



A STUDY ON THE EFFICIENCY OF 3PL LOGISTICS OPERATIONS

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Abstract:

Third party logistics (3PL) has become an important source of competitive advantage, especially in supply chains. Based on the literature review, this study develops a research model from organizational theory to elaborate the cause and effect relationship between 3PL service quality, organizational effectiveness, and relationship management with service partners. After the measurement model is analyzed, the structural model is tested and confirmed. The testing and confirmation results show that the significant criteria that are related to 3PL organizational performance comprise three constructs: service quality (SQ), organizational effectiveness (OE), and relationship management (RM). The results indicate that the causal relationships between service quality, organizational effectiveness, and relationship management are important dimensions of 3PL organizational performance. The results also confirm the multidimensional measurement capacity of 3PL organizational success and support the application of the concept to organizational performance.

Key Words: Structural Model, Relationship Management & Multidimensional Measurement

Introduction:

Effective logistics and supply chain management is the key to most organizational success. The continual advancement of logistics and supply chain management is important for India to continue to be a leading commercial trade center. High quality and efficient corporate supply chain management is a critical reason for cultivating relationships with partners and improving supply chain competence. The use of third party logistics (3PL) services is a means of obtaining these benefits. 3PL, which is also called "logistics outsourcing" or "contract logistics," has shown significant expansion over the past decade. 3PL is a relationship between a shipper or customer and a third party, and, compared to ordinary service, offers more comprehensive, customized, and multipurpose services. 3PL is also characterized by a long-term, more mutually beneficial relationship between service providers and customers. Companies that outsource their logistics activities to 3PL service providers promote interactive relationships. It is important to amass organizational connections that adopt a relational, rather than transactional, corporate approach. Logistics outsourcing and 3PL services ought to remain a key element of contemporary supply chain management. Recent research has revealed record high 3PL usage among Fortune 500 companies, and it was projected that by 2005, U.S. 3PL users would spend an average of nearly one-third of their total logistics budgets (compared to 20% today) on Support for 3PL services (Gooley, 2000). In adopting the outsourcing approach, firms employ an external company to perform some, or all, of their logistics activities to achieve high-quality professional services. 3PL firms provide inventory improvements and enhance efficiency, and capture the economies of scale that result from the higher volumes that are obtained by the aggregation of demand across a large market. There seems to be a lack of research on the collaborative relationship between management and organizational performance in 3PL services providers and their supply chain partners (suppliers and customers). This study of organizational performance measurement of logistics outsourcing in the Indian logistics industry explores the relationship between 3PL service providers and supply chain partners, and enhances the effectiveness of the services provided. It is imperative that firms excel in quality assurance to facilitate the efficient and effective flow of goods and the transfer of information and finances within supply chains.

Objectives of the Study:

The purpose of this study is to investigate 3PL organizational performance in the Logistics Industry. The specific research objectives of this study are presented as follows.

- ✓ To define the collaborative relationship and performance among 3PL service providers and their upstream and downstream partners.
- ✓ To use organizational theory to develop a research model of the performance measurement of 3PL, and to specify the collaborative relationship among 3PL service providers.
- ✓ To empirically investigate the performance measurement model, provide guidelines for logistics organizations in managing relationships with 3PL providers.

Scope of the Study:

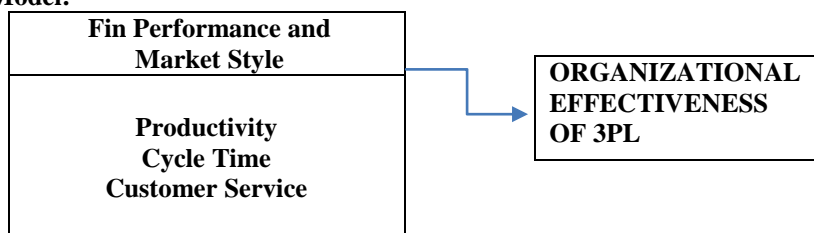
The focus of this study is to investigate the organizational performance in outsourcing and 3PL providers in the logistics industry in India. To avoid misleading research findings, "third party logistics (3PL)" and "logistics outsourcing" refer to companies that provide professional logistics services to their customers,

whereas a 3PL “customer” refers to a company that uses 3PL or logistics outsourcing services (such as suppliers, shippers, and upstream and downstream partners) within a supply chain.

Literature Review:

Research on logistics and SCM has steadily increased since the 1980s, when companies began to recognize the benefits of collaborative relationships within and beyond their own organizations (Lummus and Vokurka, 1999). However, Mabert and Venkataramanan (1998) claim that research on logistics and SCM is not a recent phenomenon. The first comprehensive investigation and demonstration of supply chain interdependence was conducted by Forrester (1961), and was documented in Industrial Dynamics. In the past few decades, innumerable studies have addressed various aspects of logistics and SCM. From the 1950s until the 1970s, research on manufacturing emphasized mass production with a minimization of production costs as the primary operation focus (Lummus and Vokurka, 1999).

Research Model:



Research Methodology:

Research Respondents: This study collects data from the business partners of four identical 3PL providers and the internal staff of the four 3PL providers in Coimbatore using the revised measurement scale. To avoid confusion, the data collection was divided into two sections the expected logistics service quality and performance and the actual logistics service quality and performance that are provided.

Instrument Development: The respondents were asked to evaluate the extent to which they agreed or disagreed with statements that addressed the service quality in targeted 3PL providers on a seven-point Likert scale that ranges from “1” (strongly disagree) to “7” (strongly agree).

Research Sampling: The four targeted 3PL providers that have been selected for this study are typical forwarding-based and value-added 3PL companies in India. The four companies are Star Trans International Limited, BEL International Logistics Limited, E-Commerce Logistics Group, and JCT Logistics Limited, and have been selected to gather information on 3PL performance measurement in India. These companies provide similar forwarding and 3PL services to their partners, and thus were able to provide similar content for this study.

Research Instrument: A total of 140 questionnaires in four groups (3PL expected, 3PL actual, customer expected, and customer actual) were distributed to four target 3PL providers and their partners. The sample size of each company is based on the company size. Hence, different numbers of questionnaires were distributed to company employees and customers

Table 1: Demographic Information of the respondents and their Companies

Respondents' Demographic Data	3 PL Expected	%	3 PL Actual	%	Customer Expected	%	Customer Actual	%
Total Number of Employees								
Below 50	8	21.05	6	15.79	18	66.67	7	18.92
50-99	12	31.58	10	26.32	4	14.81	18	48.65
100-199	13	34.21	12	31.58	2	7.41	9	24.32
200-499	5	13.16	3	7.89	2	7.41	1	2.70
500-999	0	0.00	5	13.16	0	0.00	1	2.70
Above 1000	0	0.00	2	5.26	1	3.70	1	2.70
Total	38	100	38	100	27	100	37	100
Business operations in India								
Below 2 Years	3	7.89	2	5.26	9	33.33	2	5.41
2 - 4 Years	6	15.79	4	10.53	10	37.04	9	24.32
5 - 7 Years	24	63.16	8	21.05	5	18.52	17	45.95
8 - 10 Years	3	7.89	3	7.89	2	7.41	1	2.70
Above 10 Years	2	5.26	21	55.26	1	3.70	8	21.62
Total	38	100	38	100	27	100	37	100
Value of Physical Assets								
Below 15 Millions	3	7.89	8	21.05	23	85.19	6	16.22
15 - 29 Millions	10	26.32	3	7.89	1	3.70	16	43.24
30 - 49 Millions	13	34.21	6	15.79	1	3.70	13	35.14
50 - 99 Millions	10	26.32	5	13.16	1	3.70	1	2.70
Above 100 Millions	2	5.26	16	42.11	1	3.70	1	2.70
Total	38	100.00	38	100.00	27	100.00	37	100.00
Annual Sales								
Below 5 Millions	5	13.16	6	15.79	21	77.78	2	5.41

5 - 9 Millions	3	7.89	3	7.89	2	7.41	5	13.51
10 - 19 Millions	13	34.21	6	15.79	3	11.11	25	67.57
20 - 49 Millions	15	39.47	6	15.79	1	3.70	1	2.70
50 - 99 Millions	2	5.26	4	10.53	0	0.00	2	5.41
Above 100 Millions	0	0.00	12	31.58	0	0.00	2	5.41
Total	38	100.00	38	97.37	27	100.00	37	100.00
Position in the Company								
Senior Management	10	26.32	5	13.16	4	14.81	10	27.03
Middle Management	18	47.37	12	31.58	2	7.41	15	40.54
Front line Manager	4	10.53	5	13.16	7	25.93	3	8.11
Front line Staff	6	15.79	14	36.84	13	48.15	8	21.62
Other	0	0.00	2	5.26	1	3.70	1	2.70
Total	38	100.00	38	100.00	27	100.00	37	100.00

Type of Industry								
Biotechnology/Chemical	N.A	0.00	N.A	0.00	2	7.41	0	0.00
Construction	N.A	0.00	N.A	0.00	0	0.00	1	2.70
Electrical Appliance	N.A	0.00	N.A	0.00	1	3.70	0	0.00
Electronic/IT	N.A	0.00	N.A	0.00	1	3.70	2	5.41
Industrial Machinery	N.A	0.00	N.A	0.00	0	0.00	2	5.41
Medicine/Health	N.A	0.00	N.A	0.00	1	3.70	0	0.00
Optical/Plastic products	N.A	0.00	N.A	0.00	2	7.41	5	13.51
Printing	N.A	0.00	N.A	0.00	2	7.41	6	16.22
Service/Wholesale/Retail	N.A	0.00	N.A	0.00	12	44.44	3	8.11
Textile and Clothing	N.A	0.00	N.A	0.00	3	11.11	10	27.03
Toys	N.A	0.00	N.A	0.00	1	3.70	6	16.22
Watches and Clock	N.A	0.00	N.A	0.00	1	3.70	0	0.00
Other	N.A	0.00	N.A	0.00	1	3.70	2	5.41
Total	38	0.00	38	0.00	27	100.00	37	100.00

Table 2: Mean and Standard Deviations of the Constructs

Constructs	Mean (SD)			
	3 PL Expected	3 PL Actual	Customer Expected	Customer Actual
3 PL Service Quality				
Tangibles	5.71 (0.64)	5.15 (0.87)	5.20 (0.84)	5.19 (0.77)
Reliability	5.64 (0.81)	5.21 (0.92)	5.23 (0.93)	5.34 (0.91)
Responsiveness	5.83 (0.80)	5.36 (0.96)	5.31 (0.96)	5.36 (0.96)
Assurance	5.76 (0.69)	5.35 (0.84)	5.33 (0.85)	5.33 (0.88)
Empathy	5.55 (0.72)	5.23 (0.85)	5.19 (0.89)	5.29 (0.92)
3PL Organizational Effectiveness				
Productivity	5.37 (0.98)	5.18 (0.84)	5.03 (0.72)	5.11 (0.80)
Financial Performance	4.16 (1.02)	3.81 (1.47)	3.98 (1.13)	4.13 (1.20)
Cycle Time	5.80 (0.82)	5.32 (0.81)	4.99 (0.85)	5.04 (0.74)
Customer Service	5.17 (0.75)	5.12 (0.83)	5.02 (0.96)	5.14 (0.83)
Reputation and Goodwill	5.28 (0.90)	4.88 (0.89)	4.99 (0.90)	5.12 (0.87)
Relationship Management				
Guanxi	5.30 (0.79)	5.05 (0.80)	4.80 (0.80)	4.91 (0.78)
Trust	5.55 (0.70)	5.06 (0.78)	5.07 (0.78)	5.15 (0.77)
Commitment	5.62 (0.87)	5.07 (0.91)	5.11 (0.94)	5.23 (0.85)

Table 3: Reliability of the Instrument

Factor	N	Cronbach's Alpha Coefficient			
		3 PL Expected	3 PL Actual	Customer Expected	Customer Actual
3 PL Service Quality		0.8201	0.9090	0.9271	0.9362
Tangibles	4	0.8450	0.9056	0.8262	0.8309
Reliability	5	0.8800	0.9096	0.9450	0.9251
Responsiveness	4	0.8854	0.8937	0.9341	0.9262
Assurance	4	0.8859	0.8699	0.9226	0.9035
Empathy	5	0.8777	0.9137	0.9534	0.9407
3PL Organizational Effectiveness		0.8215	0.9019	0.9232	0.9470
Productivity	9	0.9031	0.9317	0.9530	0.9434
Financial Performance	9	0.9611	0.9661	0.9751	0.9760
Cycle Time	10	0.8943	0.9427	0.9359	0.9309
Customer Service	13	0.9031	0.9486	0.9591	0.9501
Reputation and Goodwill	5	0.8997	0.8991	0.9333	0.9196
Relationship Management		0.7835	0.8411	0.8600	0.8217
Guanxi	10	0.9021	0.9101	0.9028	0.8997
Trust	15	0.9213	0.9435	0.9645	0.9568
Commitment	5	0.9016	0.9119	0.9451	0.9379

Note: n= number of measurement items

Table 4: Correlation coefficients between financial performance and other factors

Factor	Correlation Coefficient			
	3 PL Expected	3 PL Actual	Customer Expected	Customer Actual
3 PL Service Quality				
Tangibles	0.069	0.193*	0.079	0.121**
Reliability	-0.171*	0.089	-0.075*	-0.059
Responsiveness	-0.072	0.048	-0.013	-0.054
Assurance	-0.055	0.082	0.027	0.036
Empathy	0.069	0.159**	-0.026	0.007
3PL Organizational Effectiveness				
Productivity	0.089	0.219**	0.039	0.34
Financial Performance	N.A	N.A	N.A	N.A
Cycle Time	0.274**	0.282**	0.175*	0.247**
Customer Service	0.172*	0.291**	0.073	0.131
Reputation and Goodwill	0.115	0.283**	0.064*	0.107*
Relationship Management				
Guanxi	0.281**	0.297**	0.277**	0.295**
Trust	0.129**	0.246**	0.004	0.042
Commitment	0.276**	0.179*	-0.107*	-0.027

Note: N.A. = Not Available; *p<0.05; **p<0.01

Table 5: Results of the confirmatory factor analysis (3PL service quality)

	Df	χ^2	χ^2 / df	RMSEA	NFI	CFI	GFI
3 PL Expected	4	5.27	1.207	0.034	0.99	1.00	0.99
3 PL Actual	5	52.76	10.524	0.341	0.96	0.96	0.92
Customer Expected	4	7.18	10.537	0.071	0.99	1.00	0.99
Customer Actual	4	16.47	3.734	0.110	0.99	1.00	0.96

Summary of Hypotheses:

- ✓ H1 The better a 3PL provider's facilities, the better 3PL service quality.
- ✓ H2 The more dependably and accurately service commitments are fulfilled, the better the 3PL service quality.
- ✓ H3 The more willingness to assist supply chain partners and provide prompt service, the better the 3PL service quality.
- ✓ H4 The more able to convey trust and confidence, the better the 3PL service quality.
- ✓ H5 The more caring and attentive to customers, the better the 3PL service quality.
- ✓ H6 The better the organizational performance of a 3PL service provider, the better the productivity.
- ✓ H7 The better the organizational performance of a 3PL service provider, the better the financial performance and market share.
- ✓ H8 The better the organizational effectiveness of a 3PL service provider, the shorter the product or service cycle time.
- ✓ H9 The better the organizational effectiveness of a 3PL service provider, the better the customer service that it provides to its partners.
- ✓ H10 The better the organizational effectiveness of a 3PL service provider, the better its reputation and goodwill.
- ✓ H11 The better the guanxi relationship between a 3PL service provider and its supply chain partners, the greater the intent by both parties to maintain a long-term relationship.
- ✓ H12 The better the trust between a 3PL service provider and its supply chain partners, the greater the intent by both parties to maintain a long-term relationship.
- ✓ H13 The better the commitment between a 3PL service provider and its supply chain partners, the greater the intent by both parties to maintain a long-term relationship.
- ✓ H14 The better the relationship management, the better the 3PL service quality.
- ✓ H15 The better the relationship management of a 3PL service provider, the better its organizational effectiveness.

Conclusion:

This study mainly examines and identifies 3PL organizational performance measurement and management, and proposes a research model to investigate the criteria that enhances 3PL service success. After analysis of the measurement model, Croanbach analysis and the structural model is tested and confirmed. The results of the model test show that the criteria that are most strongly related to 3PL organizational performance can be grouped into three constructs: 3PL service quality (SQ), 3PL organizational effectiveness (OE), and relationship management (RM). There are eleven additional factors in the three constructs. Tangibles (TANGI), reliability (RELIAB), responsiveness (RESPON), assurance (ASSUR), and empathy (EMPAT) are found to significantly and positively related to service quality. Cycle time (CYCLE), customer service (CUSTO), and reputation and goodwill (GOORE) are significantly and positively related to organizational effectiveness. Guanxi (GUANX), trust (TRUST), and commitment (COMMI) are significantly and positively related to

relationship management. The study results indicate that the causal relationship between service quality, organizational effectiveness, and relationship management are three important aspects of 3PL organizational performance. The results confirm the multidimensional measurement of 3PL organizational success and provide support for the application of the conceptualization to 3PL organizational performance.

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