timeframe**		1975-1990	1921-2002	1971-2001	n.n.	1977-2006	1992-2009	
	Number of Studies in Sample		41	93	128	>100	78	167	
	Method of Analysis		quantitative[1]	quantitative[1]	qualitative	qualitative	qualitative	qualitative	
M&A Success	**Effect on Acquirer**		neutral	neutral/ negative	neutral	heterogeneous results[2]	heterogeneous results[2]	neutral/ negative	inconsistent[3]
	Effect on Target		positive	positive	positive	positive		positive	**positive**
	Combined Effect				positive	positive		positive	**positive**
Environ-ment	***M&A-intensity (Waves)***	**Low**					low rather preferable	low rather preferable	**low rather preferable**
		High				negative			
	Legal Regulations	**Low**	n.s.					low rather preferable	inconsistent[3]
		High			negative				
Properties of Transaction	**Payment Type**	**Cash**	n.s.	n.s.	neutral	neutral	cash rather preferable	cash rather preferable	inconsistent[3]
		Stocks	negative		negative	negative			
	Multiple Bidders	**Yes**	negative						**negative**
		No							
	Transaction Mood	**Friendly**				hostile rather preferable	hostile rather preferable		**hostile rather preferable**
		Hostile			positive				
	Merger vs. Acquisition	**Acquisition**	n.s.					takeover rather preferable	inconsistent[3]
		Merger							
	Use of Earnouts	**Yes**				positive			**positive**
		No							
Properties of Acquirer	**Acquisition Experience**	**Low**		n.s.				heterogeneous results[2]	inconsistent[3]
		High							
	Buyer's Ex-ante Performance	**Low**			low rather preferable	low rather preferable	low rather preferable	high rather preferable	inconsistent[3]
		High							
	Initiation of M&A Programs	**Yes**			positive	positive			**positive**
		No							
	Manager' Stake	**Low**				high rather preferable		heterogeneous results[2]	inconsistent[3]
		High			positive				
	Usage of Excess Cash	**Yes**			heterogeneous results[2]	heterogeneous results[2]			inconsistent[3]
		No							
Properties of Target	**Target's Ex-ante Performance**	**Low**				heterogeneous results[2]		low rather preferable	inconsistent[3]
		High							
	Form of Organization	**Private**				positive			**positive**
		Public							
Properties of Combined Entity	**Relative Size**	**Big Target**			big targets rather preferable	positive	positive	heterogeneous results[2]	inconsistent[3]
		Small Target							
	Geographic Scope	**National**				neutral			**neutral**
		International							
	Managers' Perception of Cultural Differences	**Low**						low rather preferable	**low rather preferable**
		High							
	Increase Market Power	**Yes**			neutral	neutral			**neutral**
		No							
	Synergies	**Revenue**			cost rather preferable	cost rather preferable			**cost rather preferable**
		Cost							
	Strategic Fit	**Focus**	positive	n.s.	positive	focus rather preferable	focus rather preferable		inconsistent[3]
		Diversification	n.s.	n.s.	negative				
		max R^2	41.40%	n.a.[1]					

Factors are analyzed with respect to their impact on buyers
Italic factors are only analyzed in M&A meta studies, not in software industry specific studies
For quantitative studies only significant effects are reported. "n.s." implies non significant results
1) "n.a." implies that no R^2 is reported
2) "heterogeneous results" implies that within one meta study no clear result is reported
3) "inconsistent" implies that accross the six meta studies no clear result is reported

Tab. 8: Success drivers of M&A performance: Results from generic meta studies (Schief et al. 2013a)

In terms of *Properties of Target* private target firms seems to be more lucrative than public ones. With regard to *Properties of Combined Entity,* geographical scope and

grabs for market power seem to be neutral. Besides, managers' perception of cultural differences should be rather low. In terms of synergies, cost synergies are rather preferable than revenue synergies.

2.4.2 Software Industry-Specific

Next, publications are presented that analyze the M&A success in the software industry. The **literature search process** starts with a title search for the key words „and(or(*software*), or(acquisition, merger, takeover, M&A))" in the AISeL and the Ebscohost Business Premier und Econlit databases. It resulted in 51 hits. The result list was restricted to publications that were published after double blind reviews in academic journals. After a detailed title and abstract analysis of these 41 publications the number of relevant hits was reduced to three. A forward and backward search in these papers revealed two further relevant publications. Thus, in total, five publications (Léger and Yang 2005; Gao and Iyer 2006; Léger and Quach 2009; Izci and Schiereck 2010; Laamanen et al. 2013) were identified.

Various methods and measures can be applied to measure M&A performance (Meglio and Risberg 2011, p. 422). All **five studies** conduct event studies and calculate the cumulative average abnormal return as success measure. In addition, two studies analyze the long-term success in terms of annual performance figures (Léger and Quach 2009, p. 710) and market capitalization (Laamanen et al. 2013, p. 38). These two studies hence provide an additional long-term perspective beyond the short term perspective of the event studies. Tab. 9 and Tab. 10 summarize the M&A success drivers and their impact on the performance of acquirers.

M&A success can again be analyzed from different perspectives: While the success of targets is positive, the **success of acquirers** is subject to debate. As a result, it also remains unclear if buyers in the software industry can realize the expected value of takeovers (e.g., through anticipated network effects). The telecommunication industry also shows negative results for buyers (Jope et al. 2010), even though it is characterized by network effects (Izci and Schiereck 2010, p. 69). A rationale for this contradictive effect may be the aggressive bidding behavior and resulting acquisition premiums (Izci and Schiereck 2010, p. 70). In this light, it turns out that the M&A success in the software industry also depends on various success drivers (Izci and Schiereck 2010, p. 73). By analyzing these success drivers it can be concluded which transaction yield positive effects for acquirers.

				Leger and Yang (2005)	Gao and Iyer (2006)		Laamanen et al. (2013)	Leger and Quach (2009)	Izci and Schiereck (2010)	Summary
Data and	Timeframe			1980-2002	1999-2004		1988-2008	1990-2003	2000-2007	
	Number of M&As			10033	193		5079	60	81	
	Success Measure			CAR	CAR*	CAR**	CAR	CAR	CAR	
M&A Success	Effect on Acquirer			positive	negative		heterogeneous results[2]	target performs better	negative	inconsistent[3]
	Effect on Target			positive	positive				positive	**positive**
	Combined Effect				n.s.					n.s.
Properties of Transaction	Payment Type	Cash			positive		n.s.		positive	inconsistent[3]
		Stocks								
	Price-Book Ratio	Low								
		High						negative		**negative**
	Year						n.s.			n.s.
	Transaction Volume	Low							n.s.	n.s.
		High								
	Transaction Price Disclosure	Yes					n.s.			n.s.
		No								
	Percentage Acquired	Low							n.s.	inconsistent[3]
		High		positive						
Properties of Acquirer	Acquisition Experience	Low					n.s.			n.s.
		High								
	Size of Acquirer	Low								
		High			negative		negative			**negative**
	Degree of Diversification	Low								
		High					positive			**positive**
Properties of Target	Target's Ex-ante Performance	Low						n.s.		inconsistent[3]
		High							negative	
	Form of Organization	Private					private preferable			**private preferable**
		Public								
	Acquisition of Divested Assets	Yes					positive			**positive**
		No								
Properties of Combined Entity	Relative Size	Big Target				positive			negative	inconsistent[3]
		Small Target								
	Geographic Scope	National							n.s.	n.s.
		International					n.s.			
	Synergies	Market Power						n.s.		n.s.
		Economies of Scale						n.s.		n.s.
		Economies of Scope						n.s.		n.s.
	Strategic Fit	Focus		n.s.			negative		n.s.	inconsistent[3]
		Diversification		positive						
		Software Stack Layers	Same Stack Layer		negative	negative				**negative**
			Adjacent Stack Layer		negative	positive				inconsistent[3]
			Detached stack layer			negative				**negative**
		Compatibility of Software						n.s.		n.s.
		Complementarity of Software						negative		**negative**
		Acquisition of Competencies						heterogeneous results[2]		inconsistent[3]
		max R^2		n.a.[1]	9.2%	39.9%	2%	12.1%	21.0%	

Drivers are analyzed with respect to their impact on buyers
Italic drivers are only analyzed in software industry specific studis, not in M&A meta studies
*Study based on three layer product stack
**Study based on five layer product stack
"n.s." implies non significant results
1) "n.a." implies that no R^2 is reported
2) "heterogeneous results" implies that within one study no clear result is reported
3) "inconsistent" implies that accross the studies no clear result is reported

Tab. 9: Success drivers of M&A performance: Results from software industry-specific studies – CAR studies (Schief et al. 2013a)

				Laamanen et al. (2013)	Leger and Quach (2009)				Summary
Data and Method	Timeframe			1988-2005					
	Number of M&As			435					
	Success Measure			Market capitalization	Revenue growth	Return on assets	Return on equity	Margin	
M&A Succes	Effect on Acquirer								
	Effect on Target								
	Combined Effect								
Properties of Transaction	Payment Type		Cash	n.s.					n.s.
			Stocks						
	Price-Book Ratio		Low		n.s.			heterogeneous results[2]	inconsistent[3]
			High			positive	positive		
	Year			n.s.					n.s.
	Transaction Volume		Low						
			High						
	Transaction Price Disclosure		Yes	n.s.					n.s.
			No						
	Percentage Acquired		Low						
			High						
Properties of Acquirer	Acquisition Experience		Low	n.s.					n.s.
			High						
	Size of Acquirer		Low						
			High	negative					**negative**
	Degree of Diversification		Low						
			High	positive					**positive**
Properties of Target	Target's Ex-ante Performance		Low		n.s.			heterogeneous results[2]	inconsistent[3]
			High			positive	positive		
	Form of Organization		Private	n.s.					n.s.
			Public						
	Acquisition of Divested Assets		Yes	positive					**positive**
			No						
Properties of Combined Entity	Relative Size		Big Target						
			Small Target						
	Geographic Scope		National						
			International	n.s.					n.s.
	Synergies	Market Power			positive	n.s.	negative	negative	inconsistent[3]
		Economies of Scale			positive	n.s.	n.s.	n.s.	inconsistent[3]
		Economies of Scope			n.s.	negative	negative	heterogeneous results[2]	inconsistent[3]
	Strategic Fit		Focus	n.s.					n.s.
			Diversification						
	Strategic Fit	*Stoftware Stack Layers*	Same Stack Layer						
			Adjacent Stack Layer						
			Detached stack layer						
		Compatibility of Software			positive	n.s.	n.s.	negative	inconsistent[3]
		Complementarity of Software			n.s.	positive	negative	positive	inconsistent[3]
		Acquisition of Competencies			n.s.	negative	n.s.	negative	inconsistent[3]
		max R^2		10%	34.3%	57.8%	57.6%	60.1%	

Drivers are analyzed with respect to their impact on buyers
Italic drivers are only analyzed in software industry specific studis, not in M&A meta studies
"n.s." implies non significant results
1) "n.a." implies that no R^2 is reported
2) "heterogeneous results" implies that within one study no clear result is reported
3) "inconsistent" implies that accross the studies no clear result is reported

Tab. 10: Success drivers of M&A performance: Results from software industry-specific studies – non-CAR studies (Schief et al. 2013a)

In total, **22 properties** are examined with respect to their impact on the M&A success of acquirers. By comparing the study results it can be concluded if factors are classi-

fied consistently or controversially. In the following the two types of publications, short term CAR and long-term studies, are compared separately.

Comparing the **CAR studies**, seven of the 22 determinants show inconsistent results. Furthermore, ten factors do not show any significant results. Therefore, no generic conclusion can be derived for 17 factors. For the remaining eight factors consistent results are reported or they are covered by one study only (printed in bold). In terms of *Properties of Transaction*, high price-book ratios seem to be counterproductive. With regard to *Properties of Acquirer* the results point out that transactions of large buyers are negative, whereas highly diversified buyers yield positive returns. *Properties of Target* show emphasize that private targets and the acquisition of divested assets is beneficial. In terms of *Properties of Combined Entity,* transactions on the same or on a detached stack level yield negative results. Besides, for complementarity of software products negative results are reported.

Comparing the **non-CAR studies**, only 18 determinants are investigated. Eight factors show inconsistent results and seven determinants are not significant. Thus, no generic conclusion can be derived for 15 factors. Only three factors can be presented without controversial findings. Transactions of large buyers are negative, whereas highly diversified buyers yield positive returns. Besides, the acquisition of targets representing divested assets is beneficial with respect to the success of acquirers.

Comparing the generic M&A literature reviews and the software industry-specific studies reveals interesting insights. While M&A success for targets is positive, the success of buyers is subject to debate. Both research streams underline that the M&A success of acquirers depends on success factors. Tab. 11 compares the results of the literature reviews and the software industry-specific M&A studies.

In total, **32 success drivers** are examined. It turns out that the majority is only analyzed either in the literature reviews (twelve) or in the software industry studies (twelve). Merely eight factors are analyzed in both research streams. Of these, six drivers are judged as inconsistent or not significant (Tab. 11: “relevance questionable”). Two factors seem to be relevant according to the meta studies, but have not shown significance in the software industry studies (Tab. 11: “relevant for software industry?”). Nevertheless, the number of studies focusing on the software industry is still comparably low to the vast amount of research on M&A success drivers. Accordingly, further research and analyses are needed.

			Summary Literature Reviews	Summary Software Industry Studies (CAR)	Summary Software Industry Studies (Long Term)	Comparison	Specifics of Software Industry
Environment	M&A Intensity (Waves)	Low	low rather preferable			meta studies only	x
		High					
	Legal Regulations	Low	inconsistent[3]				x
		High					
Properties of Transaction	Payment Type	Cash	inconsistent[3]	inconsistent[3]	n.s.	relevance questionable	
		Stocks					
	Price-Book Ratio	Low			inconsistent[3]	software industry only	x
		High		negative			
	Year			n.s.	n.s.		
	Transaction Volume	Low		n.s.			
		High					
	Transaction Price Disclosure	Yes		n.s.	n.s.		
		No					
	Percentag Acquired	Low		inconsistent[3]			
		High					
	Multiple Bidders	Yes	negative			meta studies only	x
		No					
	Transaction Mood	Friendly	hostile rather preferable				
		Hostile					
	Merger vs. Acquisition	Acquisition	inconsistent[3]				
		Merger					
	Use of Earnouts	Yes	positive				
		No					
	Acquisition Experience	Low	inconsistent[3]	n.s.	n.s.	relevance questionable	x
		High					
	Size of Acquirer	Low				software industry only	x
		High		negative	negative		
	Degree of Diversification	Low					
		High		positive			
	Buyer's Ex-ante Performance	Low	inconsistent[3]			meta studies only	
		High					
	Initiate M&A Program	Yes	positive				
		No					
	Managers' Stake	Low	inconsistent[3]				
		High					
	Use Excess Cash	Yes	inconsistent[3]				
		No					
Properties of Target	Target's Ex-ante Performance	Low	inconsistent[3]	inconsistent[3]	inconsistent[3]	relevance questionable	x
		High					
	Form of Organization	Private	positive	private preferable	n.s.	relevant for software industry?	x
		Public					
	Acquisition of Divested Assets	Yes		positive	positive	software industry only	
		No					
Properties of Combined Entity	Relative Size	Big Target	inconsistent[3]	inconsistent[3]		relevance questionable	
		Small target					
	Geographic Scope	National	neutral	n.s.			
		International			n.s.		
	Managers' Perception of Cultural Differences	Low	low rather preferable			meta studies only	
		High					
	Market Power	Yes	neutral				x
		No					
	Synergies	Revenue	cost rather preferable	n.s.	inconsistent[3]	relevant for software industry?	x
		Cost					
		Economies of Scale		n.s.	inconsistent[3]		
		Economies of Scope		n.s.	inconsistent[3]		
	Strategic Fit	Focus	inconsistent[3]	inconsistent[3]	n.s.	relevance questionable	x
		Diversification					
	Software Stack Layers	Same Stack Layer		negative		software industry only	x
		Adjacent Stack Layer		inconsistent[3]			
		Detached Stack Layer		negative			
	Compatibility of Software			n.s.	inconsistent[3]		x
	Complementarity of Software			negative	inconsistent[3]		x
	Acquisition of competencies			inconsistent[3]	inconsistent[3]		x

Drivers are analyzed with respect to their impact on acquirers
1) For quantitative studies only significant effects are reported. "n.s." implies non significant results
2) "heterogeneous results" implies that within one study no clear result is reported
3) "inconsistent" implies that accross the studies no clear result is reported

Tab. 11: Comparison of M&A literature reviews and software industry-specific studies (Schief et al. 2013a)

Consequently, this literature review provides a profound analysis of examined success drivers in M&A literature and reveals various areas for research. In this thesis, the focus is on the impact of software firm's business model characteristics on M&A performance. Accordingly, Chapter 5 analyzes the impact of acquirers' business models on their performance. As business models have emerged as relevant unit of analysis and the software industry has turned to be one of the most active sectors in terms of numbers of corporate takeovers, the investigation of business models seems to be a fruitful ground for further analyses.

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