"DOSYA KONUSU"

ELPIF E-LOGISTICS PERFORMANCE MEASURE EXTENSION AND ITS BENEFITS

Ruhet GENÇ [*]

ABSTRACT

ELPIF presents a promising architecture as a generic, multinational and multicultural platform for e logistics. Such generality requires a Performance Measure method to reveal further potentials of the system. Using several metrics available in the logistics literature for evaluating performance of logistics services, uncover a good source of potentially very valuable information. The knowledge gained by interpretation of these findings can be utilized as a further feedback mechanism by the customers of the system. With this motivation this article presents a proposal of an extension to the ELPIF architecture with a Performance Measure Layer and potential benefits of the extension.

Keywords: Logistics, E-Logistics, Web based logistics

1. INTRODUCTION

E-Logistics Processes Integration Framework (Liang-Jie & Pooja, 2001) (ELPIF) describes a framework aimed at providing an unified user front end to multiple logistics providers in a cost effective manner. There are several key points to be listed as the main benefits of ELPIF:

• Web based approach presents integrity through the commercial and consumer communities. Compared to typical operating system local applications, web based services provide an immense improvement of availability. Due to diversity of the Internet, any device capable of accessing the network can be included in the system in any way desired. Thus any consumer using any operating system, any mobile application running on different architectures or any service provider using any proprietary application can easily be integrated to the ELPIF.
• Single interface unifies the interface to all available service providers. Single interface provides robust access to available resources, which is a very critical asset in terms of e-logistics.

*Beykent Üniversitesi

• Integration architecture presents an interface to already existing (legacy) applications of the service providers. Cutting down on development costs is always favorable and sometimes essential for new products to be accepted. This integration interface provides a link between the ELPIF architecture and service providers, which means service providers do not need to rebuild their existing software architecture.

In this article a layer extending ELPIF is proposed. Performance Measure layer increases robustness of the framework with almost no extra cost to the service providers. The module is aimed at providing an insight to the customers about the performance of the service. Next section describes the term Performance Measure in with further details. After presenting some literature review, we will proceed to introducing our proposed module aiming to extend the ELPIF.

1.1.Performance Measure

Logistics require a certain measure of reliability for several reasons. All logistics commerce depends on precision. All parties of the service are highly sensitive to delays in the process. Thus without performance reasoning, any logistics framework stands a simple communication tool between parties of the process. Similarly in the case of ELPIF introducing a performance feedback extends the framework's utility from being a communication tool to a more general quality assurance mechanism. Performance evaluation is addressed by many authors in the literature. Gregory, Stock, Noel, Greis and Kasarda (1999) lists performance elements as follows: cost, delivery speed and reliability, quality, flexibility, customer service, and distribution.

Garland, Trevor and Henriksson (1994) presents a literature review about logistics performance. Several factors are listed to evaluate performance and reliability of a logistics system; quality control (Read & Miller 1990), vendor performance (Harrington, Lambert & Christopher, 1991), logistical performance (Gassenheimer, Sterling & Robincheaux, 1989), productivity (Clarke 1991), and efficiency (Yavas, Luqmani & Quraeshi, 1989). One of the several performance framework (Alan 1997) contains another listing of the performance measures for logistics, involving similar concepts such as total productivity, quality of operation, flexibility, speed of operation, capacity utilization. Prater et al. (2001) discusses tradeoffs between flexibility and uncertainty effecting the agility of the supply chain. Several case studies are investigated and the notion of supply chain exposure is introduced. With this idea of supply chain exposure, authors define a relation between flexibility, uncertainty and supply chain agility. As uncertainty increases, exposure of the supply chain increases and thus operation becomes more vulnerable. Prater et al. (2001) lists factors having an effect on the supply chain exposure as follows: the number of

geographic areas covered by the supply chain; the number of transportation modes used and their speed; the number of political areas and borders; the technical infrastructure; and environmental issues.

1.2. Module Concepts

Before proceeding to the module description, in this section we address the concepts used in the evaluated within the module.

1.2.1. Quality

In logistics quality is one of the prime concerns of both customers and service providers. Quality is defined (Gregory et al. 1999) two fold, performance quality and conformance quality. Performance quality refers to performance and features of the logistics product. For example a logistics company would provide many products each involving a rich number of options to choose from. While performance quality is an important aspect of logistics, it may not mean a great deal by itself only. Due to the crucial time factor embedded into logistics, no feature could compensate possible loses that may incur due to missing deadlines. Thus conformance quality is at least as important as the performance quality. Conformance quality refers to following the specifications as agreed beforehand without any defects introduced.

1.2.2. Efficiency

While quality plays an essential role in logistics, competitive nature of the market demands efficiency from the service providers. Providing any service with higher efficiency yields to higher profits and also possible fee deductions, which may be the defining factors of success in the market. Therefore a notion of efficiency is required for healthy performance analysis.

1.2.3. Uncertainty

While previous data about a company or a service holds important data, any judgement will include possibly large amounts of uncertainty. To represent the inaccuracies in the performance model and also to compensate for systematic problems within the service provider architectures, a handle of uncertainty should be included in the performance measurement module.

1.3.Performance Measure Module

In this section we will present the proposed module, which will introduce performance measure methods to the ELPIF architecture. Figure 1 shows the location of the proposed method in the ELPIF architecture. The Performance Measure Layer is located in the interface between the back end server and the users of the system. This location is critical to be able to capture the necessary data to be able to make judgement about the performance.

Figure 1: Proposed Measure Module
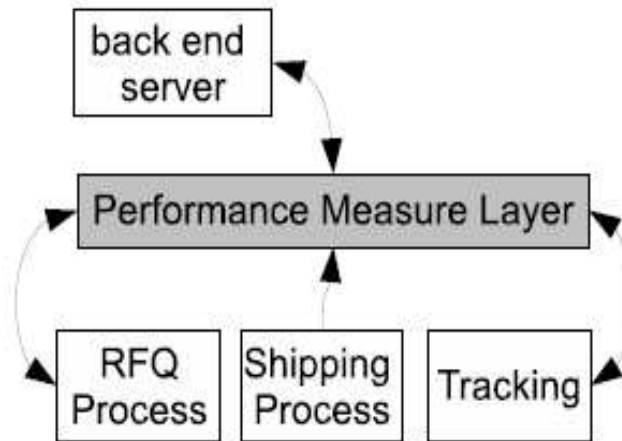
In the original ELPIF system, RFQ (Request for Quote) process is the initial action of the ELPIF system. Once the RFQ arrives, the system generates an update on the PO (Purchase Order). If the user accepts the order, the Shipping Process starts. As it is the case in other processes, any necessary updates are reported to the PO. At the last stage of the framework, Tracking Process takes place, similarly updating the PO as necessary. All these steps of the logistics processes generate a great deal of information, which consists the base for the performance measurement process. Quality information is generated from the number of services and options. The feedback mechanism of the ELPIF architecture, achieved by responses from the customer and the service party, provides information on the conformance of the orders as well. The comparison of the final outcome of an order process with the initial agreement provides information on conformance of the service party. Efficiency is defined as the unit quantity of service available for unit cost. Using this metric it is possible to deduce information about efficiency of the

logistics service providers, which is useful both for companies themselves and customers in the system.

It is possible to infer uncertainty information using a log kept within the Performance Measure Layer. Averaging past performance data of a company provides a new metric to be used for making judgement about the uncertainty involved in the transactions of the service provider in question. Once all this information is made available to the customer of the service, customers will be making better decisions and in turn reduce the possibility of loses due to logistics problems.

2. BENEFITS OF THE EXTENSION

There are many benefits of the proposed Performance Measure extension. This section lists some of the most important benefits.

2.1. Supply Chain Management

Supply Chain Management (SCM) and analysis of the overall processes of logistics is a crucial matter considering the increasing share of logistics and distribution in the total cost of operation. A useful analysis of the SCM requires a feedback input to obtain meaningful data about the standards of the SCM. Introduced Performance Measure Layer provides such a feedback method for all parties of the logistics process. Both the distributor and the customer can use the data made available by the Performance Measure Layer, in their SCM processes.

2.2. Planning and Forecasting

Any successful organization has to develop a beneficial inventory strategy to survive in the competetive market. Otherwise it is inevitable for the companies to lose profits and even lose capital, due to lost sales or excessive stocking. Customer feedback information is also important in this aspect. Inventories managed using uptodate Performance Measure data have a better chance of having the right amount of stock at the right time due to estensive coverage of the past sales data.

2.3. Customer Relationship Management

As market becomes more competetive, one of the crucial aspects of business, the role of Customer Relationship Management (CRM) becomes another field of competition among companies. Successful CRM can add a great deal of value to a company, whereas bad CRM can harm any company

a great deal. Performance Measure Layer also plays a role in CRM. Customers' responses can be forwarded to the companies requesting information to be evaluated in internal CRM process of the company, which eventually will present highly beneficial asset to be used by the company's CRM process.

2.4. E-business Tranformation

E-business transformation presents a new field of competition among firms all sorts. Any customer can easily access product database and order goods online at any time of the day or night. This direct connection to customer must be utilized with utmost care. Without a fully functional logistics backend, any e-business solution could potentially discredit the company's reputation very easily and very quickly. However with a successful e-business integration could also be an equally quick boost to the reputation of the company. One of the cornerstone notions of the e-business transformation is the ability to reach the customers efficiently. The ELPIF protocol achieves this by presenting a unified point of contact for the customers, which means customers are expected to contact the Performance Measure Layer frequently and assess company's status, which presents another useful aspect of the introduced layer.

3. CONCLUSION

In this work we present our proposal of extending the ELPIF (Liang-Jie & Pooja, 2001) with a Performance Measure Layer. Primarily using the quality, efficiency, uncertainty information made available by the ELPIF architecture it is possible to deduce further information about multiple logistics provider companies and therefore provide a further source of information for customers. Benefits of the Performance Measure Layer reveal another important aspect of performance measuring. Not only customers of the system but also distributors of the system can also benefit from the use of the layer. Several recently developing aspects of e-business and logistics indicate necessity of customer feedback. Performance Measure Layer provides this feedback mechanism besides the company feedback mechanism to be used by the customers.

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