Logistic Performance Measure Cubic Model in Logistic Industry

Ree, Sangbok

Seokyeong University, Department of Industrial Engineering, Korea

sbree@skuniv.ac.kr

Abstract

In this Paper, We propose new performance measure model in Logistic Industry. New model has been learned by key points of PZB model and advanced structure of MBNQA which has cause measure points and effect measure points. The Structure of new performance measure model is Cubic Model which is reflected with time. We try to verify this model apply advance logistic company.

Key words: Logistics, Performance Measure

1. Introduction

Logistics defined by Council of Logistics Management by "Logistics is that part of the supply chain process that plans, implements, and controls the efficient, effective forward and reverse, flow and storage for goods, service, and related information, between the point of origin and the point of consumption in order to meet customer's requirements [Kim J. 2000].

Logistics industry field are 3 Partnership Logistics, land/sea/air transport, information technology, storage, loading/unloading, automation etc.. Logistic company focus their competitive areas.

The Logistic industry which are one field of the most increasing industry in Korea.

Logistic quality of Logistic Industry become more important factor of Logistic Industry success. Bowersox are published "the success factor of World Class Logistic" in 1995. They proposed main seven success factors in Logistic industry which are customer satisfying and care, prepare of unforeseen accident, collaboration of outside service personnel, using of outside measure managing groups, alliance of outside service sponsor, use outside service company, information technology using computer and internet[Kim Youngchel et al. 2001].

Competitive logistics company, they have common factor which try to measure performance, quality, service etc. by self or outside professional groups.

In this paper, first we survey performance

measure index and propose new performance measure index model.

2. Survey Logistic performance measure index

Kim Youngchel et al. survey logistics performance measure index and research as below Figure 1. Logistics performance measure several are classified by different viewpoint.

Firstly, by viewpoint of performance, cost analysis by internal measure, productivity (efficiency), property, service quality analysis by external measure and customer satisfying. Each items detail description as below table 1.

Secondly, we can classify 4 different viewpoint which is Target, Result, People, Source as above figure 1.

2.1 Logistics performance index

Below Table 2 which are used as logistic performance index until now.

Table 2 logistics performance index which can commonly use company or can use by modified index. Fedex use SQI(Service Qulity Indicators) as table 3 which are modified of logistics performance index.

PZB model as table 4 is the most used service performance, which is composed 5 category, which analyze gap between expect and realize of customer. PZB model also can used logistics performance measure.

As below Table 5, we can analyze between logistics performance index and PZB category[Franceschini 2001].

By table 5, logistics performance index have no relation with empathy of PZB category. Empathy of PZB category means customer satisfying, communication of customer, prevent of customer complain. Logistics performance index should be added Empathy factor. We propose new logistics performance index as below table 6 which

Viewpoint of Performance	Different Viewpoints			
	Target	Result	People	source
Cost	Cost	Financial (present focus)	Internal people	Internal measure
Productivity(efficiency)				
Property			Interest people	
Service Quality	service	Non-financial (future focus)	Customer	
Customer Satisfying				Customer measure

Figure 1. Several Performance Viewpoints

is composed with table 2 and customer satisfying which are index of empathy PZB category.

2.2 Malcolm Baldrige National Quality Award

Nowadays, Malcolm Baldrige National Quality Award(MBNQA) are the most incited as measure index, which is applied manufacturing and service field. Figure 2 are relation with 7 category. MBNQA has different structure other performance measure model. Though others performance model measure result performance, but MBNQA

Table 1. Detail description of Viewpoint of Performance

Viewpoint of Performance	Detail items
Cost	total cost, activity cost, unit cost, cost comparison sail, cost comparison budget, cost for fail service and products, cost trend analysis
Productivity (efficiency)	product per unit man power, amount of labor per unit time, product per unit labor cost, amount of labor per unit equipment , amount of loading per unit capacity in storehouse, productivity contrast past/target etc.
Property	Level of inventory, level of staleness, rotation rate of inventory, complete of order, consistency of delivery, lead time of order, complete delivery of order, overall of reliability
Service Quality	availability of product, rate of right delivery time, rate of fail loading, rate of complete order, rate of consistent delivery, lead time of order, complete delivery of order, overall reliability, response of customer question
Customer Satisfying	Level of overall customer satisfying, level of items of service quality, convenient of transaction, number of customer complaint, contents of customer complaint

Table 2. Logistics performance index

Index	Description
Lead time	During Time which take from order until delivery
Regularity	Variation of lead time
Reliability	Ratio of delivered order within request time
Complete	Ratio of delivered order within constant time
Flexibility	Capability of delivering abrupt order
Correctness	Ratio of right delivered order
Damage	Number of damaged order
Productivity	Amount of dealing order

measure result performance and cause factor performance.

Results are business results which are market share, amount of sale, pure profit. Cause factor are leadership, strategic planning, customer and market focus, information analysis, human resource focus, process management. MBNQA know, if cause factor have good performance, justly

get result good performance. Cause factor should be measured formally. Even MBNQA has good framework, but that is not easy understanding and preparing to be measured.

Logistics company business results are also are market share, amount of sale, pure profit as like other companies. We find simply cause factor as employee ability, information ability, automatic ability as table

Table 3. Relation of SQI of Fedex and logistics performance index

logistics performance index	SQI of Fedex
Lead time	–
Regularity	Number of over lead time than request time (penalty of over lead time)
Reliability	Late delivery time than appoint time or Order which can not track
Complete	Order which is not delivered or order which is not delivered completely
Flexibility	–
Correctness	Mistake order which is delivered or content which is not written correctly
Damage	Damaged parcel
Productivity	–
–	Opening parcel which was packing

Table 4. PZB model 5 category

Category	Description
Tangible	Physical facility, equipment, appearance of employee
Reliability	correctly and confidential accomplish ability which are promised service
Response	Propose prompt service and intend to help customer
Assurance	Employee ability of courtesy, trust , confidence and knowledge
Empathy	Consideration which company offer to customer, attention of individual

7. In the logistics competitive performance measure index are included cause factor.

We give our logistic performance measure framework as below figure 3. Which framework are plain witch is two-dimension.

business results have different weight as like Table 8. Which weight can be cited by MBNQA. But weight of criteria of performance measure should be develop with many application.

2.3 Weight of criteria performance index

Cause factor, Performance index and

2.4 Cubic performance measure

If some company can have good results

Table 5. Relation PZB category and logistics performance index

	Tangible	Reliability	Response	Assurance	Empathy
Lead time	B		A		
Regularity	B		A		
Reliability	B	A			
Complete		A		B	
Flexibility			A	B	
Correctness		A		B	
Damage	B			A	
Productivity	A			B	

※ A : strong relation   B : weak relation

Table 6. New logistics performance index

Index	Description
Lead time	During Time which take from order until delivery
Regularity	Variation of lead
Reliability	Ratio of delivered order within request time
Complete	Ratio of delivered order within constant time
Flexibility	Ratio of delivered abrupt order
Correctness	Ratio of correct delivered order at right place
Damage	Number of damaged order
Productivity	Amount dealing order
Customer satisfying	Customer satisfying, communication of customer, prevent of customer complain

during short time, and soon that company drop bad results, we can not say that company have competitive potential. It is necessary to find competitive potential company that performance measure have long time and analyze relation with cause factor and results factor.

We propose cubic framework which have 3 dimensions as below figure 4 which compose time and logistics performance

measure index which have 2 dimensions.

3. Example

We adapt new performance measure index to C logistic company which is leading company in logistic field in the Korea. We can not find all data of performance measure index, we simply use three measure
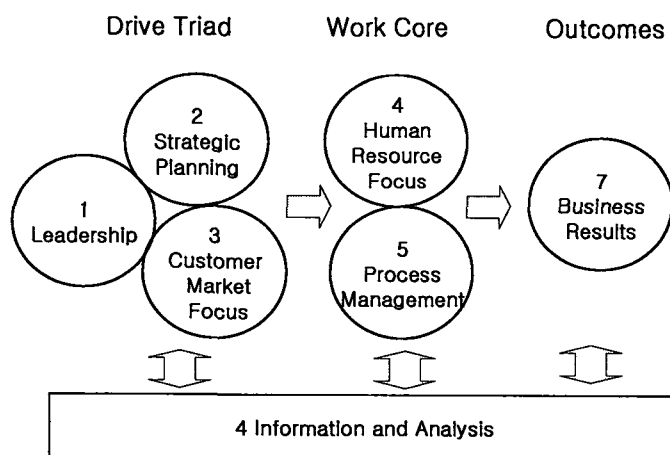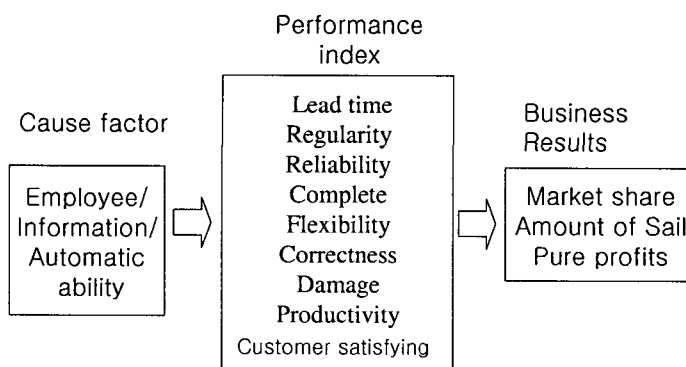

Figure 2. MBNQA Criteria Framework

Figure 3. Proposed logistic performance measure framework

Table 7. Cause factor of logistics performance index

Index	Description
employee ability	Employee ability of service, knowledge, faith as deal with customer request.
information ability	Information and communication level of internal and external, which give useful information of customer.
automatic ability	Automatic level of storage, loading and unloading

Table 8. Weight of criteria of performance measure

Category	Criteria index	Weight
Cause Factor(30%)	Employee	30%x(1/3)
	Information	30%x(1/3)
	Automatic ability	30%x(1/3)
Performance index(30%)	Lead time	30%x(1/9)
	Regularity	30%x(1/9)
	Reliability	30%x(1/9)
	Complete	30%x(1/9)
	Flexibility	30%x(1/9)
	Correctness	30%x(1/9)
	Damage	30%x(1/9)
	Productivity	30%x(1/9)
	Customer Satisfying	30%x(1/9)
Business Results(40%)	Market Share	40%x(1/3)
	Amount of Sail	40%x(1/3)
	Pure Profits	40%x(1/3)

Table 9. Three years index data

	Information ability (30%)	Regularity(3%)	Pure profits (100 million won 40%)
1999년	60	80	10
2000년	70	90	50
2001년	80	93	100

index as below table 8 which each are selected one of cause factor, performance, business results. All data get self measure by company internal special staff.

By excel program, Table 8 can be drawn as below figure 5. In Figure, all index data have upward. C company have good competitive potential system. We can believe C company will have good results for not short time.
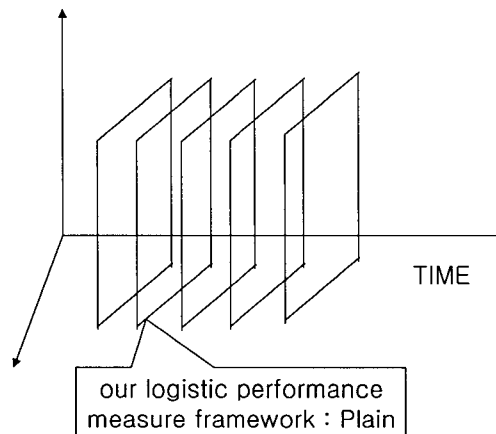

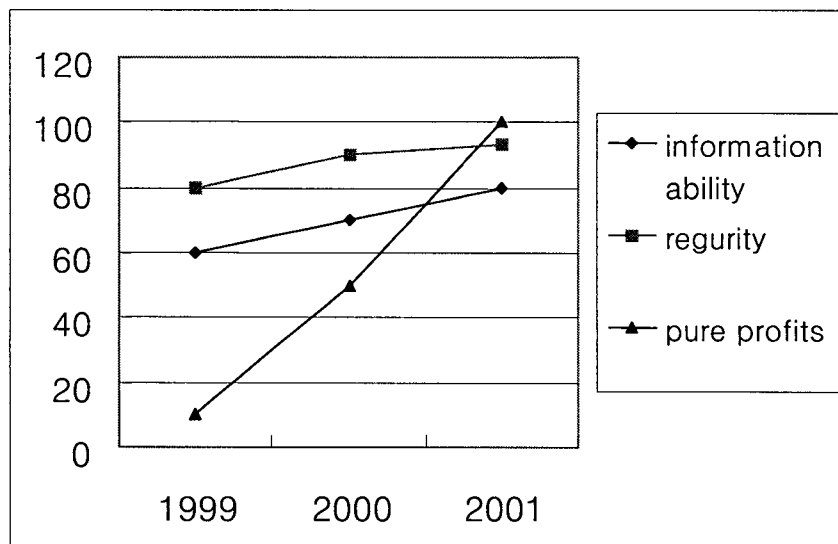**Figure 4.** Cubic logistic performance measure framework

Figure 5. Logistics performance index change figure during 3 years

4. Conclusion

In this paper, we try to propose good logistics competitive company measure model. Former logistics performance measure index which is plain framework, we know former index is not sufficient to find competitive logistic company.

In this paper we propose new logistics competitive measure model which have as follow distinguish feature (1) new logistics performance measure index which are included empathy and cause factor, (2) cubic framework

In the future, we have to verify new logistics competitive measure model by applying many logistics company and need to moderate performance measure index. We should be develop weight which can be applicability.

Reference

1. Kim, Jaeil,(2002), Company Logistics deployment : *Logistics twenty first century*, Korea Logistic Institute
2. Kim, Youngchul and Kim, Jaeil, (2001), Study of Logistics performance Dimension and measure criteria, *Korean Journal of Logistics*, Vol. 9, No, 1.
3. F. Franceschini and Carlo Rafele, (2000), Quality evaluation in logistic service, *International Journal of Agile Management Systems*, 2,1.
4. Parasuraman. A., Zeithaml, V.A. and Berry, L.L., (1985), A Conceptual model of service quality and its implications for future research, *Journal of Marketing*, Vol. 49.