



# Service-dominant logic and supply chain management: are we there yet?

SDL and supply chain management

113

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## Abstract

**Purpose** – Research suggests that service-dominant logic (SDL) is well suited to support supply chain management (SCM) research and practice. Qualitative research has shown that SDL is particularly consistent with an outcome-based supply chain strategy known as performance-based logistics (PBL). The purpose of this paper is to extend theory and practice by exploring the degree to which SDL is utilized in practice. Specifically, PBL is examined for consistency with the underlying fundamental premises (FPs) of SDL. In doing so, this paper answers the positive question, “what exists”, at the intersection of SDL and SCM.

**Design/methodology/approach** – This study employs a mixed methodological approach. First, the FPs of SDL are operationalized using the language of PBL. The PBL FPs are tested quantitatively through an online survey of 52 supply chain PBL experts. A qualitative analysis is conducted using comments associated with each premise.

**Findings** – The survey results suggest that PBL is consistent with SDL. These results indicate that PBL is a supply chain context of SDL.

**Originality/value** – This is one of the first works to examine the degree to which SDL concepts are being utilized in practice.

**Keywords** Service-dominant logic, Supply chain management, Logistics, Performance-based logistics, Theory of incentives

**Paper type** Research paper



## Introduction

Over the past decade, Vargo and Lusch (2011) and others (Venkatesh *et al.*, 2006; Lambert and García-Dastugue, 2006; Hunt and Madhavaram, 2006; Flint and Mentzer, 2006) have developed and extended service-dominant logic (SDL). SDL suggests economic growth and competitive positions are most accurately explained by adopting a view where service is defined “as a process or as the use of one’s resources or competences for the benefit of another entity” (Lusch, 2011). SDL is consistent with Smith’s original view of markets before he shifted his view to a more product-oriented position (Lusch *et al.*, 2007; Smith, 1776).

Even though there is a significant body of SDL research, as of yet there is no clear articulation of SDL in practice (Lusch, 2011). At the same time, the knowledge and network focus of SDL has significant implications for supply chain management (SCM). Flint and Mentzer (2006) contend that the critical differentiating roles of knowledge, partnerships, and services must be emphasized before supply chains can progress as an integrated value chain. SDL provides a framework consistent with supply chain elements such as knowledge, integration, customer engagement, relationships, and innovation (Song and Di Benedetto, 2008; Chen *et al.*, 2009; Richey Jr *et al.*, 2009). Following previous research this paper adopts the cross-functional business model view of SCM consistent with Lambert and García-Dastugue (2006).

Hunt (1976, 1983, 2000) argues that identifying phenomena as they exist, such as SDL in practice, is key to understanding emerging theoretical market structures. Recognition and explanation of the emerging structures provide researchers the manna upon which new theories can be built and tested (Hunt, 1991, 2000; Holland, 1992; Kuhn, 1996; Glaser and Strauss, 1967; Randall and Mello, 2012). A logical next step involves quantitative supply chain research to extend the strong foundation of conceptual or qualitative research into SDL (Randall *et al.*, 2010; Lusch *et al.*, 2010; Lusch, 2011; Tokman and Beitelspacher, 2011).

One of the challenges of SDL in supply chain research is that SCM encompasses many different strategies and tactics (e.g. just-in-time, vendor-managed inventory) (Angulo *et al.*, 2004). However, one supply chain strategy that has been examined through the “lens” of SDL is performance-based logistics (PBL) (Randall *et al.*, 2010). PBL shifts from an emphasis on a product or service to performance or outcomes (Hypko *et al.*, 2010). The success of outcome based supply chain strategies, such as PBL, is growing in both commercial and government markets (Boeing Company, 2011; The World Bank, 2008; Administration for Children & Families, 2011). For example, Rolls Royce has contracts with their customers for ongoing support of its engines where the outcome is hours of customer use (Ng *et al.*, 2009). The outcome of PBL is suggestive of a supply chain application of SDL (Randall, 2011).

The purposes of this research are twofold. First is to focus on the positive (meaning “what is”) question of: to what degree are PBL practitioners implementing concepts that are consistent with SDL? The second purpose is to develop a foundation to explore the normative question of: should PBL practitioners implement concepts consistent with SDL?

This paper is organized as follows. The literature review integrates the fundamental premises (FPs) of SDL with PBL. The method section describes the mixed methodological approach that includes a quantitative and qualitative survey. The next section discusses the results and develops the propositions that are based on the

findings and extant literature. A discussion, conclusions, and implications are provided including suggestions for future research.

### Literature review

Underlying SDL are ten foundational premises (FPs) which provide a concise framework supportive of SDL research (Lusch, 2011). Vargo and Lusch (2010, p. 172) summarize SDL in two tenets:

- (1) “Fundamentally, economic (and social) exchange can best be characterized as service-for-service exchange – that is, service is the basis of exchange.”
- (2) Value is created collaboratively and inputs (resources) must be integrated in order to realize value.

Significant academic literature has discussed the FPs of SDL (Vargo and Lusch, 2004, 2010; Hunt and Madhavaram, 2006). For a detailed overview of SDL see [www.sdlogic.net](http://www.sdlogic.net). The following literature review discusses the PBL literature and argues that the FPs of SDL are consistent with PBL in practice.

In many industries, aftermarket or post-production support greatly exceeds the original cost of a product (Farris *et al.*, 2005). PBL, which began as strategy to reduce post-production support costs for complex defense system, has been very successful (Fowler, 2008; Boyce and Banghart, 2012; Perry, 1994), and is credited with reducing post-production support costs by more than 15 percent (Miller, 2008). This is an impressive as more typically the post-production support costs for complex systems increase as they age (Maclean *et al.*, 2005). PBL’s success in the Department of Defense (DoD) has been replicated in aerospace, transportation, telecommunications, power generation, health care, child and family service, and manufacturing support (Transportation Research Board, 2009; Administration for Children & Families, 2011; Straub, 2009; Guajardo *et al.*, 2012; Cohen *et al.*, 2006).

The PBL governance structure is based upon a multi-year firm fixed price (FFP) contract where the customer agrees to pay a consistent fee per unit of use (e.g. dollar per flying hour), and the supplier ensure the system performance as represent by a particular metric (e.g. 95 percent mission readiness) or group of metrics (Geary and Vitasek, 2008; Kratz and Diaz, 2012). PBL’s use of metrics to represent the performance, or service, desired by the customer is similar to FP1 of SDL. The FFP-outcome based governance approach of PBL creates competition that is endogenous to the particular contract – the supplier team makes more profit when they are able to avoid costs while still meeting the performance metric (Randall *et al.*, 2011). Thus, similar to FP5, the PBL economy is a performance, or service, economy. The endogenous competition of the PBL governance structure means that PBL success is not unique to the government sector because government sector PBL contracts (e.g. defense, highway infrastructure, and family service) have the same structural elements as PBL contracts in the commercial sector (aviation, rail, manufacturing support). Thus, PBL functions the same whether or not the end market is profit or non-profit.

PBL, similar to FP4 of SDL, rewards knowledge based investments that reduce cost and improve customer value (Lusch, 2011; Randall *et al.*, 2010). PBL, consistent with FP3 is a contract for the delivery of performance, rather than delivery of spares, repairs or overhaul. PBL monetizes the recurring cost of repair to provide an incentive for upfront investment that improves life cycle affordability (Fowler, 2008). This creates

a win-win where supplier profitability is highest when the system does not fail (Cohen, 2012; Randall *et al.*, 2011). PBL can therefore be characterized as a return on investment, knowledge-based exchange. The PBL governance mechanism that converts knowledge into performance that is of specific value to the customer is consistent with FP6 and central to the PBL value proposition.

The underlying investment, cost avoidance, return on investment basis of PBL represents a principal-agent relationship which is based on incentive and game theories (Kim *et al.*, 2010; Nowicki *et al.*, 2008). The suppliers (agents) are free to make tradeoffs between sparing, repairs, overhaul and redesign to achieve performance (i.e. service) desired by customers (principals). Because the incentives and metrics of PBL are performance-driven, actors in the supply chain are inherently customer oriented and relational (FP8). Innovation requires that actors share knowledge and combine resources in order to create attractive value propositions (FP9). In PBL, consistent with FP7 and FP8, the supply chain comes together to offer performance based propositions that are only valuable to the customer in use (Berkson, 2005; Hypko *et al.*, 2010).

Similar to the SDL focus on aggregate, non-product based, value creation (Lusch, 2011), the “cornerstone of PBL is the purchase of weapon system sustainment as an integrated package based on output measures such as system availability, rather than input measures, such as parts and technical services” (Wolfowitz, 2004). In PBL, as in SDL, “goods” are simply a means to an end (FP3) and performance (like service) is an often complex result of service exchanges in extensive supply chains (FP2).

Like SDL, value creation in PBL does not occur unless the customer can apply or benefit from the outcomes provided. Consistent with FP10 of SDL, the value of the offering is contextual to the customer (Lusch, 2011). Cova and Salle (2008) suggest co-creation of value in business networks requires a switch to customer network value propositions. This is an important point in PBL (and SCM in general) as value is often determined not by the immediate customer, but by the customers’ customer. Because value-in-use varies, providers can only offer value propositions (FP7).

PBL shares similarities with systems selling and solutions business models (Davies *et al.*, 2007; Storbacka, 2011). In the systems selling approach, manufacturers integrate towards customers and assume many of the service-based activities once performed by customers or other providers (Davies *et al.*, 2007; Hypko *et al.*, 2010). Integral to systems selling is the “systems integrator,” an entity that coordinates delivery of product and service components to provide solutions to customers. Randall *et al.* (2010) demonstrates integration as a central construct in PBL. In PBL and systems selling, competitive advantage for the supplier network is derived from creation and combination of competences and other resources that create evolving customer value propositions (Cova and Salle, 2008; Matthyssens *et al.*, 2009).

In summary, existing literature and current practice suggest that PBL may be a practical application of SDL in profit and non-profit sectors.

### Method

Similar to Randall *et al.* (2011) and consistent with Creswell (2003) this investigation employed a mixed methodological approach that blends quantitative and qualitative techniques. The quantitative aspect involved a survey targeted to determine the degree to which practitioners involved in PBL are implementing concepts that are consistent with the FPs of SDL. This was accomplished by operationalizing the SDL FPs using the

language of PBL and surveying managers involved with PBL to determine how consistent PBL practice is with SDL. The qualitative element involved open ended questions aimed at understanding if, and how, PBL represents a practical application of SDL.

*Survey pedigree*

The objective of this paper is to determine if PBL represents a supply chain strategy that is consistent with the underlying premises of SDL. To accomplish this, a survey was created that operationalized the FPs of SDL. This investigation began with the FPs of SDL that were defined in the language of PBL as shown in Table 10 of Randall *et al.* (2010). Drawing on Randall *et al.* (2010), the PBL-FPs were modified to support a survey application, were reviewed by eight experts who were experienced in PBL and SDL, and pilot tested with 18 academics and professionals familiar with PBL and SDL. The first column in Table I provides an overview of the FPs

Service dominant premise	Performance-based logistics
FP1 – service is the fundamental basis of exchange	The fundamental basis for business exchange is not to buy goods but to gain performance-based value
FP2 – indirect exchange masks the fundamental basis of exchange	The complexities of production and extended supply chains have created a situation where individuals managing materials, supplies and services (OEMs, suppliers, vendors, depots) seldom have direct contact with the end product or customer. The metrics of PBL provide tangible outcomes that bring production and supply functions back in contact with the customer and customer value
FP3 – goods are a distribution mechanism of service provision	Goods by themselves have no value, and are simply a conduit to put performance from the supplier in the hands of the customer
FP4 – operant resources are the fundamental source of competitive advantage	Knowledge is the fundamental source of competitive advantage. PBL metrics measure value obtained through the application of knowledge and skills within the supply chain
FP5 – all economies are service economies	All value chains are ultimately about providing performance. Knowledge and skill based competition overcomes the limitations of land, labor, capital and manufactured output as a means for predicting success. Knowledge, and the ability to apply knowledge, predicts success
FP6 – the customer is always a co-creator of value	The customer is always a co-creator of value. Value creation, i.e. performance, does not occur unless the customer can apply or benefit from the PBL outcomes
FP7 – the enterprise cannot deliver value, but only offer value propositions	The extended supply chain network cannot deliver value, but only offer value propositions. Customers’ view of performance is the final determination of value
FP8 – a service-centered view is inherently customer oriented and relational	Viewing business as an exchange of performance-based value is inherently customer oriented and relational
FP9 – all social and economic actors are resource integrators	Value creation occurs within a network of individuals, firms, or organizations. This ability to achieve performance-based outcomes by integrating resources and knowledge across the network is the most important core-competency within a PBL strategy
FP10 – value is always uniquely and phenomenologically determined by the beneficiary	Performance value is ultimately determined by the end-user or beneficiary

**Table I.**  
Service dominant  
premises in PBL context

as described by Lusch (2011). The second column provides the refinement of Randall *et al.* (2010) premises as they were operationalized in this survey.

*The sample*

The goal of this study was to determine the degree to which PBL practitioners are implementing concepts from SDL. This requires a targeted, purposive sampling method (Dillman, 2000). While PBL has been largely successful implementation issues have arisen when managers did not understand the key elements of PBL (Government Accountability Office, 2005, 2008, 2010). Additionally academic research suggests that manager PBL knowledge influences PBL success (Randall *et al.*, 2010; Geary *et al.*, 2010; Geary and Vitasek, 2008). Therefore, the sampling approach focused on obtaining managers with a strategic understanding of PBL (from both public- and private-sectors).

*Demographics*

The respondents were identified and selected with the help of three well-connected DoD PBL experts. These three individuals recruited a group of experienced PBL practitioners. Each of the selected participants met at least one of the criteria listed in Table II.

The use of the experts, to qualify, and contact potential participants increased the response rate. Altogether 80 individuals were invited to take the survey over a five day period. During that time 52 completed responses were received for a 65 percent response rate. This sample included 35 government 17 industry managers. Table III provides the demographics of the respondents.

**Results and propositions**

The primary objectives of this research are to answer the positive question of the degree to which PBL is SDL in practice and, if so, develop normative propositions to guide future research. The quantitative results of the survey are summarized in Table IV. Overall, these results suggest that PBL a supply chain context of SDL in practice and provide a strong foundation for the propositions.

In the following sections the survey results are described in detail. This discussion is organized by FP. Each result section is concludes with a related SDL-PBL propositions.

Criteria	Standing in the PBL community
	PBL related publication
	Authoring PBL related policy
	Management of PBL contracts
	Conducting PBL education and training
	Invited to speak at PBL conferences

**Table II.**  
Selection criteria

	Overall mean	Government mean	Industry mean
Work experience	31.10	30.54	32.24
PBL experience	10.12	9.80	10.76

**Table III.**  
Sample demographics

	Respondents			All	STD	Mean score/rank			Comments Gov and Ind	
	All	Gov	Ind			Gov	Ind	Gov		Ind
Q1	52	35	17	5.79	1.86	5.71	4	5.94	2	42
Q2	52	35	17	5.35	1.78	5.43	6	5.18	7	42
Q3	52	35	17	3.90	1.92	3.60	10	4.53	10	41
Q4	52	35	17	5.19	1.63	5.23	8	5.12	8 <sup>a</sup>	35
Q5	52	35	17	5.42	1.46	5.40	7	5.47	6	31
Q6	52	35	17	5.96	1.04	6.06	1	5.76	5	30
Q7	52	35	17	5.04	2.00	5.00	9	5.12	8 <sup>a</sup>	32
Q8	52	35	17	5.94	1.17	5.97	2	5.88	3 <sup>a</sup>	22
Q9	52	35	17	5.88	1.44	5.69	5	6.29	1	27
Q10	52	35	17	5.92	1.48	5.94	3	5.88	3 <sup>a</sup>	28
Average				5.44		5.40		5.52		

Notes: <sup>a</sup>Tie; Gov – government, Ind – industry

**Table IV.**  
Average scores and  
comments of respondents

*Foundational premise 1*

Service, in PBL is performance, 39 of 52 respondents (74.5 percent) agree or strongly agree with FP1. In PBL, knowledge and skill integration by supply chain partners creates the platform for performance delivery. Further, the respondents clearly delineated that performance based exchange is distinct and superior to the traditional, and transactional, exchange of for parts:

I don't care that you deliver 99 percent of the parts for my [aircraft] to fly; all I care about is that my [aircraft] is ready to fly. If the 1 percent of the goods/services don't satisfy the requirement for the deliverable (in this example a working and ready [aircraft]) then all the exchanges of goods and services are worthless to me.

Thus, parts are only valuable when they provide performance – mission readiness. This perspective is contrasted with:

Traditional support, outside of PBL, is built upon simply buying goods or services. PBL has changed the game into buying results instead.

The PBL outcome basis focus actors on providing value propositions instead of parts: “from the customer’s perspective, and assuming a PBL approach, the desired outcome is performance based value”. Consistent with FP1, in PBL performance is service. Therefore:

*P1.* PBL actors focus on performance (service) as the fundamental basis for exchange.

*Foundational premise 2*

Consistent with FP2, 33 of the 52 respondents (63.5 percent) agree or strongly agree that in PBL integrated supply chains overcome the negative effects of indirect exchange:

This statement provides a sophisticated, but well framed question and argument for performance based (logistics). Because a vendor or depot that doesn't recognize the customer value proposition is a blind piece worker. The metrics of PBL make all involved in the supply chain cognizant of the end product or service going to the end customer.

The PBL metric creates a performance budgeting mechanism that brings the supply chain partners into contact with the customer. For example, system downtime is often used as the performance budgeting mechanism in PBL. The downtime budget links actions through the metric. Thus, if an aircraft needs to be available 80 percent of the time, this equates to 1,700 hours of down time per aircraft per year. More discrete control is created by breaking the budget down by subsystem (e.g. engines may be allocated 300 hours of downtime per aircraft). As budgets are kept, or broken, the actor responsible is quickly identified:

I strongly agree with this statement as long as the metrics used in the PBL arrangement are mapped back to the operational outcome to impact the behavior of the providers of the supplies and services.

In order to be able to influence the supply chain, and make effective and efficient use of it, there must be visibility from the suppliers' supplier to the customers' customer.

This metric-sub metric, system-subsystem, budgeting structure creates a clear theory of incentives based governance structure that brings the supply chain partners back into contact with the customer:

PBL metrics can provide the opportunity for even the lowest tier service or component provider to have an appreciation for the end-goal of the thing they provide. It SHOULD not automatically put them in contact with the ultimate end-customer, but it SHOULD put them in more direct contact with their immediate customer. Done correctly, PBL could certainly align that provider's product/service with the ultimate end-product customer's value – but that becomes a leadership, management, and process function.

Yet there are limits on an integrators ability to flow metrics to subsystems and components:

Many sub tier suppliers to a PBL OEM do not have metrics aligned to the PBL OEM's contract metrics.

From a business theory perspective a properly designed and contracted PBL should serve as a way to connect the sustainment value chain with the end-user [...] the reality is that the organizations doing most of the PBL's are concerned with internal metrics which are appropriate for only their piece of the sustainment enterprise [...] missing the opportunity to deliver a meaningful connection between supplier and end-user.

The metric basis of the PBL governance structure is consistent with logic of FP2. Further the PBL metric based governance structure has the potential to overcome the negative effects of indirect exchange. Therefore:

*P2a.* Performance based metrics reduce the negative effects of indirect exchange in a PBL network.

*P2b.* Metrics link incentives to outcomes to improve performance.

### *Foundational premise 3*

The respondents had difficulty accepting FP3. Only 31 percent of the respondents agreed or strongly agreed with this premise while nearly 34 percent disagreed or strongly disagreed. At the same time, the discussion surrounding FP3 provided tremendous insight into the delineation of a goods versus service (performance)

integrated supply chain value proposition. Contrary to FP3, in PBL goods are more than a distribution mechanism for service provision.

Quantitatively both the government and industry ranked FP3 tenth. Yet the qualitative aspects of the mix method provided tremendous insight. The elemental task in post-production support is to get systems running after they fail. This highlights that fact that parts fail and have consequences. The PBL manager places value on products – not as products but as spare parts that have potential, or risk based, value. As stated:

There is value in having the good on hand, when needed.

Goods by themselves are one link in a chain that provides capability. Certainly that one link alone cannot provide capability, but the statement above misrepresents the value of the individual link. A performance-based product support arrangement must address specifics related to value of goods, such as inventory ownership and product improvement insertion responsibility.

The PBL practitioners view products as a part of total system performance and as the distribution mechanism for performance. In PBL, products are in the form of spare parts represent potential performance. Therefore, goods, in the form of inventory, technician knowledge, support infrastructure and other resources, are part of the input process to deliver performance.

Goods have no value if they “are not the right items, in the right place, or available at the right time [ . . .]”, or as said by another respondent, there is no value in a “warehouse full of the wrong parts [ . . .] which will generate no readiness or customer value”. Goods are only valuable when they are combined with other resources to create value for the customer and that value is contingent on inventory – goods which are not even in use:

*P3a.* Suppliers value goods as ingredients that can be combined with other resources (e.g. knowledge, skill, innovation) to produce performance.

*P3b.* When goods are related to performance oriented metrics, PBL managers are more likely to view goods as simply distribution mechanisms for value.

#### *Foundational premise 4*

There were 28 of the 52 respondents (53.8 percent) who agreed or strongly agreed with FP4. The responses to FP4 suggest that in PBL, knowledge is foundational to competitive advantage:

Knowledge is paramount to competitive advantage.

One of the strongest characteristics of PBL is its ability to leverage knowledge to real advantage for the customer. It elevates knowledge to a key discriminator, and differentiates rote transactional processes into elegant solutions.

Value in use and a knowledge based competitive advantage is created by supply chain collaboration and innovation aligned by the PBL metric:

Information and knowledge sharing between vendors are key components of any successful supply chain; contribute to total asset visibility and cost effectiveness throughout the supply chain; and are a fundamental source of competitive advantage. Properly selected and incentivized PBL metrics measure value obtained through the application of knowledge and skills within the supply chain.

PBL metrics provide the OPPORTUNITY to add value by increasing knowledge throughout the system. However, PBL measures value of the actual processes being used, whether or not a vendor understands it or gains knowledge.

The results indicate three types of knowledge resources, therefore, we posit:

- P4a.* Use of customer-based knowledge is positively related to the PBL success and the firm's position of competitive advantage.
- P4b.* Use of supply chain knowledge is positively related to PBL success and the firm's position of competitive advantage.
- P4c.* Technical knowledge and skills are positively related to PBL success and the firm's position of competitive advantage.

*Foundational premise 5*

We found 30 of the 52 respondents (57.6 percent) agree or strongly agree with FP5. In PBL knowledge and skill is used to convert resources into performance:

Customers value performance, not land, labor and capital.

This (FP5) must be qualified because availability of land, labor and capital are more static while companies can trade those assets to acquire knowledge. Caterpillar logistics is a good example; a manufacturer can contract with CAT LOG to assist with their knowledge void. In this, they will trade their land, labor and capital, i.e. buy what they need.

Land, labor and capital are "static" resources that are needed to create performance. Converting "static" resources into performance based value requires knowledge. How well the network applies knowledge predicts success:

Analogy – the sports team that leads in all of the statistical categories is not always the champion. In fact, recent history reflects the opposite. Those teams that can better apply the skills of all of their players and manage the flow of the game, though less impressive statistically, win championships. The same applies to Logistics and Sustainment. The effective integration and management of logistics processes delivers more effective value than sheer quantitative measures of output.

In PBL, value requires integration of all aspects of the supply chain to deliver performance:

One must take a holistic approach. The value chain must consider ALL components of the supply chain. If one doesn't include the land, labor, and capital [...] there may not be a supply chain.

Knowledge is used to convert resources to create performance (service) value. Therefore, we posit:

- P5a.* Access to knowledge based resources positively influences PBL success.
- P5b.* Reduction in the transaction costs associated with knowledge exchange positively influences PBL success.

*Foundational premise 6*

We found 41 of the 52 respondents (78.9 percent) agree or strongly agree with FP6. Customers ranked this FP the highest. For both industry and government value co-creation is important:

Successful PBL takes both a knowledgeable support provider and a knowledgeable customer buyer. The best provider support is of little value to the customer if the customer has misaligned the requirements, misdirected the outcomes, and in other ways diminished the effectiveness of the strategy.

The key is ensuring that the performance outcomes meet customer requirements and expectations by involving the customer early and up front in the development of the PBL strategy and the selection of the proper metrics and incentives tied to these outcomes.

Therefore, we posit:

*P6.* Customer perceptions of value are greater when customers actively participate with the suppliers in the creation of performance based value.

*Foundational premise 7*

We found 27 of the 52 respondents (52 percent) agree or strongly agree with FP7. While the mean was 5.04, this FP had the highest variance. This variance provided insight into the perception of the idea that networks only offer value propositions. The performance based value proposition of PBL only has value when acted on by the customer and in context of customer value – that is, value is determined by the customer:

I agree with this statement if the customer’s view results in mission accomplishment.

Customer’s View IS determination of value.

Now you have got the nub of it. Supply chains create capability – Value gets “Teed Up” but is not realized unless the customer is able to absorb/consume/convert the value POTENTIAL created by the supply chain.

While PBL outcomes are often defined as “up systems” (e.g. aircraft ready to fly 80 percent of the time), actual performance value occurs when the aircraft is in use. Value is determined by the customer and the customer’s customer.

The variance in the respondent answers demonstrated that some respondents struggled with the idea of that organization cannot create value independent of the customer:

The customer’s view of performance value is critical, but the supply chain CAN deliver that value.

Lots of ambiguity here.

I am a bit confused by this one, but cannot understand how you can de-couple the final determinant of value (as being the customer) without at least acknowledging what went into creating that value, in this case, the extended supply chain network.

The struggle with FP7 affirms the findings with regard the differing views on the value of inventory. As is true with inventory, the PBL value propositions only provide value when satisfying customer requirements.

An intriguing finding emerged from respondent comments that questioned SDL’s seemingly singular focus that customer value is only part of the value equation. These comments highlight a limitation that SDL does not specifically address value determination for other key stakeholders in the supply chain:

Value has a buyer and seller. Given that value implies a receipt of a good/service in exchange for some other resource. I would argue that the customer's view may represent half or less of the final determination of value in some instances.

The customer is often the determinator of value; however, the supply chain can create value unseen or unrecognized to the customer.

PBL managers generally agree that customers are the final arbiter of value. However, the practitioners hesitate to abandon the idea that organizations can create value independent of the customer, that inventory has no inherent value, and that value is customer centric – ignoring other stakeholders. Therefore, we posit:

- P7a.* The PBL network's ability to understand customers' perceptions of value positively influences PBL success.
- P7b.* Alignment of metrics with customers' determination of value positively influences PBL success.
- P7c.* Balancing value for both customers and suppliers positively influences PBL success.

*Foundational premise 8*

We found 40 of the 52 respondents (76.9 percent) agree or strongly agree with FP8 with the second highest mean. Like SDL, PBL exchange is customer oriented and relational. Unlike traditional, transactional, post-production support, PBL provides integrated value propositions of immediate value to the customer. As one respondent stated:

Yes. Customer-oriented and relational even if the lower tier suppliers are not functioning smoothly. A performance-based value perspective enhances customer orientation and creates opportunity to build better relationships.

The respondents also highlighted the inherent difficulties integrating and aligning multiple tiers of the supply chain on a single customer oriented value proposition. Compounding this problem is that as transactions go further back in the supply chain, the more performance devolves into delivery of parts. As one respondent stated:

I agree it is inherently customer oriented; but disagree that it is necessarily relational from a supply perspective, or a supplier perspective. Frequently, PBLs focus on supply, not the end-user.

Extending the PBL governance structure beyond to the second and third tiers of the supply chain is difficult. Therefore, we posit:

- P8a.* PBL providers that focus on performance outcomes develop stronger relationships with their end-customers.
- P8b.* Suppliers removed from direct interaction with the end-customer have a greater focus on supply goods than those closer to the end-customer.
- P8c.* The further back in the supply chain the more performance (service) looks like delivery of goods.

*Foundational premise 9*

FP9 was strongly supported (75 percent agree or strongly agree) and industry respondents ranked this FP the highest:

I could not agree more. The PBL strategy is the best value mix of knowledge, skills and capabilities/resources between individuals, firms and/or organizations working in harmony across the network enterprise. It is the most important core-competency within a PBL strategy.

The key competency in the supply chain is the ability to integrate resources (e.g. knowledge, skills, and competences). PBL, unlike traditional post-production support, creates and alignment that assigns integration to the entity most capable of performing that task:

Integration is the foundation of PBL success. All sustainment strategies are based on common logistics functions: MRO, supply, technical data, IT systems, etc. The imbalance of those functions when managed as stovepipe activities sub-optimizes end-user outcomes. It is the effective integration of those functions that enables true customer value.

Integration links the separate supply chain functions to customer value. Like SDL, integration in PBL is the essence of the exchange:

In my opinion, the essence of success in a PBL strategy is dependent almost entirely on taking a holistic approach to asset management, i.e. managing the supply chain at both retail and wholesale levels. The correct approach to this management has to focus on other, outside contributors, and their contributions – which include integrating resources and knowledge.

PBL integration links the metric, cost avoidance, and investment to align the supply chain on transaction cost efficiency that decreases cost and increases performance:

Without this ability PBL cannot be affordable.

Integrated product support is the name of the game. Those who can identify, integrate and exploit the core-competencies of multiple support providers should, in the long run, achieve support results in both performance delivered and profit earned.

In PBL the ability to “identify, integrate, and exploit the core-competencies of multiple providers” is the critical competency. Therefore, we posit:

- P9a.* The efficiency of the integration of knowledge, skills, and abilities of the supply chain positively influences PBL success.
- P9b.* Integration of knowledge, skills, and abilities of the PBL network influences customer value.
- P9c.* Organizations that efficiently and/or effectively integrate resources through the PBL network positively influences PBL success.

*Foundational premise 10*

An overwhelming majority (75 percent) agrees with FP10. Like FP7 in PBL value is determined by the customer and is specific to a context for the customer:

The best provider designed PBL strategy is of no value if it delivers the wrong outcomes – the end-user is the ultimate measure of satisfaction and success.

If the customer is not successful [...] nobody wins.

The customer is ALWAYS right. If the customer is not happy with the final product, then the supply chain network that provided the product has failed the customer.

By stating that value is determined not only by end-customers but also other actors in the supply chain the respondents extended FP10:

Performance value is appreciated by receiver of the benefit. However, the provider must enjoy benefit as well or they will refuse to expose their profits and reputations to a strategy that does not benefit them.

A number of respondents also questioned the line between customer and supplier suggesting that multiple layers of the supply chain “blur” the end-customer:

Absolutely, however, we must remember that within a supply chain there are many end-users within steps. We have to make sure we understand who the customer/end-user is of our output.

The end-user/beneficiary defines success and is the ultimate customer in the supply chain.

Integration determines value creation, and this value is defined by the beneficiaries. PBL success is dependent on a firm’s ability to utilize resources (e.g. knowledge, skills and competences) of supply chain partners to create performance (service) value for the end-user. Therefore, we posit:

*P10a.* Organizations ability to determine value-in-use will positively influence PBL success.

*P10b.* Organizations ability to provide value-in-use will positively influence PBL success.

### **Discussion and implications**

This research examines the positive question of “to what degree are SDL premises utilized in practice?” Based on the results and extant literature, propositions are offered to guide future research into the normative question of “should SDL be implemented in practice? The results generally support PBL as SDL in practice. Eight of the FPs are strongly supported. While FP3 and FP7 were less supported, the qualitative comments provide insights into the challenges of implementing SDL principles in practice. We are now left with the question, what then does this mean for SDL, PBL, and SCM?

Consistent with Vargo and Lusch (2010), PBL practitioners focus on performance, collaborative value-in-use, value creation, and service. The PBL governance structure aligns the supply through the use metrics that link the supplier behaviors to customer measures of value. PBL highlights the critical role of the integrator bundling supply chain resources to create customer value propositions.

The results also indicate two areas where PBL practitioners struggle to fully buy-in to a SDL mindset. First, is the idea of a service-dominant and modified goods-dominant view of goods. In the context of PBL, goods have value as both distribution mechanisms for performance and potential performance value as inventory. PBL practitioners understand that parts have little value unless they are in-use. However, having parts in inventory to be ready when needed is viewed as valuable.

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Additionally the practitioners suggest as transactions occur further upstream from the end customer these transaction tend to be more goods oriented. Understanding and overcoming this extended supply chain alignment conundrum has implications for research and practice.

The concept that an organization does not create value but only offers value propositions is not widely accepted, or understood, by practitioners. Managers argue that companies create value through products and services while acknowledging that customers make the final judgment on the level of value created. Thus, it appears that PBL providers still hold to some long-held goods-dominant views.

#### *Research implications and future directions*

This research establishes PBL as a supply chain context of SDL. This is important as PBL is an increasingly researched strategy with an underlying shift from a return on sales to return on investment governance structure. Thus, the PBL governance structure might be adapted to provide a competitive theory basis for SDL.

SDL is grounded in the resource-based view of the firm, resource-advantage theory, and the competence-based view (Vargo and Lusch, 2004). In contrast, PBL is based upon theories of incentives and principal agent models (Kim *et al.*, 2010; Nowicki *et al.*, 2008). This work suggests that there is promise investigating theory intersecting PBL and SDL to explain knowledge based competitive advantage across the supply chain. In addition managers' comments identify numerous resources (knowledge, skills, innovation, investment, and capital). Future research should provide a framework for defining resources from a PBL and SDL perspective.

Second propositions are provided to support researchers answering the normative question in a broader context. These propositions may serve as a foundation for researchers to determine the degree to which SDL-PBL consistency predicts competitive advantage. In other words, do firms that follow the FPs of SDL perform better than others? Do supply chain networks that adopt an SDL-based strategy achieve superior competitive position to those adopting a goods-dominant approach? What theories apply?

#### *Summary*

Vargo and Lusch (2004) suggest an evolution has occurred in market exchange. In their landmark article they trace how the exchange process has evolved. Classical and neoclassical economies viewed market exchange as transactional, focused on the delivery of tangible goods. The shift to a customer orientation suggests value is determined in the market place. Emerging thought establishes co-creation as a key antecedent of value, and argues that competitive advantage is predicted by efficiency, and that the supply chain converts knowledge into value.

Our results affirm the ability of SDL to explain phenomena occurring within SCM. PBL represents a unique opportunity to examine whether supply chain executives viewed their behavior and decision-making as consistent with the SDL perspective. The analysis demonstrates that PBL is generally consistent with the ten FPs of SDL. SDL, in a PBL context provides a framework that explains how integrated SCM, aligned under a PBL governance structure co-create services value for the customer and the supply chain.

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