

PERFORMANCE MANAGEMENT SYSTEM FOR MULTIPLE-ROLE COMPANIES: A LITERATURE REVIEW

Dian Prama Irfani^a, Dermawan Wibisono^{a,b}, Mursyid Hasan Basri^a

^aSchool of Business Management, Institut Teknologi Bandung, Indonesia

^bFaculty of Business and Economics, Universitas Pertamina, Indonesia

Corresponding Email: dian.irfani@sbm-itb.ac.id

Abstract

The purpose of this paper is to examine the literature on performance management in companies with multiple roles, more specifically the unique characteristics of such companies, the criteria of performance management framework that suits the characteristics of such companies, and the suitability of existing performance management frameworks to be implemented in such settings. A systematic literature review was undertaken of 569 abstracts from Scopus-indexed journals. From those articles, 394 papers were put forward for full paper review. Totally, 65 papers were subsequently selected for the literature synthesis. This study synthesises several characteristics of multiple-role companies and proposes criteria of a performance management system that suits the characteristics of such companies. The findings also suggest that the existing performance management system frameworks have not fully answered the issues found in multiple-role companies that perform as profit generators and public service providers. The study raises questions about the usefulness of contextual performance measurement approaches for multiple-role companies, which may lead stakeholders of such companies to critically examine current practices. This is the first literature review about performance management system design in the context of companies with multiple roles. It is of value in building future research of performance management design in this context.

Keywords: Performance Management System, Logistics Performance, Multiple Roles.

1. Introduction

Companies with multiple roles can have two or more conflicting worldviews that may affect their organisational performance. This issue happens in companies that play the roles of both profit generators and public service providers. On the one hand, the role of a profit generator requires companies to emphasise cost efficiency and revenue optimisation across all business lines. On the other hand, the role of a public service provider demands that the company prioritises the social task at any cost.

Issues in balancing the role of profit generator and public service provider have been raised by previous researchers. Conaty (2012) suggests that significant tensions between priority objectives were observed in companies that have multiple objectives. According to Conaty, this issue may result in the ineffective performance of the company. For that reason, Conaty suggests that companies with multiple roles of profit generators and public service providers need to seek a balance between generating profit and fulfilling customer needs in all of their systems.

One of the systems in the organisation where conflicting worldviews may occur is the transport logistics system. Lai (2002), Panayides (2006), and Huber *et al.* (2015) assert that the transport logistics system aims to satisfy both the upstream and downstream customers in a chain with

acceptable costs. In this case, the role of a profit generator requires multiple-role companies to optimise cost and asset efficiency aspects. On the other hand, the role of a public service provider requires such companies to prioritise the reliability, responsiveness, and flexibility aspect to prevent stock void in the community. In this case, companies with multiple roles need to seek solutions for balancing their transport logistics performance and aligning their transport logistics system with organisational strategy.

The conflicting objectives in companies with multiple roles needs a better performance management system. Performance evaluation and management help companies to manage resources to achieve company objectives (Jayaram *et al.*, 2000). Similarly, Lockamyet *al.* (2000) suggest that firms must have a comprehensive set of measures to assess progress towards achieving company-wide goals; improving core business processes and aligning the firm with market needs. A good performance management system helps enterprises to create value by concentrating effort where and when it will be most effective (Chang, 2005). All in all, a performance management system is expected to help companies with multiple roles to balance their conflicting objectives and align their business goals with their transport logistics systems.

While several studies have been conducted in the field of performance management, it is unclear whether the available performance management system frameworks are fit for measuring the performance of multiple-role companies. Cuthbertson and Piotrowicz (2010) argue that performance management is a context-dependent process, tailored to specific requirements. Similarly, Lye (2004) suggests that designing performance management systems must comprehensively examine the rich interdependencies between contextual factors and the use of performance measures. However, studies that examine the performance management system design in multiple-role companies are very rare. Consequently, it can be difficult to identify a significant body of work. To develop an understanding of the key themes of the design of performance management systems to date, this paper presents the synthesis of a systematic literature review. This paper commences with a detailed description of the methodology employed and goes on to discuss the findings of the papers included in the review. The analysis considers whether the available performance management system frameworks fit the contextual settings of companies with multiple roles.

2. Research Methodology

Bakker (2010) suggests the use of search strings to identify relevant works from citation databases. This study followed the systematic review based on the method proposed by Bakker. In the first stage, keywords associated with the topic of performance measurement design and multiple-role companies were used. The keywords were divided into three categories labelled A, B, and, C as shown in Table 1.

Table 1: Search Strings

Category A	Category B	Category C
Performance Measurement System	Multiple Role Company	Logistics
Performance Management System	State Owned Enterprise	Supply Chain
Performance Management	Profit	Transportation
Performance Measurement	Non Profit	
Performance Evaluation	Public Sector	

The combined keywords result in $5 \times 5 \times 3 = 125$ search strings. A wildcard symbol (*) was used against a number of words to ensure that all the variations of those terms were included in the search. Examples of search strings included “performance*” and “multiple role*”, “supply chain*” and “performance*”. Literature was collected from major academic databases, such as Scopus, Web of Science, and ProQuest, which contain past experience of research in this area.

The initial search identified 569 unique articles. The abstracts were reviewed against the following initial inclusion criteria:

1. The performance management framework presented in the paper offers functionality to manage organisational, supply chain, or logistics performance.
2. The performance management framework in the paper has a component relevant to addressing the issues faced by multiple-role companies.
3. The paper describes characteristics of organisational, logistics, or supply chain performance relevant within the context of multiple-role companies.
4. A number of scholars have cited the performance framework presented in the paper.

Based on these criteria, 394 papers were carried forward to the next stage of the process, which was a review of the full paper. In this case, performance attributes presented in these papers were analysed using memo-writing techniques to identify each article’s main values and ideas. Of those papers, 65 were considered appropriate for this study.

A flow diagram illustrating the literature selection process is included as Figure 1.

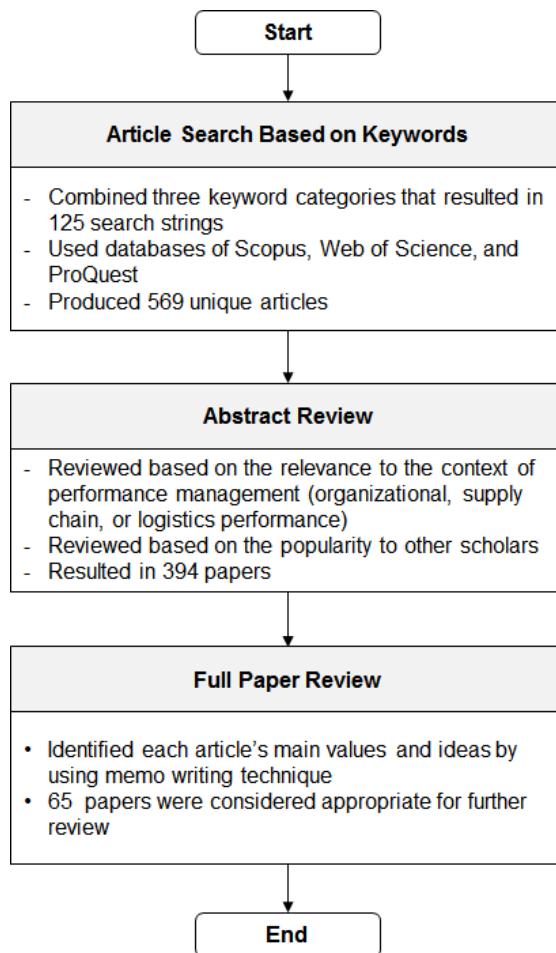


Figure 1: Flow Chart of Article Selection Process

The search was completed in October 2018. The papers were selected based on their relevance to the topic and no date limitations were placed on inclusion. As a result, the publication date of the 65 papers in the sample spanned 1987 – 2018. Figure 2 illustrates the publication date distribution of the articles included in the review.

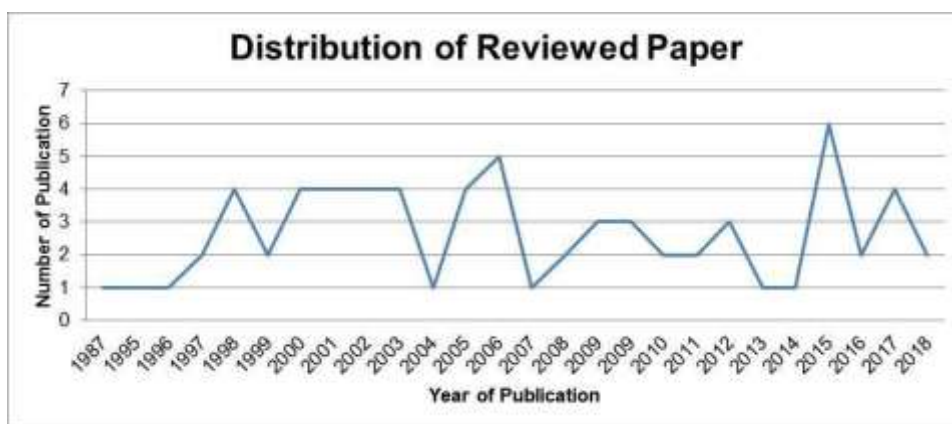


Figure 2: Distribution of Reviewed Paper

3. Findings

The analysis of the papers found that the studies fell under three main research questions that are used to structure the presentation of the literature synthesis:

1. What are the characteristics of performance management in multiple-role companies?
2. What are the key considerations for multiple-role company performance management system design?
3. How is the fit of some existing performance measurement frameworks relative to the contextual needs of performance measurement in multiple-role companies?

3.1 Characteristics of Performance Management in Multiple-Role Companies

Companies with multiple roles, such as state-owned enterprises (SOE), typically are legally autonomous entities that operate along commercial lines, but are owned either entirely or partially by the government (Friedmann and Garner, 1970). The main difference between companies with multiple roles and single roles lies in the aspect of criteria used in evaluating the company's performance. Companies that have a single role normally only have one ultimate goal in running their business activities, which is to generate profit for shareholders or to provide social services for the community (Almonte *et al.*, 2017). Almonte *et al.* explain that profit organisations or companies that act as profit generators emphasise the use of financial criteria in evaluating strategic, tactical, and operational business decisions. Meanwhile, non-profit organisations put more emphasis on the social aspect and on community satisfaction in every organisational decision. Almonte *et al.* argue that different conditions are found in companies that have multiple roles. Companies with multiple roles cannot be separated from the conflict associated with their roles as both profit generators and social service providers. The role of a profit generator requires such companies to prioritise the financial aspect in every business decision. On the other hand, the role of a public service provider requires companies to prioritise the social aspect. Therefore, companies that have multiple roles cannot only use one criterion to make decisions but must consider both financial and social aspects.

Further, Christiansen (2013) explains that some state-owned enterprises may perform multiple roles. On the one hand, some state-owned enterprises become profit generator for their shareholders, which can be either the government or public investors. On the other hand, they also receive mandates from the government to provide public services. Christiansen explains that on many occasions, state-owned enterprises face great dilemma in making business decisions due to the conflicting goals related to their roles as profit generators and public service providers.

In addition to the conflicting goals, companies with multiple roles like state-owned enterprises have multi-layered accountability arrangements towards members of society, administrations, professional groups, and political representatives (Christensen and Lægheid, 2007). Swiatczak *et al.* (2015) explain that SOEs are accountable to the state or municipal administrative body (administrative accountability), the ruling political party (political accountability), professional groups (professional accountability), society (social accountability), and legal bodies (legal accountability). In this case, a holistic approach to SOE governance needs to encompass all these accountability dimensions.

Performance controllers of companies with multiple roles often find it difficult to evaluate the performance of such companies. Ramamurti (1987) shows that different evaluation models used by controllers often trap managers in companies with multiple roles in a complex web of contradictions. Ramamurti explained that sometimes this is due to the existence of double standards and inconsistencies in the use of evaluation models. For example, external controllers can use social profitability for ex-ante decision making but on the other hand use commercial profitability for ex-post evaluation. Bai and Xu (2005) also explain that the measurement of managerial performance in multiple-role companies like state-owned enterprises is a very

complex setting, and international research still faces a research gap in this field in general and with regard to the measurement perspective in particular.

Based on the aforementioned explanations, it is noted that companies with multiple roles have several characteristics:

1. Confronted with conflicting goals to achieve commercial and social profitability.
2. Face difficulty in translating vague, complex goals into an all-encompassing measure of performance.
3. Face inconsistencies in the performance evaluation as follows:
 - a. Inconsistencies of performance evaluation between ex-ante decision making and ex-post evaluation,
 - b. Inconsistencies of performance evaluation used by different types of stakeholders,
 - c. Inconsistencies of performance evaluation used by managers who have different basic understandings.
4. Have multi-layered accountability arrangements towards members of society, administrations, professional groups, and political representatives.

3.2 Considerations for a Multiple-Role Company Performance Management System

Klovienė and Gimžauskienė (2014) explain that there are many different insights into how the performance of multiple-role companies such as state-owned enterprises should be measured. Klovienė and Gimžauskienė propose that state-owned enterprises have to align their organisational policy with the government's policy, while adjusting their policy towards economic change. In addition, Klovienė and Gimžauskienė explain that state-owned enterprises have to adjust themselves towards public needs. What makes performance evaluation in multiple-role companies complex is that external variables such as government policies and public needs can change anytime. In this case, performance management system for companies with multiple roles must provide functionalities for decision makers to analyse the impact of changes in external variables on organisational performance.

Pratuckchai (2012) suggests looking at the state-owned enterprise as a systematic model, consisting of externality and internality. In this case, the performance of multiple-role companies such as state-owned enterprises is affected by several factors, including internal and external factors. Environmental variables such as political, economic, social, and technological factors may affect the effectiveness of multiple-role companies. Similarly, several controllable variables, which are mainly the components of the internal system, such as inputs, processes, outputs, and feedback, may impact the performance of multiple-role companies. According to the aforementioned arguments, it is suggested that measuring the performance of multiple-role companies must be based on a holistic approach. In this case, a performance management system for multiple-role companies must measure both the end results and the performance drivers, which consist of both internal and external factors. This leads to the requirement that the performance management systems for companies with multiple roles must be able to reflect the dynamic relationship among components that affect organisational performance.

The conflicting goals between commercial and social dimensions as suggested by Christiansen (2013) requires a balanced and transparent performance management system. In this case, the performance management system must be able to show the trade-off between financial and social dimensions in all performance layers of the organisation, including strategic, tactical, and operational layers. In this case, the performance management system must provide functionalities to show the causal relationships among the system's components and their linkages to the end results, which consist of both financial and social performance dimensions.

Jensen (2001) promotes long-term value maximisation as the objective of companies that have multiple roles while focusing on meeting the demands of all important corporate constituencies. Following Jensen's idea, it is noted that the performance of multiple-role companies should not only be evaluated on a short-term basis but also on the long-term horizon. This requirement stands in contrast with widely implemented practices. Mostly, the firm's performance is evaluated on an annual basis. Managing performance on both short- and long-term bases demands a new perspective on performance management system design.

According to the aforementioned explanations, several considerations for designing the performance management system of multiple-role companies can be summarised:

1. The performance management system must provide functionalities to simulate the impact of changes in external policies on organisational performance.
2. The performance management system must reflect the dynamic relationship between performance drivers and end results.
3. The performance management system must reflect the trade-off between financial and social performance dimensions at all management layers, including the strategic, tactical, and operational levels.
4. The performance management system must be able to measure both short- and long-term organisational performance.

3.3 Review of Existing Performance Measurement Frameworks

In this paper, several existing performance management system frameworks were reviewed to understand whether they can be directly used to manage the performance of multiple-role companies. In this case, several organisational frameworks such as the Balanced Scorecard (BSC), Performance Prism, Knowledge Based Performance Management System (KB-PMS), and certain specific supply chain or logistics performance measurement frameworks such as the Supply Chain Operation Reference (SCOR) and Lean Six Sigma Logistics were reviewed.

1. Balanced Scorecard

Performance management systems have been evolving over time. In the early nineteenth century, traditional management accounting-based performance measures and cost accounting were widely used to measure the performance. However, knowing that there are many limitations of using only financial perspectives, several researchers aim to develop frameworks for supplementing traditional measures with non-financial measures (Neely *et al.*, 2003). Kaplan and Norton (1992) have revolutionised the framework by introducing Balanced Scorecard (BSC), which complements the financial measures by taking into account operational and strategic measures of performance. Kaplan and Norton identify financial performance as a lagging indicator that depends on leading factors of performance. For that reason, BSC provides a comprehensive measurement system by including four different perspectives, which are customer, financial, internal business process, and learning and innovation, while measuring performance. The "balanced" in BSC is supported by considering financial and non-financial measures, leading and lagging indicators and short- and long-term measures (Ahn, 2001). The integration of non-financial measures, such as quality, innovation activities, strategic orientation, and business excellence models, with traditional financial measures has resulted in the integrative perspective of performance management, which is an important phase of the revolution of PMS (Yadav and Sagar, 2013).

Referring to the criteria of the performance measurement framework for multiple-role companies, BSC has two main features relevant to the context of such companies, which are the balanced perspective and the strategy alignment features. In contrast with the earlier performance management system in the early nineteenth century that only focused on the financial dimension, BSC has four performance dimensions in the form of financial, customer, learning and growth,

and internal business process perspectives. However, considering that multiple-role companies also deal with public service tasks, BSC cannot be directly used without modifying or adding the existing perspectives with the social perspective.

Besides balanced perspectives, BSC also has a strategic map aimed at creating alignment between strategy and performance measures. This feature is especially for multiple-role companies, who need causal relationship among indicators in their performance management systems. However, Akkermans and Oorschot (2002) criticise BSC's strategic map for being unidirectional, too simplistic, and not separating cause and effect in time.

Reviews of BSC reveal that the framework has several functionalities relevant to the requirement of a performance measurement framework for multiple-role companies. However, BSC cannot be directly adopted. Firstly, the BSC does not provide the social dimension, which is critical for companies that provide public services. Secondly, companies with multiple roles are dynamic, volatile, and uncertain. They demand a more open-ended performance management approach, which is in contrast to the closed system approach of the BSC. This limitation is in line with Yadav and Sagar (2013) who argue that BSC is not very concerned about dynamism in the organisation. In addition, Atkinson *et al.* (1997) also suggest that BSC is intrinsically static. Thirdly, BSC does not explicitly provide a mechanism for accommodating the aspirations and needs of all the stakeholders of the system. Stakeholders of the system included in the balanced scorecard are shareholders, customers, and employees. In this case, some of the needs of the other stakeholders such as society/citizens are not explicitly incorporated into the BSC. Next, the BSC does not provide any mechanism for managing the conflicting objectives commonly found in companies with multiple roles. In this case, BSC does not show the trade-off between conflicting performance indicators explicitly. Norreklit (2000) extensively criticises BSC for its poor guidance on causality in terms of relationships between different measures. Similarly, Brown (2000) criticises BSC for ignoring the interrelationships among variables and its inability to predict the impact of lagging indicators on leading indicators. If not managed properly, this limitation can lead to local optimisation and silo thinking in the organisation. Neely *et al.* (1995) highlight this limitation by describing that BSC encourages short termism and local optimisation by forcing managers to minimise the variances from the standard rather than improve continually.

2. Performance Prism

Neely *et al.* (2002) developed a new PMS framework named Performance Prism, which integrates stakeholder perspective under five facets, namely stakeholder satisfaction, stakeholder contribution, strategies, capabilities, and processes. Performance Prism is not a perspective-based framework like the BSC. The main attribute of the Performance Prism is the performance management facet (Shaik, 2014). In addition, unlike BSC whose strategy is assumed to be given, in the Performance Prism the strategy is formulated as a part of the performance management process. In this case, strategy is formulated to satisfy stakeholder aspirations. Companies with multiple roles have quite a lot of stakeholders. Each stakeholder has a significant influence in determining system performance. Thus, the Stakeholder Satisfaction and Stakeholder Contribution facets in the Performance Prism are highly relevant to the requirement of performance measurement for multiple-role companies.

However, like the BSC, Performance Prism does not provide a causal relationship between the results and the drivers. In addition, it does not provide functionality to simulate the impact of changes in one variable on the system's performance. Moreover, the Performance Prism is unable to show the trade-off among conflicting performance indicators. These limitations suggest that Performance Prism cannot be directly used for managing the performance of multiple-role companies.

3. KB-PMS

As BSC and Performance Prism cannot be applied directly to all companies, Wibisono (2003) developed a PMS framework to address cultural contextual issues by proposing a methodology for the design of a realistic PMS to balance short-term and long-term measures, internal and external measures, and financial and operational measures. Wibisono combined theoretical study with model validation from Indonesian manufacturing industries through interviews, Focus Group Discussions (FGD), and field survey. The result of Wibisono's study revealed that there are nine important aspects that should be considered in designing PMS; including determining a PMS framework, identifying company environment, formulating company statements, analysing currently implemented PMS, determining performance variables, determining cause-effect amongst variables, determining performance standards, determining improvement priority, and formulating recommendations and model evaluation. In addition, Wibisono proposes the use of five perspectives to manage companies –the financial perspective, customer, manufacturing competitive priorities, internal processes, and resource availability. The use of Knowledge-based/Expert System and software package in Wibisono's PMS framework is considered novel since the two dominantly available PMS frameworks, BSC and Performance Prism, do not offer these features.

Enhancing previous PMS frameworks, Khan and Wibisono (2008) present a hybrid PMS model that utilises knowledge-based (KB), Analytic Hierarchy Process (AHP), Gauging Absence of Pre-requisite (GAP) analysis of PMS, and expert system (ES). KB approach is used because Khan and Wibisono think that a large number of performance variables are usually involved in the successful implementation of PMS and the relationships between them are quite complex. GAP analysis is used to determine the disparity between the essential or desirable prerequisites and what actually exists in an organisation, within each module of the PMS model. On the other side, the selection of the most suitable improvement priorities is a multi-attribute and complex problem which requires the development of a tool to address both qualitative and quantitative parameters. In this case, Khan and Wibisono believe that the AHP methodology is one of the most powerful tools employed to deal with these kinds of problems.

Wibisono's research is very useful, especially in understanding that PMS implementation in an organisation requires contextual analysis. At the foundation stage, KB-PMS suggests looking at the performance management system that already exists in the organisation. In the environment analysis stage, KB-PMS gives guidance in considering information relevant to the business environment such as Industry, Government, Society, Markets, and Products. In addition, KB-PMS offers comprehensive guidance in formulating a strategic plan, distinguishes performance indicators into several categories, and provides guidance to analyse the interrelationships among variables. All these attributes are relevant in the context of multiple-role companies.

Although it has some features relevant within the context of multiple-role companies, KB-PMS also has several shortcomings that make it not ready to be fully adopted in such a context. The relationships between performance indicators in the KB-PMS follow the linear and static model. This is not relevant to the needs of performance management in multiple-role companies which require a dynamic model and simulation functionality. In addition, KB-PMS does not provide any explicit mechanism to manage trade-off between financial and social performance dimensions.

4. SCOR Framework

One of the most well-known frameworks to manage supply chain performance is the supply chain operation references (SCOR) framework. In 1996, the Supply Chain Council proposed this framework, which contains five core supply chain performance attributes: reliability, responsiveness, agility, costs, and asset management (Kocaoğlu *et al.*, 2013). In addition, SCOR framework also has other attributes in the form of configuration processes that are divided into the groups of Plan, Source, Make, Deliver, and Return. These five processes form the top level of the SCOR model. Each process is further decomposed into lower levels. Level two is called configuration level where a company implements its strategy by configurations. Level three is the process elements level to fine tune the detailed operations. Level four is the implementation level that directly deals with the practices and activities (Chen and Huang, 2007).

Butilcă and Ilieş (2011) elaborate the constituents, goals, scope, and processes of the SCOR framework. According to them, SCOR contains:

- a. Standard descriptions of management processes,
- b. Relationships among the standard processes,
- c. Standard metrics to measure process performance,
- d. Management practices that produce best-in-class performance,
- e. Standard alignment of features and functionality.

Several researchers have tried to implement and enhance the applicability of the SCOR model. Thakkar *et al.* (2009) integrate the salient features of BSC and the SCOR model to deliver a comprehensive performance measurement framework for SME. According to Thakkar *et al.*, BSC and SCOR have several functionalities that complement each other. Jothimani and Sarmah (2014) explore the applicability of the SCOR model to identify the key performance indicators (KPIs) for the service-oriented sector. Their research finding suggests that companies can use the integrated approach of SCOR, fuzzy analytic hierarchy process (FAHP) and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) for effectively managing the supply chain performance.

Although the SCOR framework provides very detailed performance metrics and process standards to manage supply chain performance, it does not provide any functionality to manage the dynamism issues faced by multiple-role companies. In addition, relationships among performance metrics and their linkages to end results are not modelled explicitly. Lastly, the SCOR framework does not offer functionality to manage conflicting objectives or to show trade-offs between several conflicting indicators.

5. Lean Six Sigma Logistics

Six Sigma is defined as an organised, parallel-meso structure to reduce variation in organisational processes by using improvement specialists, a structured method, and performance metrics with the aim of achieving strategic objectives (Schroeder *et al.*, 2008). The Six Sigma management philosophy is accompanied by its scorecard. The Six Sigma Business Scorecard is a corporate performance system that requires leadership to inspire managers to improve and employees to innovate to achieve the optimum level of profitability and growth (Gupta, 2004). In all, at the heart of Six Sigma is the principle of variation reduction.

Meanwhile, Goldsby and Martichenko (2005) explain that lean is about the elimination of waste and the increase of speed and flow. Similarly, Kumar *et al.* (2006) explain that the lean philosophy pursues the reduction of lead times, delivery times, uncertainties in quality, inventories, set up times, equipment downtime, scrap, rework, and other wastes.

The business world has combined the lean philosophy and Six Sigma to create a new method called Lean Six Sigma (Gutierrez *et al.*, 2016). Gutierrez and Dubbers explain that Lean Six Sigma takes advantage of Lean and Six Sigma philosophies, such as improvement processes from Six

Sigma and productivity from the lean philosophy. They state that Lean Six Sigma can be defined as a broad long-term strategic decision-making method which maximises value-added content and minimises variation in quality and process characteristics, thereby improving customer satisfaction. Bhuiyan and Baghel (2005) explain that with the use of Lean and Six Sigma, more ways are created in which significant improvements can be made in terms of cost, quality, and lead times. Cheng and Chang (2012) explain that the objectives of Lean Six Sigma are to improve customer satisfaction, increase process speed, and reduce costs.

Recently, several efforts have been made to implement the concept of Lean Six Sigma in the logistics concept. Synthesising the concepts of Lean, Six Sigma, and Logistics, Goldsby and Martichenko (2005) define Lean Six Sigma Logistics as the elimination of wastes through disciplined efforts to understand and reduce variation while increasing speed and flow in the supply chain. They explain that the value proposition of Lean Six Sigma Logistics includes cost reduction, increased competitive advantage, and market growth. Goldsby and Martichenko argue that in order for Lean and Six Sigma to work in logistics, decisions have to be made based on the concept of “total logistics cost”. In addition, they assert that decision makers must have the courage to eliminate waste in its various forms.

Review of the Lean Six Sigma Logistics reveals that this framework is comprehensive and full of functionalities to manage logistics performance. Unlike usual frameworks that only focus on measuring performance or configuring system, Lean Six Sigma Logistics provides a model that shows how several factors may interconnect with each other to affect logistics performance. This concept is highly relevant with the needs in multiple-role companies.

However, yet again, Lean Six Sigma Logistics is still intrinsically static. In this case, Lean Six Sigma Logistics is not provided with the practical tools to simulate the impact of changes in one factor of the system’s performance. In addition, although Six Sigma Logistics clearly states that there is trade-off between financial and reliability dimension in the logistics system, the framework does not explain how to manage such a trade-off.

In addition to SCOR and Lean Six Sigma Logistics, several researchers such as Gunasekaran et al. (2001), Park et al. (2005), Ramanathan et al. (2011), Thakkar (2012), Reefke and Trocchi (2013), Fattahi *et al.* (2013), and Martins et al. (2014) have proposed other PMS frameworks to manage logistics performance. However, similar with SCOR and Sigma Logistics, the developed frameworks do not provide functionality to manage the dynamism issues faced by multiple-role companies.

3.4 The Suitability of Existing Frameworks for Multiple-Role Companies

After the key considerations of performance design for multiple-role companies have been identified and several available performance measurement frameworks like the BSC, Performance Prism, KB-PMS, SCOR, and Lean Six Sigma Logistics have been reviewed, the suitability of such frameworks relative to the criteria of performance measurement for multiple-role companies can be presented as shown in Table 2.

Table 2: The Suitability of Existing PMS Frameworks for Multiple-Role Companies

Criteria of PMS Framework for Multiple-Role Companies	BSC	Performance Prism	Knowledge-Based PMS	SCOR	Lean Six Sigma Logistics
Must provide functionality to simulate the impacts of changes in external policies on organisational performance	Does not provide simulation functionality	Does not provide simulation functionality	Does not provide simulation functionality	Does not provide simulation functionality	Does not provide simulation functionality
Must show the dynamic relationships between performance drivers and end results	Provides strategy alignment feature by using strategic map The relationship among indicators are static and linear	The relationship among indicators are static and linear	The relationship among indicators are static and linear	Does not provide linkage model explicitly	Linkages between performance drivers and end results are discussed but the detailed method of implementation is not explained
Must be able to show the trade-off between financial and social performance dimensions at all management layers, including at the strategic, tactical, and operational levels	Provides balanced perspective but does not include social dimension Provides strategy alignment feature by using strategic map Does not show the trade-off	Does not show the trade-off between financial and social dimensions	Provides balanced perspective Provides alignment mechanism between performance indicators	Does not show the trade-off between financial and social dimensions	Does not show the trade-off between financial and social dimensions

Criteria of PMS Framework for Multiple-Role Companies	BSC	Performance Prism	Knowledge-Based PMS	SCOR	Lean Six Sigma Logistics
	between financial and social dimensions				
Must be able to measure both short- and long-term organisational performance	Companies are free to select both short-term and long-term indicators, but the relationships among lagging and leading indicators are not modelled	The relationships among lagging and leading indicators are not modelled	Provides linear linkages between lagging and leading indicators	The relationships among lagging and leading indicators are not modelled	The relationships among lagging and leading indicators are not modelled

4. Conclusion and Suggestions for Future Work

This study reviews several works in literature related to performance in multiple-role companies and existing performance measurement frameworks. More specifically, this study analysed the characteristics of performance management in multiple-role companies, identified key considerations for performance management system design in such companies, and analysed the suitability of several existing performance measurement frameworks to be applied in the context of such companies.

Based on the literature review, it is known that multiple-role companies have special characteristics that differentiate them from single-role companies. In this case, multiple-role companies are confronted with conflicting goals to achieve commercial and social profitability. Decision makers in such companies also face difficulty in translating vague and complex goals into measures of performance. Often, multiple-role companies also face inconsistencies related to the performance evaluation approach that is used by performance controllers. Lastly, multiple-role companies have multi-layered accountability arrangements towards members of society, administrations, professional groups, and political representatives. All these characteristics make performance management in such a setting more difficult, which in turn leads to the need of a contextual performance management system.

The performance management system for companies with multiple roles needs to be adjusted so that it is relevant to the unique characteristics of such companies. The unique characteristics of multiple-role companies lead to the need of a performance management system that provides functionalities for decision makers to simulate the impacts of changes in external policies on organisational performance. In addition, the conflicting goals of social and financial performance dimensions needs a performance management system that is able to show the dynamic relationships between performance drivers and end results and to show the trade-off between financial and social performance dimensions at all management layers. Lastly, considering that multiple-role companies are expected to be sustainable and foster social development, their performance needs to be oriented on a longer time horizon. In this case, the performance

management system for such companies must be able to measure both short- and long-term organisational performance.

The criteria of performance management system design for multiple-role companies were used to review several existing performance management system frameworks. The findings suggest that existing logistics PMS frameworks like BSC, Performance Prism, KB-PMS, SCOR, and Lean Six Sigma Logistics do not fully suit the requirements of a performance management system for multiple-role companies. In this case, most existing frameworks have not revealed dynamic causal relationships between factors and disregarded the relationships between strategic resources, performance drivers, and end results. Furthermore, existing frameworks are static in nature and do not provide mechanism for simulating the impact of changes in one factor of the system's performance. Lastly, existing frameworks are unable to show the trade-off between financial and social performance dimensions across all managerial layers.

The findings of this literature review would suggest that a new performance management system for multiple-role companies is needed. The unique characteristics of such companies require a different approach to performance management. The absence of dynamic causal relationships among factors in most existing performance management systems may lead to a sectoral view, hamper coordination between involved parties, divide understanding between management and administrative parties, and promote local optimisation. In addition, static performance management frameworks cannot be applied to companies that perform multiple roles, as such systems are expected to be adaptable to changes in policies and business environments. This study therefore highlights a clear requirement for further work examining performance management system design for multiple-role companies with an emphasis on the link between why and how we measure.

The findings of the study differ from several studies that have been conducted before. Some studies have examined the unique characteristics of multiple-role companies and the challenges faced by such companies in managing their performance. However, to the researcher's knowledge, there has been no effort to build an integrated performance management framework that suits this context. Most of the existing studies focus on applying and adapting the existing performance measurement frameworks like BSC, Performance Prism, and others. Considering that such frameworks do not fully suit the characteristics of multiple-role companies, a new approach to performance management system design is required.

References

- i. Ahn, H. 2001. Applying the balanced scorecard concept: an experience report, *Long Range Planning*, Vol. 34, pp. 441-461.
- ii. Akkermans, H., & Oorschot, K. V. 2002. Developing a balanced scorecard with system dynamics, *In Proceeding of 2002 international system dynamics conference*.
- iii. Almonte, S., Chua, A. B., Lao, Y. I., Urrutua, K. 2017, Achieving dual objectives: Challenges and strategies faced by Philippine social enterprises, *De La Salle University, Center for Business Research & Development*.
- iv. Atkinson, A.A., Waterhouse, J.H. and Wells, R.B. 1997. A stakeholder's approach to strategic performance measurement, *Sloan Management Review*, Vol. 1 No. 1, pp. 31-43.
- v. Bai, C.E. and Xu, L.C. 2005. Incentives for CEOs with multitasks: Evidence from Chinese state-owned enterprises, *Journal of Comparative Economics*, Vol. 33 No. 3, Special Issue, pp. 517-539.
- vi. Bakker, R. 2010. Taking stock of temporary organizational forms: a systematic review and research agenda, *International Journal of Management Reviews*, Vol. 12 No. 4, pp. 466-486.
- vii. Bhuiyan, N. and Baghel, A. 2005. An overview of continuous improvement: from the past to the present, *Management Decision*, Vol. 43 No. 5, pp. 761-771.
- viii. Brown, M.G. 2000. *Winning Score: How to Design and Implement Organizational Scorecards*, Productivity Press, Cambridge, MA.
- ix. Butilca, D., & Ilies, L. 2011. Balanced Scorecard Versus Scor in Supply Chain Management a Theoretical Approach, *Managerial Challenges of the Contemporary Society*, (2), pp. 39-43.
- x. Chang H. 2005. The Influence of continuous improvement and performance factors in total quality organizations, *Total Quality Management and Business Excellence*, 16(3), pp. 415-439
- xi. Chen, S. J., & Huang, E. 2007. A systematic approach for supply chain improvement using design structure matrix, *Journal of Intelligent Manufacturing*, 18, 285-299.
- xii. Cheng, C. and Chang, P. 2012. Implementation of the Lean Six Sigma framework in non-profit organisations: a case study, *Total Quality Management and Business Excellence*, Vol. 23 No. 4, pp. 431-447.
- xiii. Christiansen, H. 2013. Balancing Commercial and Non- Commercial Priorities of State-Owned Enterprises, *OECD Corporate Governance Working Papers*, No. 6, OECD Publishing.
- xiv. Christensen, T. and Lægreid, P. 2015. Performance and accountability – A theoretical discussion and an empirical assessment, *Public Organization Review: A Global Journal*, Vol. 15 No. 2, pp. 207-225.
- xv. Conaty, F. 2012. Performance management challenges in hybrid NPO/public sector settings: an Irish case, *International Journal of Productivity and Performance Management*, 61(3), 290-309.
- xvi. Cuthbertson, R., & Piotrowicz, W. 2011. Performance measurement systems in supply chains, *International Journal of Productivity and Performance Management*, 60(6), 583-602.
- xvii. Fattahi, F., Nookabadi, A. S. and Kadivar, M. 2013. A model for measuring the performance of the meat supply chain, *British Food Journal*, 115(8), pp. 1090-1111.
- xviii. Friedmann, W.G. and Garner, J.F. 1970, *Government Enterprise: A Comparative Study*, Stevens, London.
- xix. Goldsby, T.J. and Martichenko, R.O. 2005. *Lean Six Sigma Logistics: Strategic Development to Operational Success*, J. Ross Publishing, Inc., FL.
- xx. Guiterez, L., Leeuw, S., & Dubbers, R. 2016. Logistics services and Lean Six Sigma implementation: a case study, *International Journal of Lean Six Sigma*, 7(3), pp. 324-342.
- xxi. Gunasekaran, A., Patel, C., & Tirtiroglu, E. 2001. Performance measures and metrics in a supply chain environment, *International Journal of Operations & Production Management*, 21(1/2), pp. 71-87.

- xxii. Gupta, P. 2004, Six Sigma Business Scorecard. *McGraw-Hill*.
- xxiii. Huber, S., Klauenberg, J. and Thaller, C. 2015. Consideration of transport logistics hubs in freight transport demand models, *European Transport Research Review*, 7(4).
- xxiv. Jayaram, J., Vickery, S., Droge, C. 2000. The effects of information system infrastructure and the process improvement on supply chain performance, *International Journal of Physical Distribution and Logistics Management*, 30(3/4), pp. 314–330.
- xxv. Jothimani, D. and Sarmah, P. 2014. Supply chain performance measurement for third party logistics, *Benchmarking: An International Journal*, 21(6), pp. 944–963.
- xxvi. Jensen, M.C. 2001. Value maximization, stakeholder theory, and the corporate objective function. *Journal of Applied Corporate Finance*, Fall 14 (3).
- xxvii. Lockamy, A., Beal, R.M. and Smith, W. 2000. Supply chain excellence for accelerated improvement, *Interfaces*, Vol. 30 No. 4, pp. 22-31.
- xxviii. Kaplan, R.S. and Norton, D.P. 1992. The Balanced Scorecard: measures that drive performance', *Harvard Business Review*, Vol. 70 No. 1, pp. 71-99.
- xxix. Khan, M. and Wibisono, D. 2008. A hybrid knowledge-based performance measurement system, *Business Process Management Journal*, Vol. 2 No. 2, pp. 129-146.
- xxx. Klovienė, R. and Gimžauskienė, E. 2014. Performance Measurement Model Formation in State-owned Enterprises, *Procedia - Social and Behavioral Sciences*, 156(April), pp. 594–598.
- xxxi. Kocaoğlu, B., Gulsun, B., & Tanyaş, M. 2013. A SCOR based approach for measuring a benchmarkable supply chain performance, *Journal of Intelligent Manufacturing*, 24(1), 113–132.
- xxxii. Kumar, V., Fantazy, K.A., Kumar, U. and Boyle, T.A. 2006. Implementation and management framework for supply chain flexibility, *Journal of Enterprise Information Management*, Vol. 19 No. 3, pp. 303-319.
- xxxiii. Lai, K. 2002. Measures for evaluating supply chain performance in transport logistics, *Transportation Research Part E*, 38, pp. 439–456.
- xxxiv. Lye, J. 2004. Performance measurement in the public sector: a clarification and agenda for research, *The Fourth Asia Pacific Interdisciplinary Research in Accounting Conference*, Singapore.
- xxxv. Martins, R. A. et al. 2014. Designing a performance measurement system: A case study at the Oil and Gas Sector, *IIE Annual Conference and Expo 2014*, pp. 2573–2582.
- xxxvi. Neely, A., Gregory, M. and Platts, K. 1995. Performance measurement system design A literature review and research agenda, *International Journal of Operations & Production Management*, 15(4), pp. 80–116.
- xxxvii. Neely, A.D., Adams, C. and Kennerley, M. 2002. The Performance Prism: The Scorecard for Measuring and Managing Business Success, *FT Prentice-Hall*, London.
- xxxviii. Neely, A., Bourne, M., Mills, J. and Platts, K. 2003, Implementing performance measurement systems: a literature review, *Journal of Business Performance Management*, Vol. 5 No. 1.
- xxxix. Norreklit, H. 2000. The balance on the balanced scorecard – a critical analysis of some of its assumptions, *Management Accounting Research*, Vol. 11 No. 1, pp. 65-88
- xl. Panayides, P. M. 2006. Maritime logistics and global supply chains: Towards a research Agenda, *Maritime Economics and Logistics*, 8(1), pp. 3–18.
- xli. Park, J. H., Lee, J. K., & Yoo, J. S. 2005. A framework for designing the balanced supply chain scorecard, *European Journal of Information Systems*, 14(4), 335–346.
- xl.ii. Pratuckchai, P. 2012. The Study Of Management Control Systems In State Owned Enterprises: A Proposed Conceptual Framework, *International Journal of Organizational Innovation*, Vol 5.
- xl.iii. Ramamurti, R. 1987. Performance Evaluation of State-Owned Enterprises in Theory and Practice, *Management Science*, 33(7), pp. 876–893. doi: 10.2307/2632139.

- xliv. Ramanathan, U., Gunasekaran, A. and Subramanian, N. 2011, Supply chain collaboration performance metrics: a conceptual framework, *Benchmarking: An International Journal*, 18(6), pp. 856–872.
- xlv. Reefke, H., & Trocchi, M. 2013. Balanced scorecard for sustainable supply chains: design and development guidelines, *International Journal of Productivity and Performance Management*, 62(8), 805–826.
- xlvi. Schroeder, R.G., Linderman, K., Liedtke, C. and Choo, A.S. 2008. Six Sigma: definition and underlying theory, *Journal of Operations Management*, Vol. 26, pp. 536-554.
- xlvii. Shaik, M., & Abdul-Kader, W. 2012. Performance measurement of reverse logistics enterprise: a comprehensive and integrated approach, *Measuring Business Excellence*, 16(2), 23–34.
- xlviii. Swiatczak, M., Morner, M. and Finkbeiner, N. 2015. How can performance measurement systems empower managers? An exploratory study in state-owned enterprises, *International Journal of Public Sector Management*, Vol. 28 Iss 4/5.
- xlix. Thakkar, J., Kanda, A., & Deshmukh, S. G. 2009. Supply chain performance measurement framework for small and medium scale enterprises. *Benchmarking: An International Journal*, 16(5), 702–723.
 - l. Thakkar, J. J. 2012. SCM based Performance Measurement System: A Preliminary Conceptualization, *Decision*, 39(3), pp. 5–43.
 - li. Wibisono, D. 2003. Management a Framework of Performance Measurement System, *The South East Asian Journal of Management*, pp. 107–118.
 - lii. Yadav, N. and Sagar, M. 2013. Performance measurement and management frameworks”, *Business Process Management Journal*, 19(6), pp. 947–971.