Preliminary Framework of Logistics Performance Measurement Systems for Ocean Freight Industry

Fatin 'Izzati Ishak, Azanizawati Ma'aram, Rozlina Md. Sirat, Anis Anizah Mohamad Baba

Abstract*: Two third of ocean freight industry in Malaysia are classified as small and medium enterprise (SME) which they are currently struggling to stay in industry caused by the merging of global shipping alliances. The merging of alliances has impacted the SMEs in terms of competitiveness in getting business opportunities, where SMEs have to compete alongside established companies with well-known reputation. Therefore, differentiation is becoming very crucial factor in order to leverage their capabilities. Without differentiation factor, SMEs are unable to identify their competitive advantages that distinguishes them from competitors, hence causing difficulties to survive in the industry. Another issue arises is the absence of a unique Logistics Performance Measurement System (LPMS) that considers the eccentric characteristics of ocean freight industry, therefore causing slow adaptation of LPMS despite the size and maturity of this industry. Thus, this research attempts to develop a preliminary logistics performance measurement system (LPMS) framework for ocean freight industry and incorporates differentiation factor in the developed LPMS. The preliminary framework is developed based on extensive literatures in logistics performance measures, and consists of three logistics performance measurement dimensions (efficiency, effectiveness and differentiation). However, this framework is only a preliminary point for incorporating the views of logistics dimensions in the critical processes.

***Index Terms*: Logistics, Ocean freight industry, Performance measurement, Shipping**

I. INTRODUCTION

Nowadays, logistics sector has arisen from simply a subsidiary activity that enables a smooth trade into a critical sector in Malaysia. The factor of continuously growing strategic value today attracts trades and foreign investors to do their business in Malaysia based on the competency of the country's logistics industry.

In the perspective of global ocean shipping industry, it has been observed that a substantial changes of atmosphere has occurred in this business. Previously, global ocean freight industry were controlled by four global alliances which they were 2M Alliance, Ocean Three (O3) Alliance, G6 Alliance, and CKYHE Alliance. However, effective on 1st April 2017 a dramatic revolutions has been made when these four alliances were reshuffled and three large alliance were formed between all formal carriers in ocean shipping. These huge alliances symbolize 77.2% of worldwide container capacity and a massive 96% of all East West trades' container capacity [1]. The alliances are the 2M Alliance that consists of Maersk, Mediterranean Shipping Co. (MSC), Hamburg Sud, Hyundai; secondly the Ocean Alliance that unites moguls in ocean shipping industry such as CMA CGM, APL, COSCO, China Shipping, OOCL, and Evergreen; and thirdly The Alliance which comprises of NYK Group, "K" Line, MOL, Yang Ming, Hapag-Lloyd, and UASC [2].

The realignment of global shipping alliances has taken a toll on Malaysia's logistics performance, especially in the ocean shipping industry. Consequently, the overall pool of competitors has become smaller due to the merger of the shipping conglomerates [3]. The formation of three main alliances has resulted in bigger monopolies in local ocean shipping environment due to the merger of multinational companies (MNC) that are berthing in Malaysia, and bigger companies won bigger contracts. This situation has caused the SMEs to receive less attention in ocean freight selection by importers and exporters of the country. Other than that, the industry apparently has been dawdling on implementing Performance Measurement System (PMS) despite the size and maturity of their industry, due to the shortage of an exclusive framework that considers the eccentricities of ocean freight industry [4]. Up until now, shipping companies are still doing trial and error with numerous performance measurement system (i.e. KPI, Performance Prism, Balanced Scorecard) due to the lack of a generic, harmonized measurement system that can be applied to all areas in the ocean freight industry [5]. In addition, the operational strategies formed by the strategic level of an organization needs to be deliberately designed, measured, and enhanced by using an appropriate Logistics Performance Measurement (LPM) framework [6]. Griffis *et al*. [7] further emphasize the need for firms to align performance measures to their specific goals and information reporting needs. They suggest that a firm that fails to capture measures that reflect its strategic goals, at the right organizational level and with appropriate frequency falls short in delivering optimal customer value.

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An appropriate Logistics Performance Measurement (LPM) framework allows the organization to recognize glitches and adopt suitable corrective actions to overcome the situation. Numerous researchers have established LPM frameworks which centered more towards conventional logistics performance measures (financial-based) and focused at the strategic or functional level only. Thus the impact of logistics operational level in accomplishing the entire corporate objectives was overlooked [5].

In order to respond to these shortcomings, the objective of this research is to develop a preliminary Logistics Performance Measurement System (LPMS) framework for small and medium enterprises (SMEs) in ocean freight industry that takes into account both financial and non-financial measures and simultaneously endorsing the alignment between operational, tactical and strategic objectives. In this paper, authors have established a preliminary framework of LPMS for ocean freight industry. The authors will present the indicators of all three dimensions (effectiveness, efficiency and differentiation) in the preliminary framework. In overall, this paper is prepared in the following approach. Literature review is provided in the next section, followed by the methodology and findings in terms of preliminary framework of LPMS. This paper is ended by concluding remarks and suggestion for future works.

II. LITERATURE REVIEW

Mentzer and Konrad [8] stated logistics performance is a measurement of effectiveness and efficiency of an organization in carrying out logistics activities. Langley & Holcomb [9] expanded this statement by incorporating logistics differentiation as one of key elements in logistics performance for the reason that the feedback from customers also acts as an indicator of logistics performance. They insisted that logistics could generate profit via efficiency, effectiveness, and differentiation. As mentioned by [10], value can possibly be generated through customer service components such as reliability of delivery and easiness of placing orders. If an organization could generate value through the exclusivity of its logistics activities, a firm may be capable to make a distinction from its main competitors.

Indirectly, differentiation is the factor that gives a company superiority when compared to competitors, hence contributing to excellency in its logistics performance. Later, [10] extended [9] findings by redefining logistics performance as a set of measurement comprising of logistics efficiency, effectiveness, and differentiation. Additionally, [11] found that LPMS does not work by concentrating only on differentiation and effectiveness, but efficiency must also be measured as a dimension in order for the system to be balanced and all-inclusive.

In the context of this paper, the authors hypothesized that the study of overall logistics performance must be based on the assessment of logistics activities via a set of logistics dimensions namely, efficiency, effectiveness and differentiation. Efficiency is a factor associated to the usage of resources allocation while carrying out activities, effectiveness can be termed as the degree to which objectives are accomplished and differentiation is comprehended as the value that can be generated by the elements of customer service in relation to opponents.

III. METHODOLOGY

The preliminary framework is developed based on extensive literatures in logistics performance measures.

IV. FINDINGS

In order to cater the issues discussed previously, a preliminary LPMS framework that incorporates differentiation factor into the framework are developed as shown in Fig 1. This framework consists of three main factors (i.e. efficiency, effectiveness, and differentiation). Under these three factors, there are twelve perspectives of measures that are obtained and carefully arranged from extensive literature study, which the perspectives are revenue, operational expenses, resource utilization, logistics effort, environment, quality, flexibility, reliability, responsiveness, information system, security, and lastly, competency & compliancy.

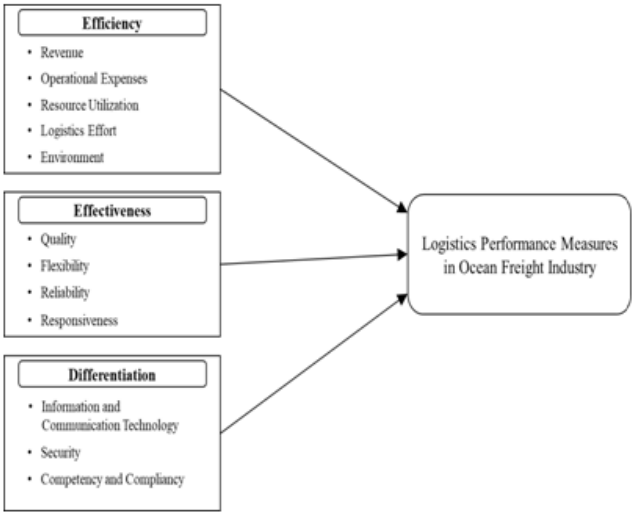

Fig. 1 Preliminary Logistics Performance Measurement Framework

From this framework, an extensive 152 measures were developed based on the twelve perspectives, and cascaded accordingly to the three decision levels (i.e. strategic, tactical, operational) in order to align the operational strategies with corporate objectives at all functional levels.

As shown in Fig 2, efficiency is the measurement for producing results by using available resources. It thus refers to the inside of the organization, on how does the organization achieve its corporate objectives. In other words, we may also say that efficiency measures the ratio between input and output [12]. Additionally, [10] emphasizes that efficiency is the capacity of the organization to control the usage of their resources wisely, and how well the resources are utilized.

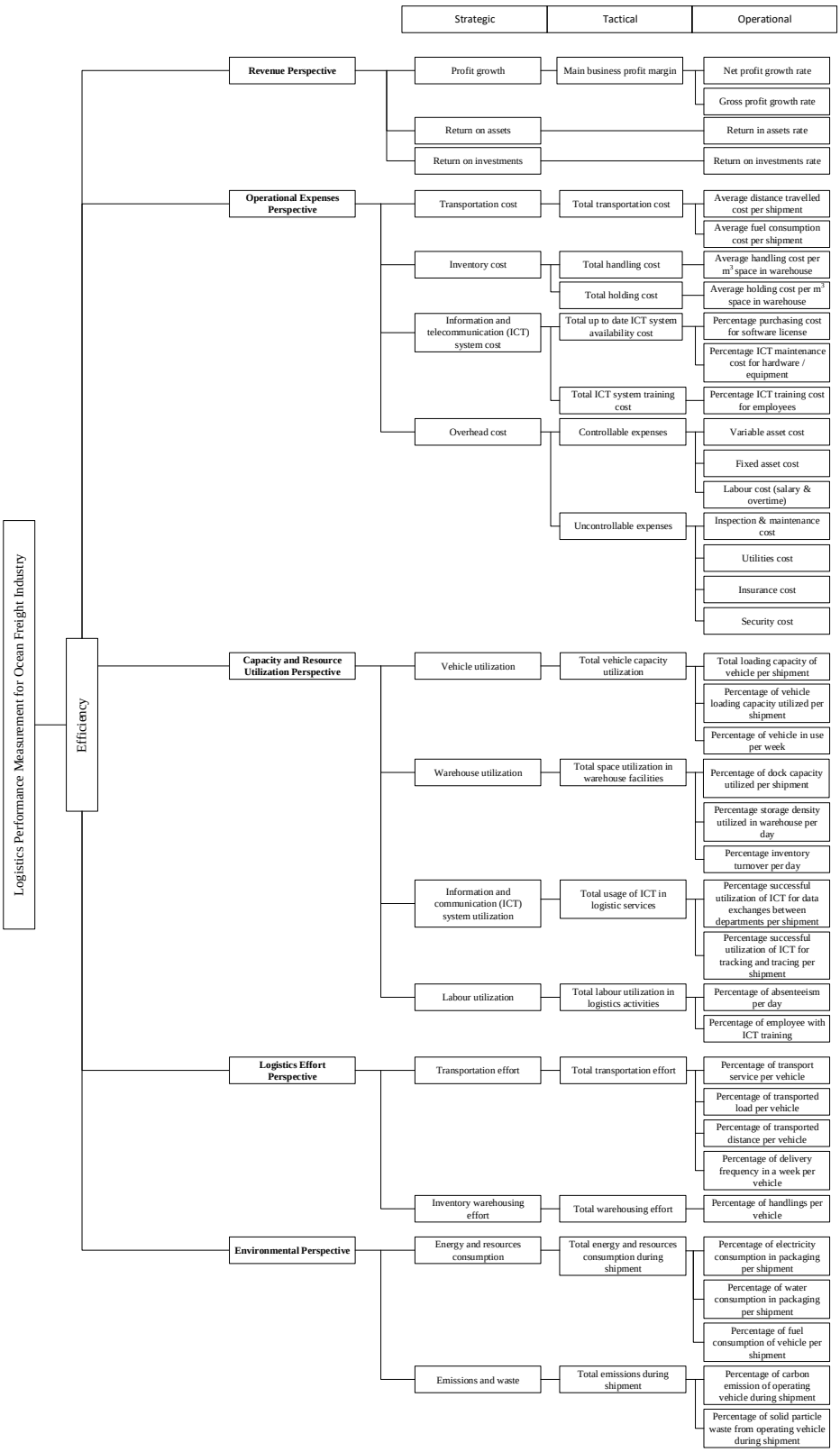

Fig. 2 Logistics Performance Measures in Efficiency Factor

In efficiency factor, there are five main perspectives that need to be taken into consideration while measuring the performance of an ocean freight company. The perspectives are revenue, operational expenses, capacity and resource utilization, logistics effort and environment. Revenue and operational expenses are part of financial perspective, where it stresses in accomplishing financial achievement while at the same time delivering value to the investors as well as expanding business profitability and revenue by cutting costs and expenditures. [13]

In logistics, effectiveness has been defined as the competency to accomplish designated objectives, as for instance, in fulfilling customer requirements in crucial result areas. [10].

In this study, effectiveness assesses the ability of an organization in delivering a planned result that affects the outer influence of the organization (i.e. customer, shipper, custom brokers) [14]. There are four main perspectives in this factor which are quality, flexibility, reliability, and responsiveness as presented in Fig. 3.

Quality in this study, measures both the quality of the service and the level of satisfaction between customers. Assesing the logistics performance is one amongst many ways to further improve the activities and at the same time ensure that customer's satisfaction levels are nicely fulfilled. [15].

Flexibility is defined in this study as to measure the agility of freight company to cater the customized demand of their customers [16]. By stating flexibility as a metric and by assessing it [17], companies can attain what was formerly impractical: prompt response to fulfil exclusive customer requirements. [18]. In this study, flexibility considers volume and delivery as the main items to measure the agility of a company to respond to customer requirements.

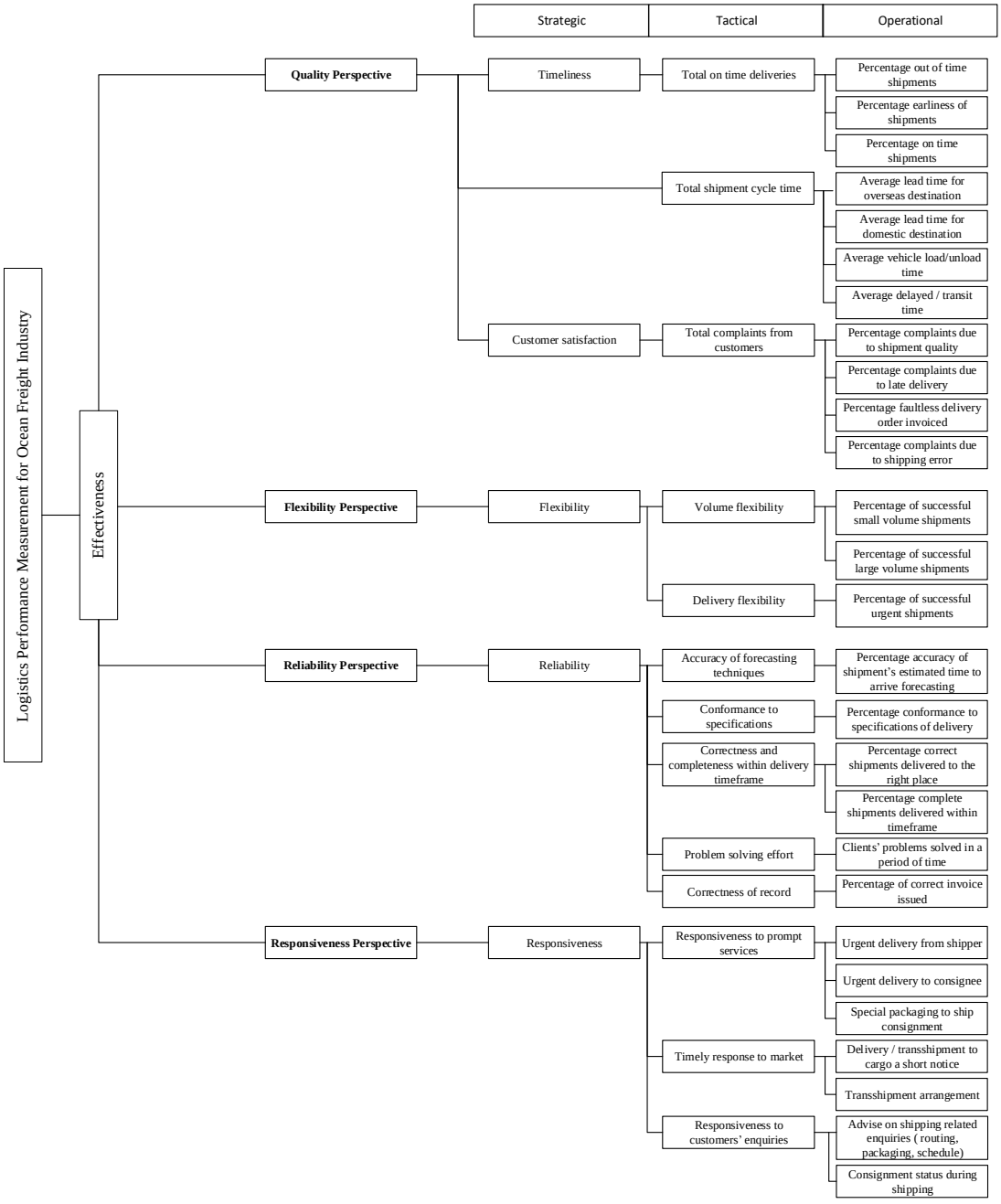

Fig. 3 Logistics Performance Measures in Effectiveness Factor

Responsiveness can be termed as the capacity of the supply chain to react correspondingly within a specified timeframe to customer requirements or fluctuations in the marketplace [19]. In this study, in the roof of responsiveness there are three items that need to be considered in measuring the logistics performance of an ocean freight company i.e. responsiveness to prompt service, timely response to market and responsiveness to customer enquiries. Differentiation as defined by [20], is the ability to generate value for the customer via the exclusivity and uniqueness of services

offered by the company. Under differentiation factor, there are three perspectives which are information and communication technology (ICT), security, and competency & compliancy as shown in Fig 4.

Information and communication technology (ICT) in this study is defined as the excellence level of a company's ICT capability compared to its leading competitors. ICT capabilities in this study is described as clusters of internally reliable fundamentals which comprises of hardware, software, ICT services and management, that help to drive towards the accomplishment of overall business objectives [21]. Bowersox, Closs, Cooper, & Bowersox [22] have discovered that ICT can boost logistics competitiveness and set an organization firm apart from its rival if ICT is thoroughly implemented in the organization. Moreover, ICT is said to be amongst the limited productivity tools that increases the competency of an organization while reducing cost. The appropriate usage of ICT in logistics will expand services [22] and indirectly improves productivity, flexibility, and operational competitiveness [23]. In addition, [24] highlights that there are absence of actual linkage between ICT and performance measurement systems as the role of ICT is still seemed as insignificant to achieve efficiency and effectiveness.

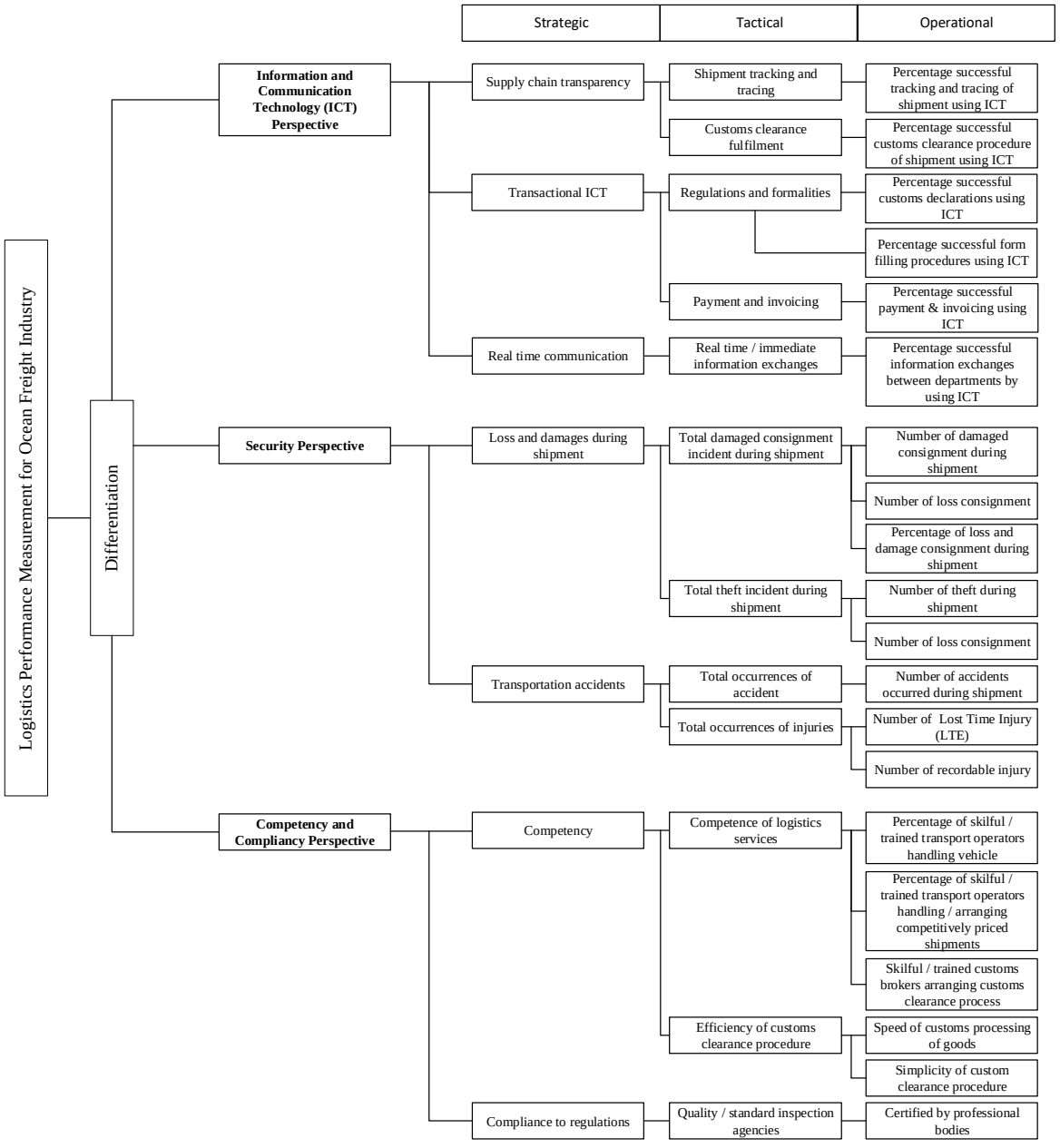

Fig. 4 Logistics Performance Measures in Differentiation Factor

On the other hand, security perspective discussed in this study is the additional cost expensed to any damaged cargo and this is interpreted as a consequence of a firm's incapability to transport the cargo to the designated customer in an excellent condition [25]. As identified by [26], security is also one amongst many criteria that influencing customer's satisfaction, hence adding value to a company's competitive advantages. This argument is also supported by [27] which concluded that safe and reliable haulage of cargo are one of the criteria that can be categorized under the value dimension

and thus can be considered as a differentiation factor of an organization.

Lastly, competency and compliancy can be stated as the capability to apply a set of associated knowledge, skills, and aptitudes needed to effectively accomplish jobs in a distinct work setting [28]. Employees are said to be one of vital components of business success and their accomplishments proportionately impact organization performance, thus there is an urgent need for companies to develop effective strategies to encourage and boost employee competency. [24]. Shariff et al. [29] suggest that great levels of expert and competency in ocean freight service providers impact customer retention for the reason that customers are guaranteed beforehand of the hauler's skills, in terms of the staff's competency and experience in handling cargo. Indirectly, logistics competency will gradually be regarded as a driven differentiator in industries and thus theoretically a crucial capability for the organization. [30]

V. CONCLUSION

In summary, the development of logistics performance measurement system (LPMS) for small and medium enterprises (SME) is a response to the need to support the survival of those entities in the very competitive industry, by enabling an effective and efficient management. This research established a preliminary framework of LPMS with the purpose to fulfil this gap. Successively, a full length survey will be carried out to companies in the ocean freight industry in order to endorse the preliminary framework of LPMS. The LPMS model and its implementation will help to link the gap between theoretical hypothesis and actual practice in the industry, as well as to spread the significance of LPMS among SMEs in ocean freight industry.

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