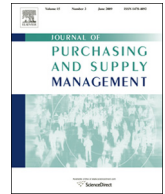




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## Towards a framework for supply chain finance for the supply side

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## ABSTRACT

Buyers increasingly offer financing alternatives to their suppliers – so called supply chain finance (SCF) practices for the supply side. Expected benefits however do not always materialize for involved actors. Guidance is needed when to provide these SCF practices to suppliers and why to select different types of practices. To provide this guidance, the paper involves an exploratory multiple-case study design including data within eight buyer-supplier-financial service provider triads. The findings explain contextual situations for the provision of SCF practices based on the contingency approach. They distinguish endogenous, relationship-related and exogenous contingencies within the aforementioned triads. Differentiation criteria are determined for the selection of SCF practices along the dimensions ‘time of financing’ (pre- versus post-shipment) and ‘source of funds’ (supply chain internal and external). Testable propositions and key learnings summarize the derived findings and form the basis to develop a contingency framework on SCF practices for the supply side.

## 1. Introduction

Modern business management has long emphasized optimizing individual firms' funding structures. Extending payment terms towards suppliers is therefore a common means of avoiding dependence on traditional external equity and debt financing (Casey and O'Toole, 2014). The consequences for material flows in supply chains are manifold, with financial risks increasing within upstream supply chains (Blome and Schoenherr, 2011). Some suppliers respond by raising prices or offering products of lower quality (Klapper and Randall, 2011). This focus on individual firms contradicts the basic paradigm of supply chain management (SCM), which stresses that companies “no longer compete as solely autonomous entities, but rather as supply chains” (Lambert and Cooper, 2000, p. 65). Practices that foster the inter-organizational management of financial flows in supply chains are thus needed. Increasingly, companies are responding to this need by offering financing alternatives to supply chain partners, via so-called supply chain finance (SCF) practices. In particular, SCF practices for the supply side have become popular in recent years (Gelsomino et al., 2016; Lamoureux and Evans, 2011). For instance, financial service providers (FSPs) enable longer payment terms for buyers while at the same time, suppliers still receive early payment (Tanrisever et al., 2012).

Previous SCF studies have examined the inter-organizational management of financial flows and identified the benefits for the entire supply chain (e.g., Gomm, 2010). Most previous work in this area,

however, has either remained on the conceptual level (Hofmann, 2005) or analyzed specific SCF techniques. In particular, several studies have focused on approved payables financing (Wandfluh et al., 2016), and researchers have identified prerequisites for its application. For instance, van der Vliet et al. (2015) discussed how a supplier's financing costs affect approved payables financing. Yet, the question arises as to whether these factors are only relevant for approved payables financing, or whether they apply in general. Moreover, previous studies have barely scratched the surface in terms of when different kinds of financing techniques are preferable. Studies by Caniato et al. (2016) and Wuttke et al. (2013a) constitute two exceptions, since they both involved a respective comparison. Nevertheless, they are more of a starting point than a comprehensive analysis. Overall, the SCF literature has revealed a need for guidance regarding how the context affects the provision of SCF practices for the supply side, as well as differences between these practices.

Providing such guidance is complex, however, since SCF practices for the supply side involve various actors. Buyers need to commit offering a financing alternative for suppliers (Templar et al., 2016), while suppliers also must signal their willingness to participate (Wuttke et al., 2016). Furthermore, FSPs often facilitate the application of SCF practices (Silvestro and Lustrato, 2014; Fellenz et al., 2009). Therefore, factors explaining the buyers and suppliers' commitment, as well as service requirements for FSPs, are needed to understand the application of different practices:

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RQ1: *Why are SCF practices applied for the supply side?*

RQ2: *How can differences between these practices be explained in relation to the buyer-supplier-FSP triad?*

This study employs the term “practices,” as it suggests a more general unit of analysis (Sousa and Voss, 2008). This choice is in accordance with the operations management (OM) and SCM literature, which defines practices as “the set of activities undertaken by an organization to promote effective management of its supply chain” (Li et al., 2006, p. 109). In contrast, techniques and instruments are the methods that an organization employs to perform these activities (Rönnbäck and Witell, 2008; Tan and Wisner, 2003). Transferred to the SCF context, approved payables financing constitutes a technique allowing buyers to offer post-shipment, supply chain-external financing practices to suppliers. We later provide detailed explanations on the selected terminology.

To answer the research questions, we first derive criteria from literature to classify SCF practices for the supply side. Based on this classification, multiple case studies are conducted to understand the contexts in which different practices are applied. The contingency approach structures the analysis of possible contextual situations within the buyer-supplier-FSP triad. In addition, it enables the integration of various, well-established theories to strengthen the explanatory power of our research. This is of particular relevance, in order to contribute to the theoretical development of SCF literature. We employ a case study design, due to the explorative character of the research (Langley and Abdallah, 2015; Eisenhardt, 1989b).

This paper is structured as follows: First, we provide an overview of the current state of research on financial flows in supply chains and develop a research framework for our further analysis (Section 2). The next section describes the methodology (Section 3). Section 4 presents the results of the cross-case analysis. In Section 5, the theoretical and practical implications of the results are discussed. Finally, the findings are summarized in Section 6.

## 2. Conceptual background

### 2.1. Management of financial flows in supply chains

The *SCM literature* has examined the integrated management of supply chain material, information, and financial flows, and it has thus treated financial flows as a central element (Stock and Boyer, 2009). Scholars describe financial flows as the flow of cash, capital tied up in material flows (e.g., inventories) and financial information (e.g., invoices; Blount, 2008). Studies on SCM have used financing restrictions and costs as parameters in their analyses of supply chain decisions (Chandra and Grabis, 2007). For instance, financial performance models (e.g., the return on assets model and the du Pont model) have measured the financial impact of supply chain decisions (Keebler, 2001). These models reveal how supply chain initiatives (e.g., just-in-time approaches) affect the volume and duration of tied-up capital (Claassen et al., 2008). Yet, the SCM literature has primarily treated capital costs as given, rather than as levers that can be managed across supply chains (Pfohl and Gomm, 2009). In particular, funding sources have not received much attention. Research on supply chain risks represents an exception, and it has analyzed the negative effect of financial distress on supply chains (Chen et al., 2013). Nevertheless, risk-management tools have emphasized transparency or monitoring, neglecting the inter-organizational management of funding sources (Wandfluh et al., 2016).

The *finance literature* has explicitly analyzed funding sources, although at the firm level (Brealey et al., 2011). Thereby, working capital management (WCM) is a common approach that firms can follow to reduce their dependence on external equity and bank credit financing (Singh and Kumar, 2014). Studies have used the cash-to-cash cycle to measure and reduce the time gap between cash inflows from customers

and cash outflows to suppliers (Jose et al., 1996). Suppliers thereby represent a possible source of financing, thanks to their provision of trade credits through deferred payments (Hofmann and Kotzab, 2010). Nevertheless, studies have emphasized optimizing individual companies' cash-to-cash cycles, with negative consequences for other supply chain members (Wandfluh et al., 2016).

The *trade finance literature* focuses on financing trade transactions (Casterman, 2012). Trade credits through deferred payments thereby constitute one measure of financing trade transactions (Petersen and Rajan, 1997). Scholars in that field have analyzed firm's motives for providing trade credits through deferred payments (Casey and O'Toole, 2014; Seifert et al., 2013). Studies in this area have shed light on the inter-organizational management of funding sources. Petersen and Rajan (1997) cited price promotions and price discrimination as reasons that suppliers offer trade credits. Moreover, scholars have identified determinants of trade credits, and emphasized that buyers consider a supplier's financial situation when defining payment terms (Ng et al., 1999). Yet, the existing trade finance literature has mainly analyzed how suppliers provide funding to their customers, downstream funding, rather than how buyers offer funding to the supply side, upstream funding (Seifert et al., 2013).

In recent years, specific *SCF literature* has emerged at the intersection of finance and SCM research. Scholars have stressed the importance of the inter-organizational management of financial flows in supply chains (Tanrisever et al., 2012). Nevertheless, previous research still misses a common definition of SCF (Hofmann and Johnson, 2016). Various scholars and practitioners have equated SCF with a single technique: approved payables financing (e.g. Lekkakos and Serrano, 2016; van der Vliet et al., 2015). A second group of researchers defines SCF as a sub-field of financial supply chain management (Pfohl and Gomm, 2009). Based on their understanding, SCF focuses on funding in supply chains. Finally, a third group of scholars has developed a broad understanding of SCF and they put SCF and FSCM on the same level. In this third definition, SCF includes the transfer of financial information and the inter-organizational management of funding sources and tied-up capital (Caniato et al., 2016; Gelsomino et al., 2016; Hofmann, 2005). This paper adopts a comprehensive understanding of SCF, but with a focus on inter-organizational financing, due to the above-mentioned gaps in the SCM literature. Furthermore, our focus on the supply side builds on the trade finance literature's previous focus on downstream supply chains.

### 2.2. Supply chain finance practices for the supply side

As previously mentioned, the literature does not provide a clear terminology for SCF. Similarly, previous studies lack common definitions of activities to transfer the general concept of SCF towards its concrete application. The range of terms employed includes “solutions,” “instruments,” and “practices” (Caniato et al., 2016; Lekkakos and Serrano, 2016; Wuttke et al., 2013). Yet, related fields of research, and OM in particular, derive a classification to describe a study's level of examination. Thereby, scholars have defined practices as activities for the purpose of actual application of a general concept such as SCF. They classify practices between general principles and specific techniques (Rönnbäck and Witell, 2008). In our context, SCF practices for the supply side include both, (i) the (constitutive) activities that a buyer undertakes to offer financing to suppliers and (ii) specific techniques (e.g., approved payables financing) to perform SCF practices for the supply side. The existing SCF literature has focused on either general principles (e.g. Gomm, 2010) or specific techniques (e.g., van der Vliet et al., 2015; Wuttke et al., 2016), but nobody did both.

Up-to-date, only few scholars provide insights to further specify SCF practices for the supply side. Caniato et al. (2016) distinguished supply chain collaborative solutions from traditional and innovative financing approaches. Moreover, Wuttke et al. (2013a) differentiated between post-shipment and pre-shipment financing practices on the basis of

timing.<sup>1</sup> Post-shipment financing occurs after goods have been delivered and approved by the buyer, while pre-shipment financing is offered during, or prior to, shipment (e.g. based on a purchase order). Finally, Templar et al. (2016) distinguished between supply chain-internal and supply chain-external funding sources, depending on whether the approach involves an additional funder or utilizes the buyer's own funds. The latter approach results in a working capital increase for buyers.

In accordance with this paper's emphasis on inter-organizational financing, Wuttke et al.'s (2013a) and Templar et al.'s (2016) dimensions are used to further classify SCF practices for the supply side. Thus, Fig. 1 depicts four types of practices (with example techniques), classified according to the dimensions “time of financing” and “source of funds”. Appendix A includes a brief description of these SCF techniques (Table A1).

### 2.3. Contingency approach

A next relevant research area refers to the contingency approach, which constitutes a common theoretical lens for studying organizations (Donaldson, 2001). It introduces the idea that a fit between an organization's activities and its context can boost performance (Doty et al., 1993). Consequently, an activity's efficiency level depends on the organizational context. Initial studies in this area have applied the contingency approach to supply chains, resulting in a distinction between endogenous (e.g., company size), relationship-related (e.g., dependency), and exogenous (e.g., economic trend) contingency variables (Kajüter and Kulmala, 2005; Wagner and Bode, 2008). Furthermore, previous research on the contingency approach has identified three types of fits, which can be used to analyze managerial problems (Sousa and Voss, 2008). The first form does not explicitly consider performance but addresses the match between contingencies and activities (Drazin and Van De Ven, 1985). The second form describes pairs of contingencies and activities that influence performance (via interactions). The third form extends the second one to cover entire systems (Sousa and Voss, 2008).

In our study, the contingency approach forms a foundation for structuring the explorative examination on SCF practices for the supply side. It underlines the assumption that the application of practices depends on the distinct context of the buyer-supplier-FSP triad. In addition, differences in contingency variables can explain the selection of different SCF practices for the supply side. Thus, we underline a match between contingency factors and SCF practices, but we do not explicitly address a performance dimension.

Providing guidance on the application of different SCF practices for the supply is complex, as it requires more than the commitment of an individual organization (Rogers and Leuschner, 2015). The relevant context for the provision of financing alternatives is the buyer-supplier-FSP triad. Triads constitute an essential element of SCM research. Several scholars have analyzed triads consisting of a buyer, supplier, and sub-supplier in supply chains (Wu et al., 2010). Another research stream has focused on service triads between logistics service providers (LSPs), buyers and suppliers and it serves as foundation for our research (Larson and Gammelgaard, 2002). Findings of the latter research stream underline the role of LSPs as intermediaries between buyers and suppliers. Nevertheless, existing SCM literature on service triads neglects FSPs as an essential player in supply chains. FSPs thereby include all providers of financial services in a broader sense. We explicitly differentiate our understanding from existing finance literature that has

<sup>1</sup> Pre-shipment financing is sometimes additionally subdivided into pre-shipment and at-shipment financing (Templar et al., 2016). At-shipment financing occurs during shipment, while pre-shipment financing takes place prior to shipment. We treat them as one financing type, due to their similar risk structures.

		Source of funds	
		Supply chain-external	Supply chain-internal
Time of financing	Post-shipment	<i>Approved payables financing techniques (e.g., reverse factoring)</i>	<i>Dynamic discounting techniques</i>
	Pre-shipment	<i>Inventory financing techniques; Purchase order financing techniques</i>	<i>Inventory financing techniques; Advanced payment techniques; Natural hedging techniques</i>

Fig. 1. Classification of SCF practices for the supply side and corresponding SCF techniques.

focused on financial institutions (e.g., banks) and that neglects innovative technology providers (Saunders, 2010; Fellenz et al., 2009). Consequently, we distinguish among endogenous, relationship-related, and exogenous contingency variables in the buyer-supplier-FSP triad, as presented in Fig. 2.

Still, the contingency approach is often criticized for its limited explanatory strength. We, however, see this as a strength, since it allows us to embed other theoretical insights (Halldórsson et al., 2007). Within our research, we include the social exchange theory (SET), the transaction cost economics (TCE), and the principal agent theory (PAT) as theoretical lenses only, in order to explain (most) of the contingency identified. We have selected and applied the theories after our empirical investigation within an iterative process.

First, TCE (Williamson, 1979, 2008) underlines the relevance of transactions and it analyzes how different factors (e.g., characteristics or specificity of exchanged goods or information exchange process) influence the affiliated costs. Within our research, the concept of transaction costs serves as one explanation for the application and selection of SCF practices. Second, SET (Griffith et al., 2006) emphasizes the relevance of relational factors (e.g., trust) and expands our perspective towards relational rewards rather than a mere cost focus. Third, PAT (Eisenhardt, 1989a; Shapiro, 2005) enables to identify both intra-firm as well as inter-organizational factors applicable for interactions, in which the principal delegates a task to the agent under condition of information asymmetry and goal misalignment. In our research, intra-firm interactions exist between the finance department (as initiator of SCF practices and principal) and the procurement/operations department (as agent). Inter-organizational interactions occur between the buying company (as principal) and the suppliers (as agents).

Thereby, the three theories complement each other and strengthen the explanatory power of our findings. This approach is in line with Hofmann and Johnson (2016), who underline the need to consider additional theories in SCF research. Nevertheless, due to the explorative character of our research, we apply the explanatory patterns of these theories to reflect on contingency factors and not to guide our research initially.

## 3. Case study method

### 3.1. Study design

Our research examines the application of SCF practices with a focus

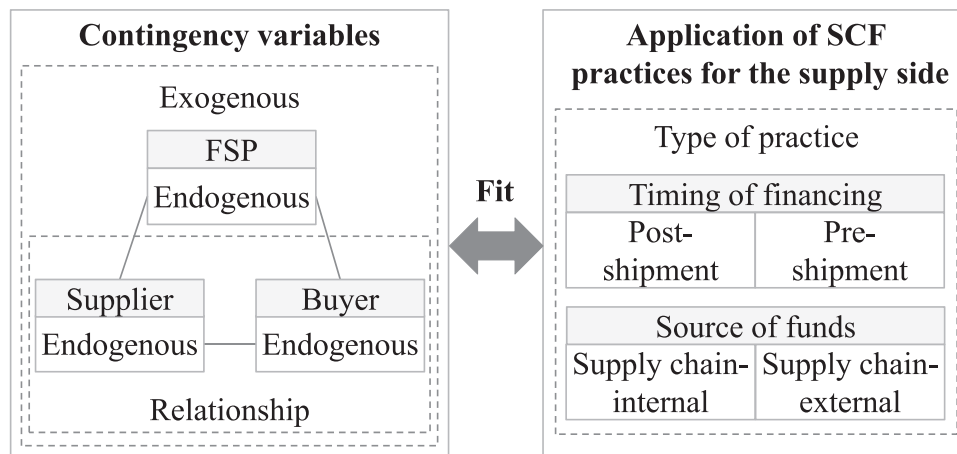


Fig. 2. Preliminary framework based on the contingency approach.

on the supply side. In addition to our previously described reasons, we have selected this focus on the supply side, as it permits an explicit study design. Thereby, we ensure cross-case comparability but can still analyze distinct differences (Eisenhardt, 1989b). We are also able to clearly define the role of actors involved in SCF practices: Who offers the financing alternative (buyers)? Who accepts it (suppliers)? Who enables it (FSPs)? Furthermore, we primarily focus on SCF practices for the supply side, because of their level of maturity in practice, which enables an empirical approach, rather than simply a model-driven one.

We employed a multiple case design, as this allowed us to contribute to theory development in the newly evolving field of SCF (Eisenhardt and Graebner, 2007; Siggelkow, 2007). Throughout our entire research process, we sought to ensure construct validity, internal validity, external validity, and reliability (see Appendix B, Table B1), referring to Gibbert et al. (2008) and Yin (2009).

Buying companies strongly influence the application of SCF practices for the supply side, since they mainly initiate financing alternatives for suppliers. Therefore, we began by examining buyers and then moved on to suppliers and FSPs. Our study relied on data triangulation, which combined multiple sources (Miles et al., 2014). We conducted interviews with buyers (50–90 min in length), as well as with suppliers and FSPs (both 30–45 min in length). All interviews relied on semi-structured questionnaires, but the focus depended on the particular actor (Yin, 2009). The structure of our questionnaire was based on the preliminary framework presented in Fig. 2 (see Appendix C).

We used both internal and external materials (e.g., presentations and brochures) on the applied SCF practices for the supply side. Publicly available information, and especially company websites and annual reports, provided general insights on buyers and their recent financial performance. Furthermore, we conducted a half-day workshop with representatives of all participating buying organizations (Cases Alpha to Theta). We briefly presented our main results to the experts and discussed our initial propositions with them (Bryman and Bell, 2015). This approach enabled us to further develop our propositions and key learnings.

A buyer interview was conducted with at least one senior representative in the finance department and in the procurement department. In that manner, we could capture the cross-functional character of SCF practices for the supply side (Gelsomino et al., 2016). For two buying companies (Beta and Gamma), we performed additional interviews with representatives of a dedicated SCF department. The selected interview partners were all directly involved in the SCF decision within their companies. We added further interviewees until we completely understood the SCF approach from the buyer's perspective (Miles et al., 2014). As all participants were involved in implementing SCF practices within various business units, we were able to detect differences between these business units through an embedded case

study design (Yin, 2009). In total, we conducted 20 interviews with representatives of buying companies.

In addition, for those buyers already offering a financing alternative for the supply side, our analysis also considered their suppliers and FSPs. For *suppliers*, we interviewed the chief executive officers (CEOs) of small and medium-sized (SME) suppliers (cases Gamma and Epsilon), as well as dedicated experts within the finance departments of large, multinational suppliers, for a total of six additional interviews. For *FSPs*, we considered banks and technology providers participating in the specific SCF practices for the supply side. As two cases involved separate regional programs partnered with different banks, we interviewed representatives of both banks. For each FSP, we talked to relationship managers that were in charge of introducing SCF practices at the customer. In sum, we conducted eight interviews with FSPs. Still, buyers provided most of the information for our study.

### 3.2. Case selection

The case selection followed a theoretical sampling approach (Eisenhardt, 1989b; Langley and Abdallah, 2015). First, we ensured that the buyer firms were similar in terms of size (large companies), industry (manufacturing and commerce), and headquarter (Europe). Size restrictions were essential and ensured that the companies had similar organizational structures. We focused on large buyers, since they so far lead the way for applying SCF practices for the supply side. The annual sales volume for 2016 ranged between 3 and 80 billion euros, meaning that we could still draw conclusions about the effect of company size. To draw these conclusions, we differentiated between huge (above/equal 15 billion euros) and large (below 15 billion euros). We focused on companies from the manufacturing and commerce industries, since they had similar working capital orientations, in contrast to service firms (Singh and Kumar, 2014). Finally, our selected companies had similar origins based in Germany and Switzerland with global networks. This approach ensured comparable economic trends, legal issues, and financial markets (Wagner and Bode, 2008; Wuttke et al., 2013a).

Second, we selected cases that differed in terms of types of practices, adoption stages, types of FSPs involved, and interviewed suppliers. We made sure to include *all types of SCF practices for the supply side*. Post-shipment, supply chain-external financing practices (e.g., approved payables financing) were rather mature in terms of market adoption and thus comprised the largest share of the dataset. Yet, all other types of SCF practices for the supply were also addressed, as Table 2 indicates.

Furthermore, we explored different *stages of adoption* regarding SCF practices for the supply side (see Table 1 for adoption stage). We considered buyers with well-established SCF practices for the supply side,



**Table 1**  
Overview of cases.

	Alpha	Beta	Gamma	Delta	Epsilon	Zeta	Eta	Theta	
Size	Huge	Huge	Huge	Large	Huge	Large	Large	Large	
Type of industry	Manufacturing	Manufacturing	Commerce	Manufacturing	Pharmaceutical	Transportation	Transportation	Commerce	
<b>Number of interviews</b>									
Buyer	1	2	2	1	1	1	1	1	10
Operations	1	1	2	2	1	1	1	1	10
Supplier	1	1	1	1	1	1	–	–	6
FSP	2	1	1	1	2	1	–	–	8
<b>Additional interview characteristics</b>									
Relative financial strength*	B = S	B > S	B > S	B < S	B > S	B < S	–	–	
Type of FSP	Bank	Technology provider	Technology provider	Bank	Bank	Bank			
<b>Applied SCF practices for the supply side</b>									
Pre-shipment					○	○			
Post-shipment	✓	✓	✓	✓	✓	✓	□	□	
SC internal			○				□	□	
SC external	✓	✓	✓	✓	✓	✓	□		

Adoption stage: ✓ = implemented; ○ = pilot projects; □ = Planned adoption.

\* Relative financial strength compares a buyer's financial situation (B) with the interviewed supplier's financial situation (S).

some of which were initiating adaptations and possible extensions involving other practices. Our sample included two extension paths:

- From post- to pre-shipment financing: Companies Zeta and Epsilon implemented post-shipment financing for their suppliers on a broad basis. In recent years, they initiated pilot projects for pre-shipment financing with selected suppliers (purchase order financing, inventory financing).
- From supply chain-external to -internal financing: Companies Gamma, Eta, and Theta evaluated the option to combine supply chain-external and -internal financing. They selected internal or external sources of funds depending on self-defined criteria (e.g., cash level, interest rates, and financing volume).

Understanding these changes was of particular interest for us, as it shed light on differences between SCF practices for the supply side. At the same time, all of these buying companies' business units were at different steps of the adoption process, and they included also non-adopting business units. Thus, we could detect distinct contexts relevant for adopting and non-adopting business units (Bryman and Bell, 2015). We also involved buyers that had not yet offered a financing alternative to suppliers but that were planning to do so within the next two years. There, we gained direct access to their evaluation criteria and processes. This approach allowed us to differentiate between contingencies for the actual application decision and factors connected to the subsequent implementation.

Additionally, we guaranteed the involvement of *different types of FSPs* within our cases to avoid biased results. For instance, in some cases, a single bank acted as an external partner, while in others, multiple banks or technology providers filled that role. Two buyers discussed excluding FSPs entirely from their practices. Finally, the cases were *diverse in terms of interviewed suppliers* and these ranged from large multinationals to SME suppliers. Table 1 includes a comparison of the financial strength of the buyers and suppliers considered in our case studies. The financial strength was measured in terms of their assigned credit rating. Thereby, we also captured arrangements in which the participating supplier was the financial stronger party.

The diversity of our case sample enhanced the external validity of our results (Gibbert et al., 2008; Yin, 2009). Our case selection followed an iterative process of data collection and initial analyses (Glaser and Strauss, 1967). Additional cases were included only when they deepened our knowledge of the four above-mentioned dimensions. We stopped adding cases when additional insights were marginal (Eisenhardt and Graebner, 2007; Langley and Abdallah, 2015).

### 3.3. Case analysis

Our analysis integrated all of the above data sources, including interview and workshop transcripts, as well as additional materials. Initially, we performed a within-case analysis to better understand the actors and the SCF practices for the supply side that they had considered or applied (Bryman and Bell, 2015). The results are briefly summarized in Table 1, and implicitly captured in the subsequent sections.

Afterwards, we conducted a cross-case analysis, which allowed us to identify differences and common patterns (Eisenhardt, 1989). We used codes grounded in the data to analyze our cases (Glaser and Strauss, 1967; Yin, 2009). The codes were then categorized and challenged in accordance with previous literature and theory (Miles et al., 2014). Multiple researchers reflected on these categories and then organized them in order of their importance in terms of the research objective. The contingency approach provided the structure for our coding scheme. The SET, TCE, and PAT supported the reflection on and aggregation of individual codes. Furthermore, we discussed the resultant categories with the workshop participants and incorporated their feedback. Finally, we classified the categories according to our preliminary framework based on the contingency approach. Our analysis differentiated between contingencies for the general application of practices and contingencies for the selection of specific practices. To gain further insights, we included descriptions and operationalization of those categories related to the general application of practices (see Table 2). Within the subsequent sections, citations are involved to delineate low and high values for our categories. Additionally, we include examples demonstrating differences in applied SCF practices for the supply side. These are in Table 3 (supply chain-internal versus supply chain-external financing) and Table 4 (pre-shipment versus post-shipment financing). Our findings are based on a rich dataset, and the subsequent explanations cannot capture its full depth, but involve only illustrative examples. Theoretical explanations are mentioned in the finding section when applicable, yet they are elaborated in detail in the discussion section.

## 4. Findings of cross-case analysis

Applied SCF practices for the supply side were diverse in terms of the "time of financing" and "source of funds" (see Table 1). To structure our analysis, we first derived those contingencies relevant to the general provision of financing alternatives for suppliers, independent of the specific practice (Section 4.1). Subsequently, we considered those contingencies explaining differences between selected SCF practices for

**Table 2**  
Description and operationalization of categories, including related literature (examples).

Category	Definition	Operationalization (e.g.)
<i>Buyer-related endogenous</i>		
Financial strength	Financial strength stems from low costs, easy access to external funding, and sufficient liquidity (Brealey et al., 2011). It increases the financial benefits of SCF practices for suppliers.	<ul style="list-style-type: none"> <li>Financial costs</li> <li>Access to external funding</li> <li>Liquidity level</li> <li>Sales volume</li> <li>Number of employees</li> </ul>
Company size	A firm's sales and number of employees determine its size. Large corporations benefit from synergy effects across business units (Lambert and Cooper, 2000). They are able to centralize resources and knowledge on SCF.	<ul style="list-style-type: none"> <li>Aligned objectives</li> <li>Common incentive structures</li> </ul>
Financial strategy alignment	Financial strategy alignment describes common financial objectives for finance and operations departments (Wandfluh et al., 2016).	
<i>Supplier-related endogenous</i>		
Financial strength	The reverse of financial strength (defined above). With increasingly financially weak suppliers, the benefits of SCF practices for the supply side increase for them (Brealey et al., 2011).	<ul style="list-style-type: none"> <li>Financial costs</li> <li>Access to external funding</li> <li>Liquidity level</li> <li>Working capital objectives</li> <li>Avoidance of late cash inflows</li> </ul>
Working capital orientation	A supplier's working capital orientation describes its focus on working capital and liquidity (Chiou et al., 2006). It enhances the benefits a supplier stands to gain from SCF practices for the supply side.	
<i>FSP-related endogenous</i>		
FSCM reputation	FSPs can develop a SCF reputation in various ways, including financial stability, previous experience with SCF practices for the supply side, and innovative service offerings.	<ul style="list-style-type: none"> <li>Financial strength</li> <li>Experience with FSCM</li> <li>Innovativeness of service offerings</li> <li>Simplicity of ERP interfaces</li> <li>Features of platforms</li> </ul>
IT capabilities	IT capabilities involve platform features, the ability to ensure ERP interfaces, IT knowledge, and technological advancements for platforms (Lacity et al., 2009).	
<i>Relationship-related</i>		
Reliable goods of exchange	The reliability of goods of exchange is characterized by the quality of products, as well as by the continuity of demand (seasonal/non-seasonal and project/series production).	<ul style="list-style-type: none"> <li>Quality level</li> <li>Continuity of demand</li> <li>Additional claims after delivery</li> <li>Aggregated relevance of supplier base</li> <li>Substitutability of suppliers</li> </ul>
Aggregated buyer dependence	Buyer dependence describes the degree to which a buyer requires valuable resources from a supplier (Pfeffer and Salancik, 1978). Aggregated buyer dependence on suppliers refers to buyers' overall dependence on their supplier base (Wuttke et al., 2013a).	
Cash flow uncertainty	Uncertain cash flows increase with the length of payment terms and the level of variance for incoming payments (Ng et al., 1999; van der Vliet et al., 2015).	<ul style="list-style-type: none"> <li>Length of payment terms</li> <li>Punctuality of incoming payments</li> <li>Buyer's share of sales volume</li> <li>Expected future relevance of buyer</li> </ul>
Supplier dependence on buyers	Supplier dependence describes the degree to which a supplier requires valuable resources from a buyer (Pfeffer and Salancik, 1978).	
<i>Exogenous</i>		
Economic trend	An economic trend can consist of either a stable economic environment or growth rates. A recession increases the need for financing of suppliers and a focus on working capital management (Wilner, 2000).	<ul style="list-style-type: none"> <li>Growth rates</li> <li>Stability of economic situation</li> <li>Stability of finance industry</li> </ul>

the supply side (Section 4.2). The cross-case analysis allowed us to define common contingency factors throughout our case companies. In addition, we were able to compare different SCF practices for the supply side and identify criteria for their selection.

#### 4.1. Contingencies of applying practices

Our analysis yielded numerous insights into possible contingencies within the buyer-supplier-FSP triad. We prioritized them in accordance with patterns that were present in the dataset accordingly the categories of our preliminary framework (Fig. 2).

##### 4.1.1. Buyer-related endogenous

Buyer-related endogenous contingencies constitute all buyer-internal prerequisites for the application of SCF practices for the supply side. All cases underlined that buyers needed a certain *financially strength* to offer financing alternatives to suppliers. In contrast to company-focused financing, such SCF practices involve the supplier

accessing the buyer's financing costs and funding sources. Thus, a buyer's financial strength forms the foundation of SCF practices for the supply side. It ensures that funds are continuously available for suppliers. As a financial representative from Delta explained, "What will happen with our practice when our credit rating worsens? We may have to abandon the provision of financing to our suppliers." Moreover, a buyer's financial strength reduces the arising financing costs for suppliers. With less financially strong buyers, suppliers' financial benefits decline, making SCF practices less applicable.

Increasing *company size* allows business units to realize scale and synergy effects between business units, and it ensures an adequate amount of available resources for managing SCF practices for the supply side. Delta, the smallest buyer within our case sample, described that its finance department only contained two employees, who were both responsible for other major projects. Unlike Delta, Alpha, Beta, Gamma, and Epsilon had established dedicated project teams, with employees specialized in SCF. A representative from Beta stated that, "We have a centralized team of around five people who combine know-

**Table 3**  
Examples of quotes regarding key categories related to supply chain-internal and supply chain-external financing.

Category (type of contingency)	Supply chain-internal financing	Supply chain-external financing
Buyer's working capital position ( <i>endogenous</i> )	"Our company generates lots of cash that we can utilize for supply chain-internal financing." (Gamma)	"Besides our financial strength, we have funds tied up in working capital that we want to release." (Alpha)
Working capital conflicts ( <i>relationship-related</i> )	"Margin, margin, margin – everything we do needs to have a positive effect on margin. Working capital and longer payment terms are not a central topic for us." (Theta)	"Supply chain-external financing enables us to prolong our payment terms without negative working capital impacts on our suppliers. They can even improve their liquidity levels." (Epsilon)
General interest rates ( <i>exogenous</i> )	"Using our own liquidity for the SCF practice becomes particularly interesting for us in times of negative interest rates." (Eta)	"High interest rates increase the pressure on working capital and foster the benefits of supply chain-external financing." (Beta)

**Table 4**  
Examples of quotes regarding key categories related to pre-shipment and post-shipment financing.

Category (type of contingency)	Pre-shipment financing	Post-shipment financing
Commitment level for goods of exchange (relationship-related)	"The purchase order basically obliges us to accept the delivery afterwards. Therefore, we are exposed with 95% of the purchase value." (Epsilon)	"We are able to reject deliveries and adapt orders prior to delivery. Thus, it becomes difficult to evaluate financial risks prior to delivery." (Delta)
Trust and interdependence (relationship-related)	"Pre-shipment becomes relevant for reliable and benevolent suppliers, since we know that they adhere to our agreements." (Epsilon) "We only consider pre-shipment financing for very strategic suppliers with a yearly volume of at least 20,000,000 €." (Zeta)	"Post-shipment financing is based on invoices, reducing risks for us. Trust is beneficial for ensuring suppliers' commitment but not required." (Alpha) "We also involve suppliers in our SCF practices that are less relevant for us and account for a yearly procurement volume of minimum 50,000 €." (Beta)
Dispersion of buyer dependence (relationship-related)	"Pre-shipment financing is of interest for business units that depend strongly on very few suppliers." (Zeta)	"Most of our suppliers are not easily exchangeable. Still, we avoid being too dependent on suppliers through multiple sourcing." (Eta)

how on SCM, as well as finance, and are solely responsible for our practices across business units and countries." It is important to note that being a large firm is not always beneficial in an SCF context. Although size encourages the application of SCF practices for the supply side, it also impedes subsequent implementation, due to the complexity of internal interfaces.

Aside inter-organizational collaboration, SCF studies also stressed intra-firm cooperation (Caniato et al., 2016). Likewise, our results indicated that *financial strategy alignment* of the finance and procurement/operations department is a key prerequisite for the application of financing alternatives. Such an alignment resolves cross-functional conflicts that would otherwise form fundamental barriers (Wandfluh et al., 2016). As the head of procurement at Beta put it, "Our purchasers do not like to hear about payment extensions. They fear suppliers could increase their prices." Common incentives played a crucial role in aligning financial strategies across units. Epsilon's finance manager described what happens in the absence of such an alignment: "We failed in one business unit, although suppliers revealed a strong need for financing. Within this business unit, the procurement department captures SCF as a minor issue in its negotiations, since the employees first have to achieve four opposed key performance indicators (KPIs)." In their research, Wandfluh et al. (2016) analyzed among others the intra-firm strategic alignment in an SCF context based on the explanatory patterns of PAT. In accordance, research on PAT (Shapiro, 2005) identifies strategic alignment as an essential factor to avoid conflicts between the principal (in our case the finance department as initiator) and agents (in our case the procurement/operations department).

The following proposition summarizes these endogenous contingencies:

**P1 – Buyer-related endogenous:** A buying company's financial strength, size, and aligned financial strategy jointly contribute to the application of SCF practices for the supply side.

#### 4.1.2. Supplier-related endogenous

Former supplier-related insights into SCF have been limited or have relied on analytical models (Gelsomino et al., 2016). Related research has cited company size as playing a key role (Lekkakos and Serrano, 2016). In our analysis, findings regarding supplier size were somewhat ambiguous. While Alpha, Gama, Epsilon, and Theta stressed lower financial strength and faster decision making of SME suppliers, the other four cases claimed that SMEs sometimes lacked SCF knowledge and a working capital orientation. A procurement manager from Zeta pointed out that, "The privately owned SME suppliers are focused on equity financing. They do not want to depend on alternative financing." Therefore, we excluded company size as a supplier-related contingency variable.

The relevance of a *supplier's financial strength* is rather apparent, since financing costs and access to external funding directly influence a

supplier's financial benefits (van der Vliet et al., 2015). Thus, financially weak suppliers enjoy greater leverage from access to a buyer's financial strength. As Beta's supplier explained, "The SCF practice constitutes a financial benefit for us. We face higher financing costs than does our buyer." In contrast with company-focused financing, weak financial strength does not restrict a supplier's access to SCF practices, since the supplier benefits from the buyer's financial strength. Consequently, the applicability of SCF practices for the supply side increases as suppliers become less financially strong.

Yet, financing alternatives for the supply side do not necessarily presuppose financial weakness on the part of suppliers. Eta constituted an illustrative example, citing the importance of a supplier's *working capital orientation*: "We have large, cash-rich suppliers who are still incentivized to improve working capital KPIs. They are interested in an SCF practice for the supply side." Furthermore, an interviewee from Beta stated that a supplier's working capital orientation comes along with the expertise necessary to evaluate the impact of SCF practices for the supply side. Thereby, the results added to previous findings on SCF, emphasizing suppliers' actual working capital positions and financing costs over working capital objectives (Wuttke et al., 2013a).

The consideration of supplier endogenous contingencies resulted in the subsequent proposition:

- **P2 – Supplier-related endogenous:** A supplier's financial strength and a supplier's working capital orientation influence the application of SCF practices for the supply side.
- **P2a:** A supplier's financial strength has a negative influence on the application of SCF practices.
- **P2b:** A supplier's working capital orientation has a positive influence on the application of SCF practices.

#### 4.1.3. FSP-related endogenous

FSPs do not represent a compulsory actor involved in SCF practices for the supply side. Yet, they are a key enabler of such financing alternatives (Martin and Hofmann, 2017). The cases cited two types of service providers: banks and technology providers. Eta and Theta both also intended to involve a technology provider in their planned supply chain-internal financing practices. Thereby, FSPs facilitate inter-organizational financing through a digital platform. Similarly, SET and TCE both introduce explanations for the involvement of external service providers. From a TCE perspective, FSPs serve as intermediaries between buyers and suppliers and reduce transaction costs (Williamson, 2008). For instance, FSPs can facilitate the (financial) information exchange between supply chain members (a buyer and its suppliers) in an SCF context. The SET adds a relational perspective (Griffith et al., 2006). The FSP then serves as an intermediary to resolve conflicts, e.g. due to missing trust between a buyer and its suppliers. We analyzed common patterns across the cases so that we could contribute to the as-of-yet limited research on FSPs within supply chains (Silvestro and

Lustrato, 2014; Martin and Hofmann, 2017).

All of the cases in our sample stressed that it is important for FSPs to have an *SCF reputation*, noting that such a reputation can be built in multiple ways. Beta, Zeta, and Eta noted that providers need to be reliable in terms of their financial position and business models. Reliability is crucial, due to the continuous emergence and disappearance of start-ups in the SCF market. At the same time, several banks experienced financial issues in the aftermath of the economic crises of 2008/2009. The SCF expert at Beta accordingly explained: “We depend on our FSP to offer our financing alternative to suppliers. The FSP’s financial strength is essential, since otherwise we would need to repeat the entire effort with a different service provider.” Moreover, all interviewees underscored that FSPs require overall SCF expertise, in the form of previous SCF experience and knowledge of SCM and finance. For Beta, Gamma, Epsilon, and Zeta, innovativeness can enhance an FSP’s SCF reputation, since that quality is expected to expand the introduction of innovative types of SCF techniques.

In addition, FSPs are involved in SCF practices for the supply side as intermediaries between buyers and suppliers, digitalizing the transfer of invoices and payments, and increasing the transparency of payment processes. FSPs can thus help to reduce transaction costs (Williamson, 2008). For this to be possible, however, all of the interviewees mentioned that FSPs must have an appropriate level of *IT capabilities*. As a regional CFO from Beta pointed out, “With the complexity of more than 80 enterprise-resource-planning (ERP) systems, we need an FSP to offer customized interfaces for all our systems in order to apply SCF practices for the supply side.” The FSPs also emphasized the distinct service requirements of SCF in contrast to those of traditional funding services. In the context of SCF, they found funding aspects to be less important, instead citing the need for more guidance on SCF and associated technological interfaces.

From those findings, we derived the following proposition on FSP endogenous contingencies:

- **P3 – FSP-related endogenous:** *The FSP’s IT capabilities and reputation regarding SCF promote the application of SCF practices for the supply side.*

#### 4.1.4. Buyer-supplier relationship-related

In our cases, buyers and suppliers both indicated that relational factors had an effect on their commitment to, and consequently their application of, SCF practices for the supply side. Yet, their perspectives varied significantly. For buyers, the reliability of goods of exchange and aggregated buyer dependence on suppliers were key contingency variables. For suppliers, their dependence on the buying company and cash flow uncertainty were the primary relational factors.

The previous SCF literature has not focused on the characteristics of goods of exchange. Some trade finance studies have analyzed the impact of product quality on trade credit terms (Ng et al., 1999). Similarly, TCE has indicated that characteristics of goods influence, for example, actors’ uncertainty levels (Williamson, 1979; Shelanski and Klein, 1995). Transferred to an SCF context, the *reliability for goods of exchange* determines a buyer’s willingness to offer early payments. Gamma and Theta accordingly did not offer financing alternatives for seasonal products, since they returned unsold goods to suppliers at the end of season. Furthermore, they described needing to file claims with suppliers after delivery for quality-related reasons. In contrast, Epsilon introduced such high quality standards for suppliers that it could release payments before quality checks were finished. Thus, the provision of financing alternatives to suppliers presupposes reliable goods of exchange for buyers.

Wuttke et al. (2013a) introduced the notion that the provision of financing alternatives for the supply side is not determined by a buyer’s dependence on individual suppliers, but rather by the *buyer’s aggregated*

*dependence* on the supplier base. Our results supported their findings. All buyers noted that they only offered SCF practices for the supply side for business units that depended on their supplier base. For instance, Zeta explained that it had stopped offering an SCF option for one business unit, because it purchased commodities traded on markets and did not depend on the supplier base.

In contrast, for suppliers, the specific buyer-supplier relationship was relevant. A *supplier’s dependence on the buyer* defines the relational and financial leverage it stands to gain from SCF practices for the supply side. With an increasing share of the buyer for suppliers’ sales volume, the funding volume raises as well, and thus also financial leverage. Previous SCF studies have mainly underscored the relational leverage of a supplier’s dependence (Liebl et al., 2016; Wuttke et al., 2013b). In particular, they have described the impact of power, as defined in SET, to pressure suppliers to commit (Caniato et al., 2016). Nevertheless, the type of relational leverage again depends on the supplier’s own power position. In our study, Alpha, Delta, and Zeta emphasized the state of interdependence, besides buyer power, in long-term and trusting relationships for financially strong suppliers with a limited working capital orientation. Zeta’s supplier explained its commitment: “For us, our commitment is not driven by any direct economic advantages. Our own credit rating is better than the buyer’s rating. Yet, the buyer’s practices make longer payment terms acceptable and are an investment in a strategic customer.” To sum up, a supplier’s dependence on the buying company defines the former’s commitment and, thereby, the applicability of SCF practices for the supply side.

Moreover, a supplier’s benefits depend on *cash flow uncertainty*, in terms of existing payment terms and the punctuality of incoming cash flows. This contingency variable transfers the idea of lead times in material flows to financial flows and captures the qualitative benefits of SCF practices for the supply side (Gelsomino et al., 2016; van der Vliet et al., 2015; Wuttke et al., 2013b). Accordingly, our analysis indicated that cash flow uncertainty increases the application of SCF practices for the supply side. As the procurement manager from Alpha stated, “Existing long payment terms are a crucial prerequisite for the application of SCF practices. When I have suppliers with 90-day payment terms, the benefits of an early payment are obvious to them.”

The various relationship-related factors were captured in the following proposition:

- **P4 – Relationship-related:** *Reliable goods of exchange, aggregated buyer dependence, cash flow uncertainty, and supplier dependence encourage the application of SCF practices for the supply side.*

#### 4.1.5. Exogenous

Exogenous contingency variables detect influential factors within the buyer-supplier-FSP triad environment. Our findings indicated that the general economic climate – in particular a *negative economic trend* – was the only exogenous variable shared across all cases. Although SCF market adoption and technological progress were also relevant factors, they served as moderators, as subsequently described. All of the cases underscored that the need for financing alternatives increases during economic downturns, as the example of Epsilon demonstrated: “We benefited from the economic crisis in 2008/2009. From 2010–2011, the suppliers’ application rate increased by 250%.” Similar to previous SCF studies, the analysis indicated that SCF practices for the supply side serve as pro-active measures, mitigating upstream financial distress in times of economic downturns and, thereby, avoiding increasing transaction costs (Lamoureux and Evans, 2011). At the same time, our results contradict to some extent the findings of Iacono et al. (2015). Their model of approved payables financing found that an economic downturn would have a limited effect, due to reduced receivables volumes. The suppliers within our case sample stressed that strategic buyers have significant financial leverage, even when the overall



receivables volumes decrease.

We therefore conclude with the following proposition:

- **P5 – Exogenous:** *A positive economic trend is negatively associated with the application of SCF practices for the supply side.*

#### 4.1.6. Moderators of application

With technological progress and SCF market adoption, our cross-case analysis revealed that two variables moderate the effect of contingencies on the application of SCF practices for the supply side. These moderators add a dynamic character to our contingency framework.

In recent years, SCF market adoption has proceeded, with the increased use of approved payables financing and the introduction of new techniques (Bryant and Camerinelli, 2014; Templar et al., 2016). Furthermore, SCF market adoption places pressure on buyers to offer financing alternatives. This occurs when competitors already offer such alternatives, and suppliers start to ask for them. A finance manager from Alpha accordingly indicated that the company had introduced SCF practices for the supply side to meet market demands and respond to an increasing number of supplier requests. Furthermore, all cases highlighted that SCF market adoption goes hand-in-hand with an increase in knowledge on financing alternatives, thus reducing suppliers' reluctance. Consequently, increasing market adoption rates strengthen the effects of all above-mentioned contingency variables on the application of SCF practices for the supply side.

In contrast, the moderating effect of *technological progress* was less consistent. Our findings revealed that technological progress strengthens the effect of certain contingencies, while weakening the influence of others. In general, technological progress reduces the amount of effort needed to apply SCF practices, and it increases the potential benefits (Caniato et al., 2016). For instance, a representative from Gamma underlined that suppliers' paper-based invoices significantly increased the amount of effort the firm needed to expend on its SCF practices. At the same time, the head of procurement from Delta indicated that automated reports had boosted transparency for their suppliers regarding incoming cash flows. Thus, technological progress facilitates internal and external interfaces, again reducing transaction costs. Yet, technological progress also decreases the relevance of some contingencies. In particular, a buyer's company size becomes less important as the amount of effort and resources needed to offer financing alternatives declines.

Regarding the application of SCF practices, we summarize the following additional findings as key learnings:

- **Moderators of application:** *SCF market adoption and technological progress moderate the influence of endogenous, relationship and exogenous contingency variables on the application of SCF practices for the supply side.*

#### 4.2. Contingencies of selecting practices

Besides addressing the general question of application, our cross-case analysis provided insights regarding the selection of different types of practices. We underline that all of these differentiation criteria presuppose the general applicability of SCF practices for the supply side.

##### 4.2.1. Source of funds

Supply chain-external financing involves an additional funder from outside the physical supply chain (Templar et al., 2016). In our samples, buyers offered a guarantee to the external funder, in the form of either approved invoices or payment promises. Thereby, they indirectly provided the suppliers with access to their financing costs. Supply chain-external financing does not affect buyers' working capital position. On the contrary, it even improves their working capital position,

when buyers combine supply chain-external financing with an extension of payment terms towards suppliers (Liebl et al., 2016; van der Vliet et al., 2015). In our sample, only Gamma did not introduce longer payment terms with its supply chain-external financing options. Supply chain internal-financing utilizes the buyer's own funds to enable earlier payments. Consequently, the buyer's working capital increases. In return, buyers can secure their deliveries or achieve discounts on procurement prices. Gamma, Eta, and Theta were all considering supply chain-internal practices, and these included requests for "dynamic" discounts on procurement prices. Our findings indicated the existence of three relevant differentiation criteria. Table 3 presents illustrative citations for these contingencies related to the opposed types of practices.

Gamma, Eta, and Theta all had any financial constraints. Thus, a very strong *buyer's working capital position* has been identified as a first relevant factor. Eta even had achieved a negative working capital position, due to customers' advance payments. Similarly, Gamma and Theta both experienced only a short time gap between cash inflows from customers and cash outflows to suppliers. Accordingly, the head of treasury at Eta stated that, "We have high levels of surplus cash and are looking for new investment instruments." For that firm, supply chain-internal financing was a tool permitting it to invest its surplus cash in exchange for additional returns. In contrast, in the remaining cases, the time gap was considerably longer, resulting in higher levels of working capital. Thus, all of the cases intended to more actively manage the time gap between cash inflows and cash outflows through supply chain-external financing.

Furthermore, *working capital conflicts between buyers and suppliers* lead to a preference for supply chain-external financing over supply chain-internal financing. The TCE describes how conflicts result in increased transaction costs (Williamson, 2008, 1979). The finance literature has analyzed the role of external funders as intermediaries, but it has focused on debtors and creditors in general, rather than on supply chains (Greenbaum and Thakor, 2007). Supply chain-external financing seeks to solve the conflict between a buyer's goal of extending payment terms and a supplier's goal of accelerating cash inflows. Correspondingly, Alpha and Beta both emphasized the working capital benefits for both themselves and their suppliers. For Zeta, supply chain-external financing was a central financing instrument without negatively influencing its supplier's working capital position. At the same time, the cases revealed two scenarios in which no working capital conflict is present between buyers and suppliers:

- Buyers have a strong working capital focus, but suppliers do not: Representatives from Beta, Delta, and Epsilon explained that some suppliers were not interested in participating but still enabled longer payment terms.
- Buyers do not have a working capital focus, but suppliers do: Gamma, Eta, and Theta were all examples of companies with a very strong working capital position, resulting in a limited working capital focus. As the procurement manager from Theta noted, "Our firm's focus is on profitability. We need our resources within procurement to achieve positive effects on profitability."

Moreover, Gamma and Eta intended to combine supply chain-internal and supply chain-external financing. An interviewee from Gamma elaborated that the firm was currently testing pilot programs, and these utilized its own cash until a predetermined upper limit, at which point an external funder would become involved, to avoid harming the firm's financial position.

All of the cases illustrated that *general interest rates* – as an exogenous contingency factor – have an effect on whether supply chain-internal or supply chain-external financing are a better fit. On one hand, high general interest rates increase the cost of external funding, and

particularly of bank credits (Qian and Yeung, 2015). On the other hand, low or even negative interest rates facilitate the access to external funds and reduce the pressure on working capital. The CFO of Theta even mentioned that the firm was currently receiving money from banks for borrowing from them. Consequently, an interviewee from Eta described supply chain-internal financing as an appropriate investment tool in a low interest rate environment.

Thus, we conclude with the following proposition:

- **P6 – Source of funds related:** *The characteristics ‘buyer’s working capital position’, ‘working capital conflicts’, and ‘general interest rates’ determine the source of funds applied of SCF practices in different ways.*
- **P6a:** *A buyer with a strong working capital position is positively associated with the application of supply chain-internal financing.*
- **P6b:** *A working capital conflict between buyers and suppliers is positively associated with the application of supply chain-external financing.*
- **P6c:** *A low general interest rate is positively associated with the application of supply chain-internal financing.*

#### 4.2.2. Moderators of source of funds

Moreover, our findings suggested that *legal restrictions* and *accounting standards* have a moderating effect on the differentiation criteria used for determining whether supply chain-internal or supply chain-external financing is a better fit. For instance, Beta, Gamma, Delta, and Zeta stressed that legal factors (e.g., taxes and legislation) had forced them to abandon supply chain-external financing in some countries. Similarly, buyers noted that changing accounting standards pose a risk for supply chain-external financing when they result in a reclassification of their payables as short-term debt.

Some buyers additionally mentioned an FSP’s business model as a moderating variable. For instance, interviewees from Eta and Alpha noted that banks push their own supply chain-external financing options. Nevertheless, as technology providers become more widespread, this effect diminishes, with the key question becoming how to select an appropriate FSP rather than how to select a specific type of practice.

An additional key learning regarding the source of funds is therefore:

- **Moderators of source of funds:** *Legal restrictions and accounting standards moderate the influence of the differentiation criteria ‘buyer’s working capital situation’, ‘working capital conflicts’ and ‘general interest rates’ on the source of funds of SCF practices for the supply side.*

#### 4.2.3. Timing of financing

Pre-shipment and post-shipment financing differ in terms of whether funding is provided prior to delivery or after delivery (including the approval of invoice). Pre-shipment financing captures a broad time span, ranging from the point when a supplier sources materials, through production and storage, and up until delivery to the buyer. Thereby, the funding risks are higher, since the quality of goods has not been confirmed, and the invoice has not been released for payment. Within our sample, Epsilon and Zeta had started pilot projects assessing pre-shipment financing. Epsilon offered advanced payments for selected suppliers on the basis of the purchase order. To that end, it involved an external funder that financed the time gap between the purchase order and the payment from Epsilon. In partnership with an FSP, Zeta offered some suppliers credit for inventories, and it guaranteed purchases to lower the risk for the external funder. All of the other cases employed post-shipment financing practices for the supply side. Our findings indicated that the specific buyer-supplier relationship is of major importance for pre-shipment financing practices, but not for post-shipment financing practices.

SET claims that *trust* and *interdependence* explain exchange partners’ commitment levels (Griffith et al., 2006). Our results revealed that both

factors are not essential for post-shipment financing, although they are important for pre-shipment financing. Epsilon and Zeta pointed to the importance of a strategic buyer-supplier relationship characterized by mutual trust and interdependence for pre-shipment financing. These characteristics reduce risk levels for actors involved. For instance, Zeta was only considering pre-shipment financing for suppliers with a yearly procurement volume of more than 20 million euros. Lower limits for post-shipment ranged between 50,000–2,000,000 euros in our sample. On the topic of trust, a supplier involved in pre-shipment financing with Epsilon underlined that, “Our relationship with Epsilon is built on trust. Otherwise, pre-shipment financing would not be possible.”

Nevertheless, trust and interdependence alone are not enough to make pre-shipment financing the best fit. Epsilon and Zeta both stressed *high levels of commitment for their goods of exchange* as central pre-requisites. One Epsilon business unit needed to invest in suppliers on a large scale to ensure sufficiently high quality standards. These standards reduced information asymmetries and, thus, uncertainty as described in PAT (Eisenhardt, 1989a). From an inter-organizational principal-agent perspective (with the buyer as the principal and the suppliers as agents), lower uncertainty reduces the risk of undesired or hidden actions by the supplier. In our example, purchase orders resulted in a payment obligation for 95% of the procurement volume. Thus, the buyer (principal) faces low risk to provide funding before the supplier (agent) delivers its products. The head of procurement for that business unit explained that, “Once we order, we have to pay anyway. Consequently, the risks of pre-shipment financing diminish.” Zeta sourced goods from suppliers that specifically designed those products for it. Similar to Epsilon, the purchase order entailed a partial payment obligation. In contrast, all other buyers indicated that they struggled with evaluating the financial risks associated with pre-shipment financing prior to delivery. They therefore preferred post-shipment financing practices.

Our findings regarding the choice between pre-shipment and post-shipment financing partly contradict those of Wuttke et al. (2013a), who provided initial insights on this topic. They indicated that pre-shipment financing is less attractive for buyers with a weak working capital position relative to the upstream supply chain. Zeta, however, utilized pre-shipment financing to improve its own working capital position. It transferred inventories to strategic suppliers with a strong working capital position, offering a financing alternative through an external funder in exchange. Based on our results, Wuttke et al.’s (2013a) results rather hold true when pre-shipment financing is combined with supply chain-internal funds. Our cross-case analysis supported their findings regarding the *dispersion of buyer dependence*. Pre-shipment financing involves high levels of buyer dependence with few suppliers, while post-shipment financing is applicable when buyer dependence is more dispersed. Alpha, Beta, Gamma, and Epsilon also offered their financing alternatives to suppliers with smaller procurement volumes and medium to low buyer dependence.

It is important to mention that pre-shipment financing can complement post-shipment financing. As our case descriptions in Table 1 reveal, Epsilon and Zeta combined both types of funding. They applied post-shipment financing in breadth, as well as pre-shipment financing in depth, for selected strategic suppliers. The findings indicated that this combination presupposes high levels of commitment for goods of exchange, at least for parts of the materials buyers purchase from their suppliers.

Regarding the timing of financing, we conclude the following:

- **P7 – Timing of financing related:** *The characteristics ‘commitment level of goods of exchange’, ‘trust and interdependence’ and ‘dispersion of buyer dependence’ determine the timing of financing of SCF practices in different ways.*
- **P7a:** *A high commitment level for goods of exchange is positively*

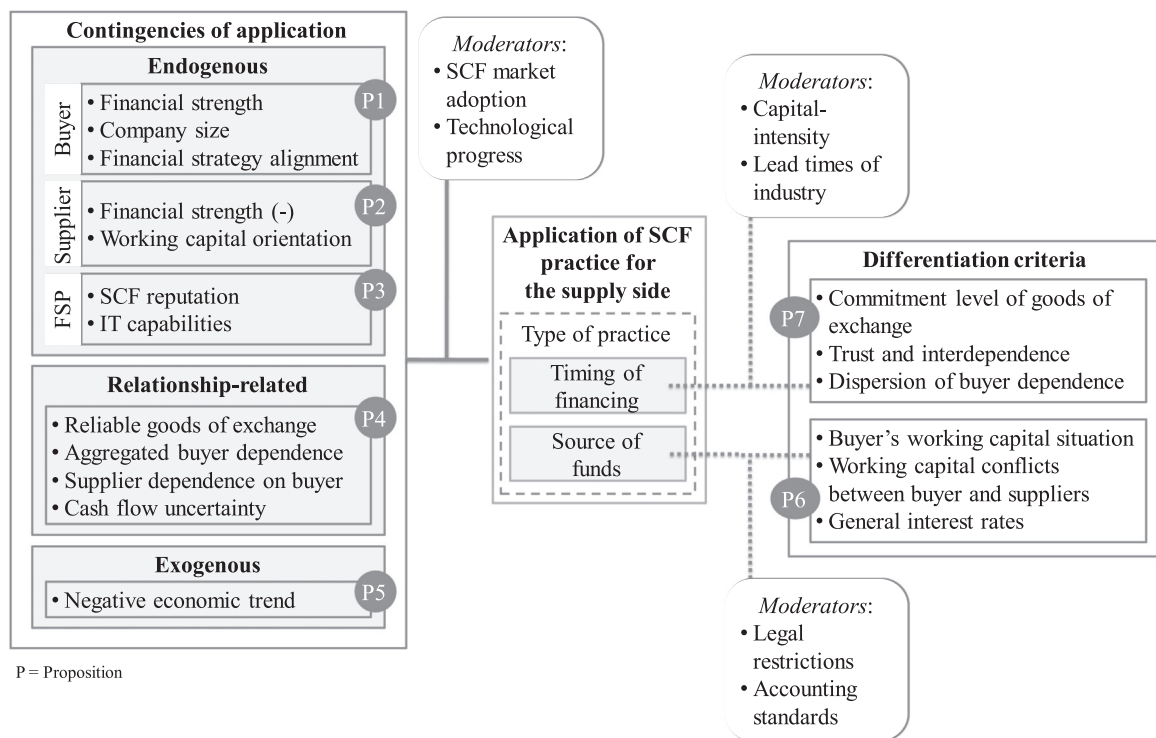


Fig. 3. Contingency framework for the application of SCF practices for the supply side.

associated with the application of pre-shipment financing.

- **P7b:** A high level of trust and interdependence is positively associated with the application of pre-shipment financing.
- **P7c:** A highly dispersed buyer dependence is positively associated with the application of post-shipment financing.

#### 4.2.4. Moderators of timing of financing

Several moderators again influence the relationship between the timing of financing and its key contingency factors. Industry-specific *lead times* and *capital intensities* seem to be such moderators, as previous studies have demonstrated (Chiou et al., 2006). Our case study results underline this presumption. For instance, in Zeta's capital-intensive industry, lead times were two to five years long, increasing financial pressure on suppliers. Products were designed and made in accordance with customer orders. In contrast, Gamma and Theta were both from the commerce industry, in which lead times were shorter due to a lack of own production. In such low capital-intensive industries, working capital requirements are lower.

Consequently, the moderating effect of industry type must be considered when analyzing the choice of pre-shipment financing versus post-shipment financing. Regarding the timing of financing, we can summarize the following additional key learning:

- **Moderators of timing of financing:** The capital-intensity and lead times of industries to which buyers and suppliers belong moderate the influence of the differentiation criteria 'commitment level for goods of exchange', 'trust and interdependence' and 'dispersion of buyer dependence' on the timing of financing of SCF practices for the supply side.

## 5. Discussion

Our analysis identified various contingency variables in the buyer-supplier-FSP triad (see Fig. 3). In a best-case scenario, all contingencies will fulfill the requirements for the application of SCF practices for the

supply side. Nevertheless, our findings indicate that not all identified contingencies are obligatory.

For instance, our findings reveal that *suppliers' commitment* to funding alternatives is always founded on a vendor's dependence on the buyer. Supplier dependence thereby determines the financial and relational leverage of SCF practices for the supply side. Previous SCF research has underscored the importance of buyer power, which permits buyers to pressure their suppliers to participate (Liebl et al., 2016; Wuttke et al., 2013b). Our findings do not contradict these insights. Yet, they also point to the significance of interdependence. Our sample included suppliers that described their commitment as a deliberate investment in selected strategic partnerships. Through the employed practices, they extended payment terms for strategic customers without negatively affecting their own working capital position.

Based on the supposition that supplier dependence is a general prerequisite, we differentiate *three types of reasons for suppliers to commit* (Martin, 2017): First, some suppliers are primarily motivated by financial reasons (type A), and suppliers with high financing costs and a difficult access to external funding fall into this category (Brealey et al., 2011). Second, financially stronger suppliers with a distinct working capital orientation and cash flow focus (type B) benefit from the positive effects on their working capital positions. Third, in the absence of other reasons (types A and B), suppliers commit to financing alternatives only for relational reasons (type C).

In accordance with the contingency approach, we differentiate endogenous, relationship-related and exogenous contingencies (Donaldson, 2001). These contingencies explain the general application as well as the selection of specific SCF practices for the supply side. Specific to SCF, our identified contingencies involve financial and supply chain-related factors as well. Still, the contingency approach benefits from adjacent theoretical lenses. In particular, when we analyzed relationship-related contingencies, TCE, SET, and PAT – among others – provided valuable explanations (Halldórsson et al., 2007).

From a TCE view, the influence on transaction costs explains the

application of SCF practices (Williamson, 1979). Accordingly, SCF practices can facilitate transactions, since they enhance electronic exchange and decrease cash flow uncertainty for suppliers among others. Wuttke et al. (2013b) identified similar factors in their research on SCF. In addition to their findings, our results showed how TCE also helps to explain the selection of specific SCF practices. In particular, working capital conflicts between buyers and suppliers constituted an essential reason to prefer supply chain-external instead of -internal financing practices.

The SET addresses long-term relationships instead of individual transactions (Cook and Emerson, 1984). Thus, it introduces additional factors such as trust and dependence as explanations for the application of SCF practices. In particular, when we analyzed the selection of pre-shipment financing, long-term relationships based on trust and interdependence played a crucial role. As a consequence, considering the impulses of SET in our research avoided an exclusive focus on (transaction) costs only (Griffith et al., 2006). Instead, relational reward was included as an additional benefit of introducing SCF practices for the supply side.

PAT provides an additional benefit to SCF research as it considers principal-agent constellations within and between companies (Hofmann and Johnson, 2016). First, from an intra-firm perspective, it stresses the importance of facilitating interaction between the financial department (as initiator of an SCF program and principal) and the operations/procurement department (as agent). Ordinarily, the financial department (treasurer) designs an SCF program, and the operations/procurement department (purchasers) assists to roll out the SCF program. Without an alignment of purchasers to the goals of the initiated SCF practice, the expected successes will fail (Wandfluh et al., 2016). Second, from an inter-organizational perspective, the relationship between a buying company (as principal) and its suppliers (as agents) can be further examined. Aside general phenomena's like moral hazard or adverse selection, SCF specific explanations are derivable, such as the design of appropriate incentives to foster suppliers' commitment positively. Because after all: without an (voluntary) onboarding of the suppliers on a SCF platform, no reverse factoring or dynamic discounting program can be introduced.

Overall, all four theories provide valuable explanations in our research context. We reveal how SCF research can benefit from these theories. This is of particular relevance to the field of SCF in order to strengthen its theoretical foundation.

## 6. Conclusion and outlook

The present research examined the application of SCF practices for the supply side, as well as the differences between such practices. The findings were based on eight case studies that collected data on buyer-supplier-FSP triads. They have numerous managerial and theoretical implications. *First*, we offer empirical insights into the existing SCF literature (Rogers and Leuschner, 2015). *Second*, our study relies on SCF practices as a more general unit of analysis, allowing us to establish contingencies for the provision of funding alternative to suppliers (Sousa and Voss 2002). *Third*, we classify SCF practices for the supply side in terms of the “time of financing” (post-shipment versus pre-shipment) and the “source of funds” (supply chain-internal versus supply chain-external). Based on this classification, we derive criteria to select different types of practices. Our findings also consider contextual situations permitting the combination of several practices, resulting in a differentiated selection approach. *Fourth*, we use the contingency approach as a theoretical framework for our analysis. Together with TCE, SET and PAT, our research provides selected interfaces with theoretical

lenses applicable in the field of SCF (Hofmann and Johnson, 2016). *Fifth*, our findings differentiate among three types of reasons (financial, cash flow-related, and relational) explaining a supplier's commitment to SCF practices for the supply side.

From a managerial perspective, *buying companies* can utilize these contingencies as a list of prerequisites when considering initiating SCF practices for the supply side. Insights on suppliers and FSPs can enhance their understanding of relevant actors. Buyers can consequently develop individualized approaches for addressing suppliers. The service requirements are initial criteria for evaluating and comparing FSPs. The differentiation criteria help buying companies to select appropriate SCF practices for the supply side. *Suppliers* can better understand the financing alternatives available to them. The derived contingencies enable them to analyze the applicability of different practices and approach buyers accordingly. For instance, in our sample, there were several cases of suppliers proactively approaching buyers about SCF practices for the supply side. Finally, *FSPs* can utilize the results to improve their services related to inter-organizational financing.

Nevertheless, our research also faces several limitations, opening opportunities for future research. For content-related and methodological reasons, this study focused on the supply side. Future studies should thus examine the demand side and analyze any differences (Gelsomino et al., 2016; Hofmann and Zumsteg, 2015). Furthermore, market adoption rates vary by the type of practice. Although our sample included all relevant SCF practice types, future studies would benefit from further analyzing supply chain-internal and pre-shipment financing. Further insights are particularly needed regarding pre-shipment financing (e.g. purchase order financing techniques), considering its potential with onward market adoption of innovative approaches. For instance, our analysis treated pre-shipment and at-shipment financing as a single type of practice. Future studies could thus extend our contingency framework, also with regard to other theoretical lenses, like the network theory or resource based view (Halldórsson et al., 2007). In addition, we focused on the inter-organizational management of funding and neglected collaborative or LSP-oriented approaches to inventory management (Caniato et al., 2016; Hofmann, 2009). In the future, it would be interesting to investigate differences and similarities regarding the integrated management of inventories in supply chains. Thereby, accounting rules like “substance over form” have to take into account, as inventory-financing solutions or sale-and-lease-back options largely need to address such moderating effects. Finally, the mentioned key learnings regarding the moderating effects of the application of SCF practices have to be examined much more into detail.

Overall, our findings constitute a starting point for future research, since we conducted a broad, explorative analysis. In particular, data on suppliers and FSPs is scarce, and our research only offers initial insights. Focus studies could apply quantitative approaches to extend our work. In addition, the moderating effects of SCF market adoption and technological process require additional research. Such analyses could assess the effect of disruptive innovations, such as blockchain technology, in an SCF context (Templar et al., 2016).

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## Appendix A. Description of SCF techniques

See Appendix [Table A1](#)

**Table A1**

SCF techniques for the supply side and their classification with regard to source of funds and time of financing.

SCF technique	Description	Source of funds		Time of financing		Example studies
		SC-ext	SC-int	PoS	PrS	
Approved payables financing	An FSP is introduced as an intermediary to the buyer-supplier dyad. The buyer approves the invoice for payment to the FSP. The supplier receives an early payment from the FSP in exchange for a discount. The buyer pays the full invoice on the agreed-upon due date. The FSP ensures intermediate financing, relying on the buyer's creditworthiness.	X		X		(Lekkakos and Serrano, 2016; Liebl et al., 2016; Wuttke et al., 2016)
Dynamic discounting	The supplier receives early payment from the buyer for approved invoices in exchange for variable discounts. The buyer's discounts increase with every day of earlier payment. The buyer uses its own liquidity for funding.		X	X		(Caniato et al., 2016)
Inventory financing	The buyer offers funding to the supplier for the latter's inventories. Buyers can utilize their own funds. Typically, an FSP (e.g., a bank or LSP) provides funding sources.	X	X		X	(Bryant and Camerinelli, 2014; Hofmann, 2009)
Purchase order financing	An FSP offers funding to suppliers on the basis of the buyer's purchase order. The buyer provides an acceptance guarantee to reduce financing costs for suppliers.	X			X	(Bryant and Camerinelli, 2014; Wuttke et al., 2013a)

## Appendix B. Applied measure for validity and reliability

See Appendix [Table B1](#)

**Table B1**

Applied measures to ensure validity and reliability of case study results.

	Definition	Applied measures (examples)
Construct validity	Use of adequate measures for the examined constructs	<ul style="list-style-type: none"> <li>• Development of semi-structured questionnaire in accordance with the related literature (see appendix)</li> <li>• Data triangulation of multiple sources (interviews, presentations, reports, etc.)</li> <li>• Multiple interviewers (see <a href="#">Table 1</a>)</li> <li>• Reviews of transcripts by interviewers</li> </ul>
Internal validity	Establishment of causal relationships and identification of spurious correlations	<ul style="list-style-type: none"> <li>• Research framework based on the contingency approach</li> <li>• Inclusion of multiple, well-informed respondents</li> <li>• Open-coding and pattern-matching among cases</li> </ul>
External validity	(Partial) generalizability of results to another context	<ul style="list-style-type: none"> <li>• Within-case analyses</li> <li>• Theoretical sampling approach</li> <li>• Comparative, multiple case design, including different types of practices and adopters/non-adopters within the buying companies</li> </ul>
Reliability	Possible repetition of examinations with same findings	<ul style="list-style-type: none"> <li>• Case study protocols</li> <li>• Case study database</li> <li>• Semi-structured questionnaire as basis for interviews (see appendix)</li> <li>• Transcripts of all interviews</li> <li>• Involvement of independent researchers</li> </ul>

## Appendix C. Interview guideline for buyers

The subsequent questions constitute an overview of the main questions within our semi-structured questionnaire for buyers. The questions for suppliers and FSPs relate to the below questionnaire.

### 1. Starting questions

- Please briefly describe your supply chain structure (supply and demand side).
- Which SCF practices have you introduced for the supply side?
- Why did you introduce the SCF practices for the supply side? Which were your reasons to select the specific practices?

### 2. Structure of applied SCF practices

*Buyer internal:*

- How was the introduction of your SCF practice organized?
- Which internal functions were involved? What was/is their role?
- How did/do operations and finance functions interact within your organization?

**Suppliers:**

- Based on which criteria did you approach suppliers to participate?
- How many suppliers did participate after the first year?
- How did you adapt your criteria to approach suppliers throughout the introduction process?

**FSPs:**

- Do you involve an FSP in your SCF practice? Why?
- Why did you select the specific FSP?
- How did/does the FSP influence the introduced SCF practice?

**3. Dynamics for applied SCF practices**

- Did your organization adapt the SCF practices? If so, how and why?
- Which influences would cause you to stop the applied practices?
- Do you consider the introduction of additional SCF practices? Which and why?
- How do external factors (e.g., interest rates and economic trend) influence your applied SCF practices?

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