PETER J.H. LUKASSEN
CARL MARCUS WALLENBURG

Pricing Third-Party Logistics Services: Integrating Insights from the Logistics and Industrial Services Literature

Abstract

As the logistics services outsourced by companies increase in scope and complexity, the challenge of designing appropriate contracts grows. Here, the price model, which determines the remuneration, takes a central position. In practice, however, the agreed-upon contracts often fail to govern the relationship and set wrong or misleading incentives for either or both of the involved parties.

In order to provide a conceptual basis and to identify promising avenues for future research in the increasingly important field of pricing third-party logistics services, this article provides a comprehensive review of the existing literature on logistics and industrial service pricing using a refined version of the established Industrial Marketing and Purchasing (IMP) group relationship management framework.

For more than two decades the logistics services industry has exhibited tremendous growth (Maloni and Carter 2006). Especially since the 1990s this development was paralleled by an increasing academic interest in third-party logistics (3PL). With the majority of academic articles on 3PL, however, following a descriptive approach (Selviaridis and Spring 2007), this field is still in its early stage of development (Marasco 2008). While the increase of theory testing articles (Sachan and Datta 2005) indicates a beginning maturation (Colquitt and Zapata-Phelan 2007; Boyd et al. 2005), deficits in the theoretical foundation of 3PL research still exist (Marasco 2008; Selviaridis and Spring 2007; Mentzer et al. 2004).

Recently, three extensive reviews of logistics literature related to 3PL have been published: Maloni and Carter (2006), Selviaridis and Spring (2007), and Marasco (2008). All stress the potential importance of contractual arrangements and incentives in logistics outsourcing as well as the need for further research in this area. Maloni and Carter (2006) emphasize studies on logistics contracts being underrepresented. Selviaridis and Spring (2007) call for more work on the question of whether contracts are an important element of relationship management or just a necessary formality, and Marasco (2008) claims that bonding elements, necessary for the preservation and development of sustainable logistics relationships, require closer examination. This need for further research is substantiated by the empirical observation that users and providers of logistics services lack the know-how how to design purposeful agreements and pricing structures. The agreed-upon contractual arrangements often fail to govern the relationship and set wrong or misleading incentives (Halldorsson and Skjoett-Larsen 2006). Considering contractual arrangements to define the legal frame of 3PL relations, pricing represents its economic "heart" and will be the focal point of the following analysis.

According to Williamson (1979; 1991), contracts are an important instrument of relational governance. One of their central elements and, thus, of major importance is the agreed-on price model; others include the service specifications. In long-term arrangements, as present in 3PL relationships (Lieb and Bentz 2005a), a

Mr. Lukassen is research fellow, Kuehne-Center for Logistics Management, WHU — Otto Beisheim School of Management, 56179 Vallendar, Germany; e-mail lukassen@whu.edu. Mr. Wallenburg is professor of logistics and Kuehne-Foundation Chair of International Logistics Networks, Technische Universität Berlin, 10623 Berlin, Germany; e-mail wallenburg@tu-berlin.de.

well fitted price model sets the path for further relational development and success. In contrast, an inappropriate price model may impede further prospering of the relationship as the service provider may only undertake the most necessary changes and improvements to its services and not consider specific investments that are mainly beneficial to the customer. Therefore, knowledge about 3PL pricing is not only relevant to service providers, but also to the customers – especially since customers heavily influence the structure of price models through the tendering process and by issuing detailed and specific requests for proposal (RFPs) and requests for quotation (RFQs).

The three aforementioned literature reviews, due to their broad scope, do not provide detailed insights into the existing body of knowledge regarding the pricing of 3PL services. In order to facilitate future research on 3PL pricing, it is necessary to consolidate previous studies – especially from the fields of logistics and marketing – and to identify promising avenues for further theoretical development. This is the aim of this article.

With this aim in mind, the nature of 3PL services will be discussed first. In order to carve out their distinguishing characteristics, the scope of examination is narrowed gradually, beginning with basic services via industrial services and finally 3PL services. Then the methodology and framework used is described, and relevant literature is identified and reviewed, providing a synthesis of the field of logistics and industrial services pricing. The manuscript closes with a discussion of implications and directions for further research.

Characterizing Third-Party Logistics

Characteristics of Industrial Services

3PL services are a subset of services in general and industrial services in particular. Services are described by Zeithaml et al. (1985) as being (1) intangible, (2) inseparable, (3) heterogeneous, and (4) perishable. Compared to services in general, industrial services exhibit several additional characteristics that distinguish them from other services, especially consumer services. According to Morris and Fuller (1989), industrial services are non-convenience products, customized to the specific needs of the customer, thus requiring a formal and extensive provider selection process in order to assure the service provider's capability to perform accordingly. Moreover, industrial services are often provided at the location of the customer, performed to goods (e.g., in logistics transporting, handling, and storing objects) rather than to people, and based heavily on human resources and their specific knowledge involving costly service-specific equipment (Morris and Fuller 1989). Finally, industrial service relationships tend to be long-term and continuous, showing a more predictable demand pattern than consumer services.

Revisiting the initially cited four service characteristics, there are additional typical specifications relevant for industrial services: (1) intangibility does not only complicate service comparisons but requires an intense ex-ante supplier selection process, (2) inseparability does not only imply the customer but especially its assets to be integral part of the service production, (3) heterogeneity does not only result in service performance that varies due to differing customer attributes, but also due to prerequisite service-specific equipment and know-how, and finally (4) perishability does not only refer to a discrete capacity allocation problem but also – due to the long-term nature of the relationship – to a continuous capacity dedication and planning problem. While this complicates the analysis on the one hand, demand is more predictable on the other hand.

Definition and Particularities of 3PL

As a next step, common definitions of 3PL are analyzed to identify the specificities of 3PL. Here, different views can be identified that reach from broad to narrow (Deepen et al. 2008; Marasco 2008). The first conceptualization depicts a broad view of 3PL. It encompasses simple "traditional" transportation, warehousing services, and more complex multi-service bundles (Lieb 1992) as well as respective contract durations ranging from short-term agreements to long-term relationships (Bask 2001). Second, a narrower view associates 3PL with the provision of comprehensive logistics services (Sink et al. 1996) on the basis of a longer-term relationship (e.g., Berglund et al. 1999; Murphy and Poist 1998; Skjoett-Larsen 2000; Knemeyer and Murphy 2005).

Observing the market for logistics services, the first perception of 3PL includes all service offerings that range from basic logistics, like freight forwarding, courier, express, and postal services, to the provision of complex services bundles and logistics solutions. In the more narrow view, only the second, more complex services belong to 3PL. This latter notion of 3PL, specifically the one of Berglund et al. (1999), is applied in the following. Otherwise 3PL would include all outsourced logistics and would, in this way, not differ from the more general term *logistics services.*

Based on this definition, a further refinement of the services characteristics is proposed for 3PL – especially regarding the third element of heterogeneity. In contrast to other industrial services, like auditing or operations and maintenance services, 3PL comprise the management and execution of multiple services. This implies high complexity and customer specificity of the service bundle. While this requires a larger part of the associated investments to be not only specific to the service but also to the individual customer, it allows for greater price differentiation too. Along this line, 3PL services are especially heterogeneous industrial services, where both the service and price components can be customized. This refined characterization serves as a guideline when evaluating whether certain service pricing articles may be relevant for 3PL services and therefore should be included in the subsequently conducted literature review.

Methodology

Consistent with, for example, Marasco 2008, Spens and Kovács 2006, Li and Cavusgil 1995, and Krippendorff 1980, we apply content analysis to consolidate the existing knowledge regarding pricing of 3PL. Content analysis aims for a reliable, objective, systematic, and quantitative study of existing publications (Ellinger et al. 2003; Krippendorff 1980) and allows for the investigation of implicit assumptions as well as explicit statements of texts (Krippendorff 1980). Thus, it represents a promising method for reviewing literature (Cullinane and Toy 2000). In order to conduct a content analysis, two steps are required: sampling and categorization (Li and Cavusgil 1995).

Sampling

In an initial step, articles that contribute to the domain of logistics service pricing have to be identified. Given the diversity of available publications, appropriate limits have to be applied in the search. First, only literature penned in the English language and published or frequently referenced in academic journals was considered to account for quality and traceability. Next, the scrutinized literature was limited to two areas: (1) logistics articles dealing with pricing and contracting issues (this area will be referred to as "logistics pricing") and (2) due to the proximity of 3PL services and other industrial services, articles that address industrial service pricing (this area will be termed 'industrial service pricing'). Concerning the year of publication, all electronically available literature until the end of 2007 was included. Keeping in mind that pricing research is still comparatively weak (Hinterhuber 2004; Malhotra 1996), especially with respect to services (Bolton and Myers 2003) and industrial goods (Noble and Gruca 1999), no starting date was specified and no journal preselection applied.

For the first area (logistics pricing) the keywords "Third Party Logistics" or "Logistics Outsourcing" and "Contract" or "Price" or "Pricing" were applied to titles, abstracts, and author-supplied keywords using the EBSCO database. The resulting thirty-one academic publications were scrutinized as to whether they contribute to the analysis of logistics pricing, which resulted in the omission of thirteen articles. In the next step the references of the remaining eighteen articles, as well as the most recent literature reviews on logistics from Maloni and Carter (2006), Selviaridis and Spring (2007), and Marasco (2008), were searched for further articles potentially addressing logistics pricing. This revealed another nine academic articles, as well as five studies, to be included in the present literature review. Thus, in total, thirty-two publications were considered from the logistics pricing domain (see Appendix 1).

Likewise, for the second area (industrial service pricing), a keyword search was conducted in the titles, abstracts, and author-supplied keywords of articles in the EBSCO database using "Service(s) Price" or "Service(s) Pricing," revealing 170 academic articles. In order to identify those articles relevant for the question of

3PL pricing, the characteristics of 3PL services previously described were applied to each of them. Based on this, articles focusing solely on spot transactions (e.g., Chao and Wilson 1987; Crew et al. 1990; Yano and Newman 2007), on retail services (e.g., Hoffman et al. 2002; Rabinovich and Bailey 2004), or on services non-specific to an individual relationship (e.g., Morris and Fuller 1989; Essegaier et al. 2002) were excluded. Moreover, an intense search for relevant cross-references was conducted. This resulted in a total of twenty-nine articles, which were included in the present literature analysis (see Appendix 2).

Literature Classification

For the classification of the literature according to methodological research orientation we follow the approach taken by Croom et al. (2000) and Selviaridis and Spring (2007), which distinguishes between conceptual and empirical work on a first dimension and descriptive and prescriptive work on a second dimension. It becomes apparent that the research orientation differs widely between the two areas of literature (see Figure 1). 81 percent, and thus the clear majority of logistics pricing publications, are empirical, while only 31 percent of the articles on industrial service pricing are empirical and thus the majority conceptual. Also 81 percent of studies on pricing in logistics are confined to describe the phenomenon, whereas the majority of articles on industrial service pricing offer explanatory norms.

This lack of conceptual as well as prescriptive work on logistics pricing is no surprise, as logistics research in general is still primarily descriptive: 69 percent of all logistics articles and 80 percent of the specific literature on 3PL are descriptive in nature (Selviaridis and Spring 2007; Marasco 2008). However, it is surprising to note that the conceptual work on logistics pricing primarily – in five out of six cases – is prescriptive. This is in contrast to the general conceptual literature on logistics and supply chain management which by Croom et al. (2000) and Selviaridis and Spring (2007) is found to be predominantly descriptive. In this respect, the methodological approach in the logistics pricing literature is closer to industrial service pricing literature, where the major part (90 percent) of conceptual work is prescriptive.

Research on service pricing, and more specifically on industrial service pricing, has a longer history than the specialized logistics pricing research. The first article identified in this area is Beard and Hoyle (1976), fourteen years before Bowersox (1990) wrote about pricing issue in logistics outsourcing relationships for the first time. However, looking at the number of published articles (see Figure 2), research on industrial service pricing also did not receive much attention for a long time. Only recently there seems to be increasing interest in the topic, especially in the work of Avlonitis and Indounas, who alone have contributed six of the last twelve articles on industrial service pricing (Avlonitis and Indounas 2005a; 2005b; 2006; 2007a; 2007b; Avlonitis et al. 2005).

Nevertheless, the further theoretical development of industrial service pricing is impeded by the wide dispersion of the articles in primarily second-tier journals. The twenty-nine industrial service pricing articles have been published in twenty different journals. Only seven journals yield more than one article, and only one of these, the *Journal of Service Marketing,* with four studies, more than two articles. In contrast, logistics research profits from a stronger focus within dedicated journals (Zsidisin et al. 2007; Carter 2002; Fawcett et al. 1995). Out of the thirty-two logistics publications, twenty-eight have been published in fourteen different academic journals, much more than half (57 percent) in three of the most renowned logistics outlets (Carter 2002): seven in the *International Journal of Physical Distribution and Logistics Management,* six in the *Journal of Business Logistics,* and three in the *Transportation Journal.* The remaining four publications are the self-published studies of Langley et al. (2003; 2004; 2005; 2007).

From a methodological point of view, there are also major differences between the reviewed logistics and service pricing articles. While only five out of the thirty-two logistics studies take a theory-driven approach to logistics pricing, 62 percent (eighteen out of twenty-nine) of service pricing articles do. Additionally, the two literature streams differ in choice of theories applied. Four of the five theory-driven logistics articles refer to general economic theories: Transaction Cost Theory,

Figure 1. Classification of Reviewed Literature (32 Logistics Pricing Articles and 29 Industrial Service Pricing Articles)

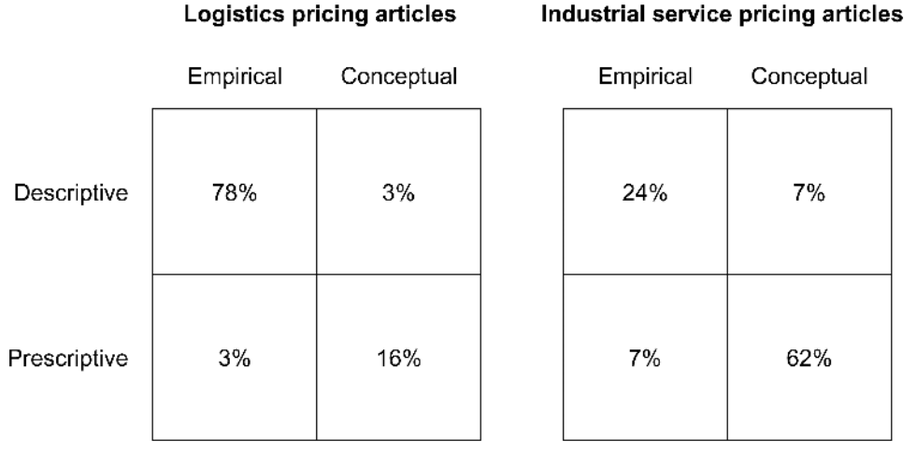
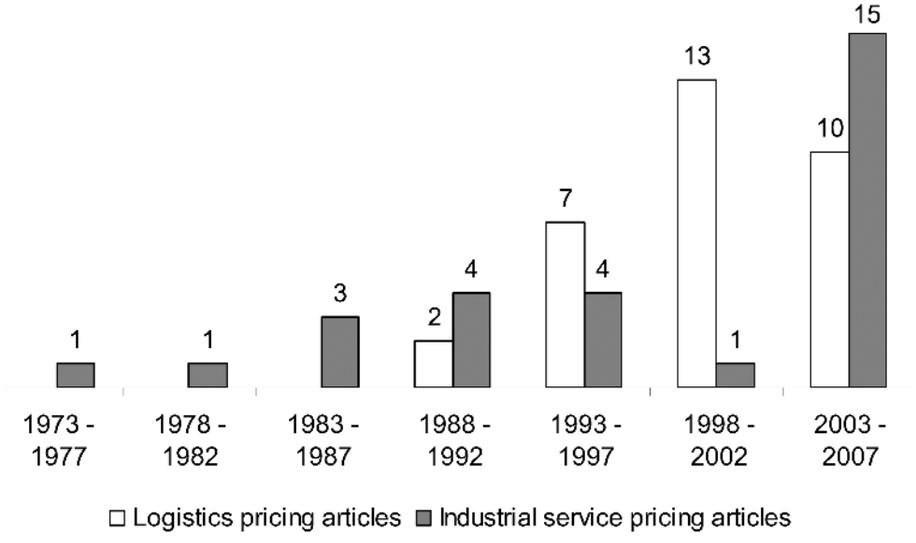


Figure 2. Publication Dates of Reviewed Logistics and Industrial Services Pricing Studies

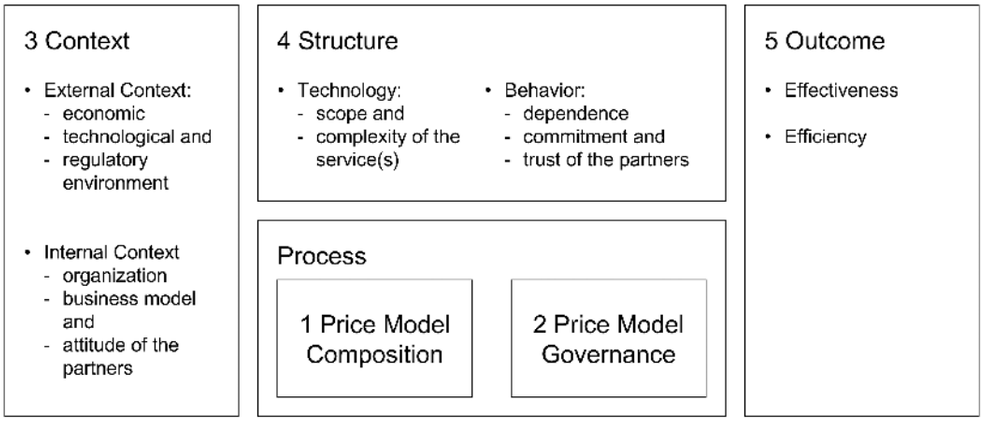


Principal-Agent Theory, Resource-Base View, and Game Theory. The remaining article – Maltz and Ellram (1997) – is based on a Total Cost of Relationship approach developed by the authors. In contrast, service pricing literature lacks this inclination for economics theories and utilizes different pricing approaches and mechanisms (see Appendix 3).

Categorization

To categorize the existing service pricing literature (see Figure 3) we use Marasco's (2008) relationship framework and conceptualization, which builds on the framework of the Industrial Marketing and Purchasing (IMP) group. In total, Marasco (2008) distinguishes four main aspects – process, context, structure

Figure 3. Categories Underlying the Content Analysis



and outcome – that are essential for any relationship. While we follow this division in general, we adjust Marasco's view of the process phase (Marasco 2008) to account for the specific problem of designing price models. Although price level and the imposed costs are some of the most important criteria for outsourcing decisions and service provider selection (Lieb and Bentz 2005b; Wilding and Juriado 2004; Boyson et al. 1999), pricing is not only a matter of price level (Kotler and Keller 2006). It is also a matter of designing purposeful incentives structures which are able to govern the further development of the relationship.

The *composition of the price model* specifies how much the service provider gets paid and under which conditions. Due to the specificity of 3PL services, reaching an agreement both on the elements and the level of the price model requires pre-relationship negotiations and will influence the later set-up (e.g., level of proprietary service solutions, the usage of dedicated or shared assets, and initial investments of the service provider) of the service. Once the relationship is agreed upon, the negotiated price model has to be implemented. During the ongoing relationship, the price model serves as a governance mechanism and influences the behavior of both the service provider and the customer. For example, if bonuses and penalties are included the service provider is likely to adapt the service level to a level where own profits are at a maximum. To cover this interrelationship, *price model governance* is introduced as a second process-related category to complement the first category (price model composition) of our framework.

Context as the third category relates to the specific relational context the 3PL relationship is embedded in. This includes all external as well as internal factors which are independent from the individual exchange relationship. The external context comprises the economic, technological, and regulatory environment, while the internal context comprises the organization, business models, and attitude, i.e., risk aversion, of the customer and the service provider – as far as they are non-dependent on the specific service encounter. This context can be assumed to have a non-trivial influence on the pricing process.

Structure is the fourth category. It relates to the structure of the relationship and comprises its technical as well as behavioral set-up as far as it is dependent of the specific relationship situation and the partners involved in this relationship. A first structural element is the scope of the service rendered within the exchange relationship. Considering potentially different scopes of the services (Berglund et al. 1999), contracts will be more or less complex, long-termed, or detailed (Hakannsson and Snehota 1995). Further structural elements include (mutual) dependence of the partners and behavioral aspects, like commitment or accumulated trust,

Table 1. Categorization of Reviewed Logistics and Pricing Literature

Content category	Logistics pricing articles		Industrial services pricing articles	
	Number of articles	Share of articles	Number of articles	Share of articles
1 Composition	28	88%	10	34%
2 Governance	4	13%	2	7%
2 Context	6	19%	18	62%
3 Structure	7	22%	19	66%
4 Outcome	4	13%	7	24%

e.g., through previous collaboration. These elements will influence the outsourcing arrangement (Marasco 2008) and, therefore, possibly also the price model design.

Following Marasco (2008), *relationship outcome* is the fifth and last category within our conceptual framework. Obviously, price model design is only a relevant element of logistics relationships if it actually affects the outcome of the relationship. Such effects may be observable both with regards to efficiency and effectiveness. Thus a comprehensive evaluation of price model design calls for the inclusion of the outcome dimension.

Examining the reviewed articles regarding the aforementioned categories, again, a remarkable difference between logistics pricing and industrial services pricing articles can be observed (see Table 1). Almost all (88 percent) reviewed logistics articles consider the composition of 3PL compensation, while only 34 percent of the industrial services articles investigate this topic. Also governance aspects of pricing are almost twice as often covered by logistics articles. In contrast to this, 62 percent of the selected industrial services studies cover the relationship context – almost four times the percentage of the reviewed logistics pricing articles with only 16 percent. Moreover, 66 percent of industrial services articles are concerned with relationship structure and its implication for pricing, while this is only the case for 22 percent of selected logistics articles. Finally, with 24 percent, the outcome dimension is considered substantially more often in articles on industrial service pricing.

Composition

In total, twenty-eight of the thirty-two articles on logistics pricing refer to the composition of price agreements. One series of exploratory empirical studies that uses one standard framework of 3PL usage of Lieb (1992) starts in 1992 and successively covers all continents (Bhatnagar et al. 1999; Dapiran et al. 1996; Lieb et al. 1993; Lieb and Randall 1996; Lieb and Randall 1999a; Lieb and Randall 1999b; Millen et al. 1997; Peters et al. 1998; Sohail and Sohal 2003; Sohail et al. 2004; Sohail and Al-Abdali 2005; Sohal et al. 2002). These studies investigate current 3PL practices. This includes reporting the degree to which actual 3PL relationships are based upon signed contracts and whether the agreements include ex ante variable components in the form of performance-based bonuses or penalties. In general, the use of outcome-based bonuses and penalties seems to have increased over the years. This trend first started in the U.S. (Lieb 1992) and Europe (Lieb et al. 1993) and moved with some delay to Asia (Millen et al. 1997; Bhatnagar et al. 1999) and to Africa (Sohail et al. 2004; Sohail and Al-Abdali 2005) before eventually reaching the saturation point, as observed for the U.S. by Lieb and Randall (1999b) with regards to the use of bonuses (down from use in 65 percent of all relations studied to 52 percent) as well as penalties (down from use in 51% percent of all relations to 49 percent). For Europe the initial trend is ascertained by van Laarhoven et al. (2000) and for the U.S. by Crum and Allen (1997).

Langley and colleagues (2003; 2004; 2005; 2007) achieve more detailed results with their

annual surveys on global 3PL usage. They show that the usage of risk- and reward-sharing agreements have decreased over the last years, while cost-based contracts, often in practice referred to as cost-plus, which relate the remuneration to the actual inputs made by the service provider, and transactions-based fees have gained in importance and are utilized more. While the popularity of cost-based agreements is also shown by Jaafar and Rafiq (2005) in a survey of firms from the UK, the descriptive article of Lambert et al. (1999) highlights the importance of risk and reward sharing in building strong logistics relationships.

Concerning the choice between cost- and outcome-based 3PL remuneration, there are different propositions. While Lieb and Bentz (2004) note that managers with outsourcing experience advise first-time users of 3PL services to avoid cost-based contracts, Fernie (1999) identifies that in the practical application simpler logistics services are compensated based on outcome and more complex ones based on costs – independent of outsourcing experience.

Considering the reviewed prescriptive work, Maltz and Ellram (1997), based on a total cost of relationship approach, generally promote outcome-based compensation. In contrast, Richardson (1993) proposes to use cost-based contracts in situations of high technical uncertainty, e.g., in start-up phases or new markets. Bowersox (1990) recommends basing this decision on the relative risk aversion of the partners, and van Hoek (2000), who applies transaction cost theory, suggests using detailed, fixed price contracts, and restraining from ex ante variable components with complex services. Logan (2000), who uses a multi-theory approach, shows this matter to be ambivalent as she posits that the service provider should aim for long-term outcome-based contracts while customers should demand open book, cost-plus agreements. Further, Lim (2000), based on game theory, shows that a small base-remuneration combined with high bonuses and penalties reveals the true capabilities of the service provider.

While the many articles applying the framework of Lieb (1992) and the studies of Langley et al. (2003; 2004; 2005; 2007) offer no recommendation or explanation concerning price composition, the articles going beyond these cited above focus on specific elements of 3PL contracts and result in varying and often contradictious conclusions. For example, 3PL services in dynamic businesses are often complex, yet, following Richardson (1993), compensation should be cost-based, while according to van Hoek (2000), compensation should be fixed. These contradictions obviously stem from the different theoretical and methodological approaches taken. Therefore, a broader but also more in-depth investigation into 3PL price agreements is necessary to provide a comprehensive understanding of relevant pricing components and guide practice in the appropriate application.

Examining the ten industrial service pricing articles that relate to price composition, the aforementioned importance of cost-based pricing is affirmed. Indeed, Avlonitis and Indounas (2005a, 2006) and Zeithaml et al. (1985) find cost-based pricing to be the most used pricing design by service firms.

Based on a review of interdisciplinary articles, Schlissel and Chasin (1991) recommend the combination of time-based rates to cover for spending that is not specific to the individual service provided and cost-based rates for costs only incurred due to the specificity of the service request. Similarly, Lovelock and Gummesson (2004) propose time-based compensation for rental and access relationships like 3PL in order to reflect their intermediate position between market and hierarchy.

For services that require input from both partners and some inputs that are substitutable, Löbler et al. (2006) advise the use of cost-based over outcome-based compensation. This may be illustrated with the following example: To manage the customer's outbound logistics, the logistics service provider may require volume forecasts from its customer, yet the required warehouse workers may be employed by either of the firms. Consistent with this notion, the use of cost-based compensation is generally recommended as it increases transparency as to whether services are performed profitably (Beard and Hoyle 1976). Kim et al. (2007), similar to Bowersox (1990), refer to the risk transfer, which also is inherent in 3PL services, and recommend remuneration to be more outcome-based the more the customer is

risk averse compared to its service provider and more cost-based the less the customer is risk adverse. The reason for this can be seen in two facts: (1) risk premiums are lower when risks are carried by parties that are less risk adverse and (2) cost-based contracts shift risks from the provider to the customer while outcome-based contracts transfer risks in the opposite direction. Differently, Docters et al. (2004) suggest that all service relationship contracts should include risk sharing, insurance, or warranties to cover for potential non-performance costs.

In summary, as was the case with the logistics pricing literature, the industrial service pricing literature lacks a comprehensive and consistent evaluation of price model composition. While both logistics and service pricing literatures note the predominance of cost-based compensation, there is no agreement on which determinants are and should be considered for the choice and design of price models. From a methodological point of view, the theory-comparative article of Logan (2000) as well as the Performance Contracting approach of Kim (2007) and industrial pricing concept of Forman and Hunt (2005) offer an especially promising basis and multiple links for further research.

Governance

With only six articles (four on logistics and two on industrial services) considering how price models govern 3PL relationships, this is the least examined of the five categories – especially as most of the six publications only peripherally touch this aspect of pricing.

For logistics pricing literature, risk and reward sharing (Lambert et al. 1999) and bonuses and penalties (Andersson and Norrman 2002) are seen as an integral part of relational governance. It is stressed that not only outcome-based compensation but also cost-based rates may establish incentives that influence the behavior of the logistics service provider (Logan 2000). Yet, it should be considered that price models not only offer the potential to support the relationship, but may also be a source of conflict between the two parties involved (Halldorsson and Skjoett-Larsen 2006).

In the industrial services literature, payment equity, the perceived fairness of the price paid for the purchased services, is emphasized by Bolton and Lemon (1999). It influences not only the customer's service satisfaction, but also customer willingness to use the respective service in the future (Bolton and Lemon 1999). Expressed differently, price should not only be thought of as part of a single transaction point, because the price model balances the interests of both relational partners and in this way secures customer loyalty (Cram 1996).

With respect to possible incentives through variable remuneration, the existing literature underestimates governance-related impacts of price models on logistics service relationships. Overall, the literature does not provide a clear description of the governance function of price models, nor does it offer a thorough explanation of its effects on relationship development and success. Further analysis might profit from a thorough application of Transaction-Cost Theory (e.g., Halldorsson and Skjoett-Larsen 2006) or the Payment Equity Concept (Bolton and Lemon 1999).

Context

Only six out of the thirty-two reviewed logistics publications consider the relational context of pricing design. This influence is shown in general in the recent case study article of Halldorsson and Skjoett-Larsen (2006). More specifically, Maltz and Ellram (1997) point out that the demand for logistics services is a derived demand, determined externally and influenced by the market success of the logistics customer. The derived nature of the 3PL service combined with the complexity of the service – a structural aspect of the relationship – leads to inflation measurement costs when a pure cost-based remuneration is chosen and in turn favors a more outcome-based pricing. More generally, Logan (2000) mentions that technological progress as well as (de)regulation drives sophistication and complexity of logistics services, which in turn calls for a more sophisticated price model design. In contrast, when focusing on customer experience, Lieb and Bentz (2004), based on managers' opinions and experience, advise inexperienced customers to avoid cost-based pricing. Regarding customer attitude, Bowersox (1990) emphasizes that the distribution of risk aversion between the partners (equal opposed to higher with LSP or with customer) influences optimal remuneration, while Boyson et al. (1999) further specify the

argument highlighting that risk-adverse customers have a stronger preference for detailed and explicitly outlined contracts.

Within the industrial service pricing literature, context represents the second-most often considered category of the five. In particular environmental characteristics are frequently regarded as influencing pricing (Tung and Capella 1997; Hinterhuber 2004; Forman and Hunt 2005; Taher and El Basha 2006; Avlonitis and Indounas 2007a). More specifically, competition amongst logistics service providers is shown to foster market-based pricing (Avlonitis and Indounas 2005a) and decrease short-term profit maximization in favor of more long-term- and service-quality-related objectives (Avlonitis and Indounas 2005b). Additionally, LSP competition reduces the extent to which cost-based pricing is used in practice (Avlonitis and Indounas 2006). Similarly, a relatively high risk aversion of the customer compared to the service provider disfavors cost-orientation, and should lead to outcome-orientation of compensation (Kim et al. 2007). Yet, a limited availability of alternative service providers, i.e., absence of LSP competition, allows for the inclusion of price premiums and higher prices (Arnold et al. 1989).

For cases where service demand is at least partially predictable and separable into more than one unit, which is the case with logistics services, Lovelock (1984) and Berman (2005) suggest pricing should depend on the availability of necessary service capacities. Given high uncertainty about adaptation need, Hiller and Tollison (1978) highlight cost-based compensation to be the appropriate compensation basis. Taking a different vantage point on future uncertainty, Docters et al. (2004) focus on probability, as well as associated cost of service non-performance. Here, the inclusion of risk-sharing elements is suggested in case of costly and / or frequent service failures.

In general, the industrial service literature indicates a much higher affinity to either cost-plus or customer-oriented pricing (Cram 1996) than found with retail services. In this regard, Avolonitis et al. (2005) show that LSPs when pricing their services should concentrate more on increasing their asset utilization and customer retention (Avlonitis and Indounas 2007b).

In contrast to logistics publications, literature on industrial service generally acknowledges the great importance of the relational context for pricing services, but still displays a great heterogeneity amongst the utilized approaches and the results derived. From these approaches, most often the discussion focuses on the appropriateness of cost-plus pricing schemes. While the literature provides a comprehensive view on this specific question, it does not provide an integrative assessment of the relationship between context and the appropriate design of price models. From a theory-focused point of view, the performance contacting (Kim et al. 2007), value-based pricing (Hinterhuber 2004), as well as total cost of relationship (Maltz and Ellram 1997) concepts should be further examined.

Structure

With respect to relationship structure, logistics publications regard that complexity of the service drives the need for advanced logistics solutions (Andersson and Norrman 2002) and influences the choice between cost and outcome compensation (Fernie 1999; van Hoek 2000). Similarly, both the ex ante uncertainty regarding technical performance (Richardson 1993) and the ex post measurement of this performance (Maltz and Ellram 1997), which is determined by the actual layout of the service, should influence the pricing design of 3PL services. In this regard, Bowersox (1990) motivates the use of bonuses and penalties to cover the risk transfer from the customer to the service provider that is inherent in any 3PL service. Taking a different point of view, Logan (2000) argues that pricing is not only affected by relational trust but also in turn influences relational trust.

Taking into account the strong relation between marketing and behavioral sciences, it does not come as a surprise that a large part of the selected industrial service pricing articles posit that behavioral characteristics in a relationship, like mutual trust and confidence (Cram 1996), affect the choice of 3PL compensation (Tung and Capella 1997; Hinterhuber 2004; Taher and El Basha 2006; Avlonitis and Indounas 2007a). Thus, the service provider should try to match its customers' needs with pricing (Avlonitis and Indounas 2005a; Avlonitis and Indounas 2005b; Groth 1995b). For

example, in early stages of the service lifecycle, this refers to more quality- or value-oriented pricing (Avlonitis et al. 2005). Considering the technical dimension of the relational structure, Avlonitis and Indounas (2006) highlight that increasing uniqueness, i.e., customer-specificity, of the service makes cost-based remuneration preferential for the LSP as unique services pose higher risks which can be reduced through cost-based contracts. Consistent with this, Forman and Hung (2005) posit technical complexity and Löbler et al. (2006) technical entanglement favor cost-oriented pricing. Given a high degree of fixed costs, prices should consider capacity restrictions (Berman 2005). For customized service offerings (Roth et al. 2006), as well as for large projects (Cannon and Morgan 1990), pricing itself should be based on negotiations to reflect the specificity of the relationship. Further, service providers may realize price premiums if the service is essential to the customer (Hoffman and Arnold 1989), exclusive (Groth 1995a), and non-testable (Arnold et al. 1989). Finally, risks and consequences of non-performance which are due to the chosen service layout may require the inclusion of insurance or risk sharing (Docters et al. 2004).

Overall it is apparent that the structuring of the relationship has been analyzed more profoundly by the industrial service pricing literature than by the logistics literature. While there seems to be no consensus how certain behavioral determinants affect the optimal pricing design, technical aspects, like high complexity and specificity, are most commonly associated with cost-based, instead of fixed, compensation. Here, the transaction-cost-based survey study of van Hoek (2000) as well as the modeling assessment of integrated services by Löbler et al. (2006) might be of further methodological interest.

Outcome

Finally, price model composition affects relational governance and, subsequently, it should also affect relationship outcome. In order to improve performance for both parties, the logistics relationship has to be appropriately established (Lambert et al. 1999) and the price model adjusted to the specifics of the relationship (Halldorsson and Skjoett-Larsen 2006). This ensures a mutually beneficial development and improvement of relationship performance (Andersson and Norrman 2002). On this note, Lim (2000) shows that appropriate remuneration schemes induce truth telling of the service provider and therewith offer Pareto-efficient improvements.

The industrial service pricing research shows that model design can be improved in a Pareto-efficient way by considering the relative risk aversion of the relational partners when relationship immanent risks are distributed to the party with lower risk adversity (Kim et al. 2007). Similar to highly customized services, the advantage of negotiated prices is demonstrated by Roth et al. (2006).

Regarding the composition of price models, it is not possible to derive general conclusions whether cost-plus or outcome-oriented contracts impose higher total costs, as these costs depend on the uncertainty about future adaptations and cost developments (Hiller and Tollison 1978). For the service provider, capacity-dependent pricing, where prices are higher for services that include highly utilized resources, can help to balance demand as well as to increase profits (Lovelock 1984). Last, payment equity, i.e., the relative perceived fairness of the price model, should be considered as it influences not only customer satisfaction but also future service usage (Bolton and Lemon 1999).

Taking a different vantage point, past outcomes may also influence actual pricing, as superior performance in the past may be a justification for charging premium prices (Friedman and French 1987).

In sum, a consensus seems to exist that (logistics) service pricing affects relational success. Even though existing literature on this topic utilizes various approaches and refers to different patterns, it is limited regarding the scope of factors considered. It can be assumed that significant further research – especially of an empirical nature – is necessary to gain a thorough understanding of the mechanisms that link pricing design to relationship outcomes. Referring to prospective theories, Game Theory (e.g., Lim 2000) as well as Transaction Cost Theory (e.g., Halldorsson and Skjoett-Larsen 2006) appear promising.

Implications and Future Research Directions

In considering the insights from the sixty-one reviewed articles on logistics service pricing and industrial service pricing, several implications can be concluded for future research in this field of relationship management.

First, a lack of integrated approaches for pricing decisions can be observed. In this regard, there is no agreement on which determinants are and should be considered for the choice and design of price models. Moreover, significant interdependencies exist between different relational factors within each of the analyzed five segments of the pricing framework, which mostly are not accounted for in the existing literature. For example, van Hoek (2000) identifies the need for more detailed and fixed contracts with increasing complex service offerings. Those complex services, however, are associated with technical performance uncertainty, which, according to Richardson (1993), calls for cost-based remuneration. Further, there are also interdependencies across the five segments that need to be considered as well as major differences in the motives and goals between the customer on the one hand and the service provider on the other hand. These also interact with numerous other factors and thus should be considered in pricing frameworks (Logan 2000). In this context the sole application of a single theory, like transaction cost or agency theory, while beneficial in their focal nature, may be detrimental as they do not comprehensively cover all five dimensions of the pricing framework. Instead, the application of either holistic concepts or multiple complementary theories is advisable. One example of such an approach is Logan (2000), who applies three different theories in her research.

Second, even though the present review of pricing literature on logistics services and industrial services shows that both streams face common problems and apply comparable approaches, there are hardly any cross-references between the two. Here, industrial service pricing research might profit from the empirical foundation of the logistics service pricing research, while logistics service pricing research, in turn, might build on the rich conceptual basis of industrial service pricing literature.

Third, although cost of service is a major driver for outsourcing as shown by numerous studies, pricing design, which determines the actual level and structure of remuneration, is still perceived as minor in importance, especially within logistics research. The central role price models play in defining and managing logistics relationships is still overlooked in most publications as only few explicitly focus on pricing issues. Only recently, a sprouting of interest in the topic has started to develop, including the works of Logan (2000) and Halldorsson and Skjoett-Larsen (2006).

Fourth, the existing literature seems to underestimate the governance function of price models within service relationships as only very few (six) articles relate to this domain. Currently, both a clear description of the governance function and differentiated explanations of its effects on relationship development and success are still missing. Here, operations management research might offer further insights on the coordinative impact of contracts, e.g., revenue sharing (Hsieh and Wu 2009; Xianghua et al. 2005; Cachon and Lariviere 2005), which could be implemented in 3PL relations in terms of sharing cost improvements.

While the further theoretical development of logistics service pricing clearly requires a more focused analysis and discussion of the subject, there are two predominant needs for future research. First, the conceptual base should be expanded to incorporate multiple interdependent relational determinants and their implications for the business relationship as a whole. Here, it might be promising to either integrate available concepts from the industrial service pricing literature (e.g., Beard and Hoyle 1976; Hinterhuber 2004; Tung and Capella 1997) or to utilize general theoretical foundations like Transaction Cost Theory, as proposed by Maloni and Carter (2006), or Principal Agent Theory, as done by Logan (2000). Second, although many logistics studies have already touched the domain of price model design, it appears to be fruitful to scrutinize the design and effect of logistics pricing in more detail. So far, the existing literature does not allow for conclusions on the effects and mechanisms of price model design in logistics service relationships.

Further theoretical development and empirical analyses could be very promising to gain

a better understanding of the underlying dynamics of a market which already comprises more than half of all business logistics activities (Langley et al. 2007).

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Appendix 1. Reviewed Logistics Pricing Articles

Author(s)	Classification				Categorization					
	descriptive	prescriptive	empirical	conceptual	composition	governance	context	structure	outcome	
										Key points regarding pricing
Andersson and Norrman (2002)	x			x		x		x	x	Outcome-based bonuses and penalties effectuate contractual governance
Bhatnagar et al. (1999)	x		x		x					70 % of signed contracts (50 %) include bonuses or penalties
Bowersox (1990)		x		x	x		x	x		Risk transfer calls for the inclusion of bonuses as well as penalties
Boyson et al. (1999)	x		x				x	x		Customers are risk-averse and try to explicitly outline service charges
Crum and Allen (1997)	x		x		x					82 % of contracts include performance standards, 12 % penalties
Dapiran et al. (1996)	x		x		x					54 % of signed contracts (60 %) include bonuses, 52 % penalties
Fernie (1999)	x		x		x			x		Simpler services are compensated based on outcome, more complex ones based on cost
Halldorsson and Skjoett-Larsen (2006)	x		x			x	x		x	Price models may sketch possible win-win arrangements, yet, if misaligned, cause constant quarrel
Jaafar and Rafiq (2005)	x		x		x					43 % of signed contracts (62 %) use open-book cost-plus compensation, 26 % closed-book fixed rates
Lambert et al. (1999)	x		x		x	x			x	Risk and reward sharing is important in building strong relationships
Langley et al. (2003)	x		x		x					47 % of contracts include cost sharing, 38 % risk and reward sharing, 10 % revenue sharing
Langley et al. (2004)	x		x		x					46 % of contracts include cost sharing, 33 % risk and reward sharing, 18 % cost-plus agreements
Langley et al. (2005)	x		x		x					32 % of contracts include cost sharing, 19 % risk and reward sharing, 28 % cost-plus agreements
Langley et al. (2007)	x		x		x					65 % of contracts include transaction based fees, 44 % fixed prices, 27 % cost-plus agreements and 19 % gain sharing
Lieb (1992)	x		x		x					One third of signed contracts include bonuses, half envision penalties
Lieb et al. (1993)	x		x		x					European contracts include bonuses more often (43 %) than in the US (25 %), yet, the usage of penalties is similar (51 % Europe vs. 44 % US)
Lieb and Randall (1996)	x		x		x					60 % of contracts include bonuses or penalties
Lieb and Randall (1999a)	x		x		x					Outcome-oriented remuneration is most common, followed by cost-plus and gain-sharing agreements
Lieb and Randall (1999b)	x		x		x					52 % of signed contracts (91 %) include bonuses, 49 % penalties

Appendix 1. Reviewed Logistics Pricing Articles (cont.)

Author(s)	Classification				Categorization					
	descriptive	prescriptive	empirical	conceptual	composition	governance	context	structure	outcome	
										Key points regarding pricing
Lieb and Bentz (2004)	x		x		x		x	x		3PL compensation should be outcome based rather than cost based
Lim (2000)		x		x	x				x	Combining low base compensation and high outcome-based bonuses as well as penalties induces logistics service providers to reveal their true capabilities
Logan (2000)		x		x	x	x	x	x		Logistics service providers should call for long-term outcome-based contracts, customers should demand open-book cost-plus agreements
Maltz and Ellram (1997)		x		x	x		x	x		3PL services are often hardly quantifiable, thus remuneration should be more often based on delivered value to the customer (outcome)
Millen et al. (1997)	x		x		x					Compared to US and Europe, Australian 3PL relationships include less often signed contracts, yet, of these more envision explicit bonuses and penalties
Peters et al. (1998)	x		x		x					47 % of signed contracts (85 %) include bonuses, 65% penalties
Richardson (1993)		x		x	x			x		Cost-plus contracts are favorable if technical uncertainty is high
Sohail and Sohal (2003)	x		x		x					73 % of signed contracts (40 %) include bonuses or penalties
Sohail et al. (2004)	x		x		x					60 % of signed contracts (70 %) include bonuses or penalties
Sohail and Al-Abdali (2005)	x		x		x					31 % of signed contracts (60%) include bonuses, 38 % penalties
Sohal et al. (2002)	x		x		x					40 % of signed contracts (75 %) include bonuses, 63 % penalties
van Hoek (2000)		x	x		x			x		More complex services call for detailed contracts containing fixed prices
van Laarhoven et al. (2000)	x		x		x			x		Half of signed contracts (75 %) specify logistics services in detail, 40 % envision penalties

Appendix 2. Reviewed Industrial Service Pricing Articles

Author(s)	Classification				Categorization					
	descriptive	prescriptive	empirical	conceptual	composition	governance	context	structure	outcome	
										Key points regarding pricing
Arnold et al. (1989)		x		x			x	x		Service pricing decisions should be based on testability and availability of the service
Avlonitis and Indounas (2005a)	x		x		x		x	x		Pricing services, most companies use cost-plus (58 %) and pricing accordant to market's average price (55 %)
Avlonitis and Indounas (2005b)	x		x				x	x		Being important for logistics services, quality, competition and customer related objectives are associated with relationship pricing
Avlonitis et al. (2005)	x		x				x	x		Transportation companies emphasis capacity and asset utilization in their pricing decision, in the initial stage they are concerned with service quality
Avlonitis and Indounas (2006)	x		x		x		x	x		Cost-based pricing is positively associated with the uniqueness of services (cost-plus) and high importance of service costs (target return pricing), contrary intensity of competition has a negative effect
Avlonitis and Indounas (2007a)	x		x				x	x		Service, organizational, and environmental characteristics influence pricing strategy, thus it has to be formulated dependent on the relational situation
Avlonitis and Indounas (2007b)	x		x				x			Pricing their services, transportation companies focus on customer retention considering competitors prices and neglecting profit maximization
Beard and Hoyle (1976)		x		x	x					Services should be priced based on accruing costs allowing for better founded decisions on whether to accept a job or not
Berman (2005)		x		x			x	x		Given limited capacity, high fixed costs as well as separable and fluctuating demand capacity-dependent pricing is favorable
Bolton and Lemon (1999)		x	x			x			x	Payment equity, i.e., customer perception of compensation fairness, influences service satisfaction as well as further service usage
Cannon and Morgan (1990)		x		x				x		Large enough projects should be priced either based on sealed bids or explicit price negotiations
Cram (1996)		x		x		x	x	x		In industrial markets cost-plus and customer-based, i.e., prices are calculated based on customer-specific performance indicators
Docters et al. (2004)		x		x	x		x	x		Given non-performance to be costly service pricing should include insurance or risk sharing
Forman and Hunt (2005)		x	x		x		x	x		Relationship structure and context affect pricing strategy, thereby cost-plus pricing is primarily driven by internal factors, i.e., capacity or cost structure

Appendix 2. Reviewed Industrial Service Pricing Articles (cont.)

Author(s)	Classification				Categorization					
	descriptive	prescriptive	empirical	conceptual	composition	governance	context	structure	outcome	
										Key points regarding pricing
Friedman and French (1987)		x		x					x	Delivering better than expected services allows for charging premium prices
Groth (1995a)		x		x				x		Delivering exclusive services allows for pricing a premium, not only because of physical attributes of the service but also because of its psychic perception
Groth (1995b)		x		x				x		Pricing services is different as attainable price depends on the match of customer needs as well as the inherent uncertainty about to be delivered quality
Hinterhuber (2004)		x		x			x	x		Pricing should consider the customer, company, and competition perspective as well as respective feed-back
Hiller and Tollison (1978)	x			x			x	x	x	Given high (low) uncertainty about future adaptations and cost developments cost plus contracts are less (more) expensive than outcome contracts
Hoffman and Arnold (1989)		x		x				x		The more essential the service is to the customer, the higher is the potential premium the service provider can command
Kim et al. (2007)		x		x	x		x		x	The higher the risk aversion of the customer compared to the one of the service provider, the more compensation should be outcome based, however, in any case some part of compensation should remain cost based
Löbler et al. (2006)		x		x	x			x		Integrated services, i.e., input from both partners is necessary but substitutable, favor pricing based on provider input rather than outcome
Lovelock (1984)		x		x			x		x	As service demand-capacity relation change over time, higher (lower) pricing in peak (low) times increases overall profits as well as directs demand
Lovelock and Gummesson (2004)		x		x	x					Proposing to position rental between ownership and external sourcing, a stronger input, i.e., time-based, compensation is suggested
Roth et al. (2006)	x			x				x	x	The more services are customized, the more price negotiation is to be preferred over ex-ante fixed prices
Schlissel and Chasin (1991)		x		x	x					Service pricing should apply different approaches, a combination of time-based rates for regular and cost-based ones for unique costs is suggested
Taher and El Basha (2006)		x		x			x	x		Pricing strategies should refer to situation-specific service characteristics and associated transaction costs as well as demand heterogeneity

Appendix 2. Reviewed Industrial Service Pricing Articles (cont.)

Author(s)	Classification				Categorization					
	descriptive	prescriptive	empirical	conceptual	composition	governance	context	structure	outcome	
										Key points regarding pricing
Tung and Capella (1997)		x		x			x	x		A multi-step synthetic service pricing approach is proposed considering demand, profit, and service characteristics as well as cost structure
Zeithaml et al. (1985)	x		x		x		x			Service firms differ considerably from each other, yet, concerning pricing, cost-orientation dominates, being used by 63% of the respondents

Appendix 3. Methodological Assessment of Theory-driven Articles

Author(s)	Theory applied/developed	Methodology	Categorization				
			composition	governance	context	structure	outcome
Logistics service pricing							
Halldorsson and Skjoett-Larsen (2006)	Principal-Agent Theory, Transaction Cost Theory	Case Study		x	x		x
Lim (2000)	Game-Theory	Modeling	x				x
Logan (2000)	Resource-Based-View, Principal-Agent-Theory, Transaction-Cost-Theory	Deduction	x	x	x	x	
Maltz and Ellram (1997)	Total Cost of Relationship	Deduction	x		x	x	
van Hoek (2000)	Transaction-Cost-Theory	Survey	x			x	
Industrial service pricing							
Arnold et al. (1989)	Differentiation Premium Pricing	Deduction			x	x	
Berman (2005)	Capacity-Dependant Pricing	Deduction			x	x	
Bolton and Lemon (1999)	Payment-Equity-Dependant Pricing	Survey		x			x
Cannon and Morgan (1990)	Strategic Pricing	Deduction				x	
Cram (1996)	Relationship Pricing	Deduction		x	x	x	
Docters et al. (2004)	Service Pricing	Deduction	x		x	x	
Forman and Hunt (2005)	Premium Pricing	Deduction					x
Friedman and French (1987)	Industrial Pricing	Survey	x		x	x	
Groth (1995a)	Exclusive-Value Pricing	Deduction				x	
Groth (1995b)	Service Pricing	Deduction				x	
Hinterhuber (2004)	Value-Based Pricing	Deduction			x	x	
Hiller and Tollison (1978)	Incentive vs. Cost-Plus Pricing	Modeling			x		x
Kim et al. (2007)	Performance Contracting	Modeling	x		x		x
Löbler et al. (2006)	Input- vs. Value-Based Pricing	Modeling	x			x	
Lovelock (1984)	Capacity-Dependant Pricing	Deduction			x		x
Lovelock and Gummesson (2004)	Maturity/Time-Dependant Pricing	Deduction	x				
Roth et al. (2006)	Negotiation-Based Pricing	Modeling				x	x
Tung and Capella (1997)	Multi-Step Service Pricing	Modeling			x	x	