Supplier performance assessment: Evidence from a UK–based manufacturing company and its suppliers

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Abstract

Purpose- The discussion of supplier performance assessment and implementation challenges has been evidenced well in the academic literature. However, the analysis of supplier performance assessment has been limited in terms of inclusion of suppliers' perspective, especially in terms of what key performance indicators they deem to be relevant and aligned with their goals. Therefore, the purpose of this paper is to shed light on supplier performance assessment, taking into account both manufacturing company's and suppliers' perspective, to evaluate to what extent the utilised performance measures are beneficial to all parties.

Methods- Based on literature review on supplier performance assessment ten categories of performance measures was established and explored in a case study involving a UK manufacturing company and its suppliers. A questionnaire was distributed to the manufacturing company and their thirty suppliers, resulting with a total of 41 responses.

Findings- From the established ten categories only six categories were highly rated which were: net profits, flexibility & responsiveness, delivery performance and time and cycle time, product quality and availability, which were aligned to financial and internal business process categories.

Originality- The research on the topic of supplier performance assessment often relates to measurement and highlights measures for assessing suppliers' performance to a particular industry or area of performance measurement. Hence, this study embeds three distinctive angles including the academic literature on supplier performance assessment, suppliers' and the manufacturing company's perspectives.

Limitations – This study focused on a UK based company and its relationship with its suppliers and how performance measures were assessed within this context. A further study needs to be conducted in terms of comparing the results of the study to other companies' supplier performance assessment.

Type- Research Paper

Keywords: Supplier Performance, manufacturing, UK

1. Introduction

Performance is often referred to as a degree of productivity and the ability to achieve pre-set goals and objectives, which impact supply chain members (Gunasekaran & Kobu, 2007).

Hence, it allows the establishment of accurate, comprehensible, effective and informative measures, which in turn can assist companies to identify, establish and eliminate their inefficient and inaccurate procedures and practices. The performance in this context help supply chains to re-organise resources, free up cash, improve visibility and flexibility (Franceschini et al. 2007; Gunasekaran et al., 2001). When investigating the supply chain, performance measures can show variance within the supply chain, depending on where the focus is (Bak, 2018). For example, when investigating performance measurement from the supplier management perspective we may have different measures to assess. Similarly, Melnyk et al. (2004) noted that supplier management requires a systematic dynamic approach in managing current, and potential suppliers. Especially, with the on-going process of globalisation and innovation, where the focus has shifted towards supplier-buyer relationships and how to improve processes to drive them closer (Baily et al, 2005; Gadde et al, 2010). This is also due to the fact that supplier management has the potential to create competitive advantage for the entire supply chain (Gadde et al. 2010). In this context, the assessment of supplier performance and how it is embedded within the supply chains becomes noteworthy. Simpson et al. (2002) point out that, due to tendency towards supplier base reduction, the long-term supplier-buyer relationships are especially under pressure and are crucial for the long-term success of businesses. Performance measurement particularly is important to logistics service providers, service and material providers and distribution industries (Kaplan & Norton, 1992; 1993; 2004; Gunasekaran et al, 2001; Bukh & Malmi, 2005; Cagliano et al., 2014).

Given the relevance of supplier performance assessment and its potential impact on performance, at both company and supply chain level, a wide range of literature is available on performance management tools and their implementation based on enterprise-wide productivity assessment. However the execution of performance asssessment and how it translates to suppliers is rather limited (Sancha et al., 2019; Cagliano et al, 2014; Skaes, 2017) and there is limited research on how performance assessment is relevant to each supplier (Cannon and Homburg, 2001; Vereecke and Muylle, 2006). From the academic literature, it can be seen that although many authors have discussed supplier performance management, the benefits of performance measurement on suppliers is largely anecdotal based on the buying companies perspective only. In some cases, assessment of suppliers' performance can even have a negative impact on suppliers' performance (Sancha et al., 2019). Hence there is a need for wider empirical evidence encompassing the supplier's perspective in order to understand to what extent performance measurements are beneficial to all parties in the supply chain.

2. Supply chain performance measurement mechanisms

Supply chain performance measurement has emerged as one of the key business areas where companies can gain sustained competitive advantage (Lee, 2002). It is considered as a key strategic factor for increasing organisational effectiveness and for better realisation of organisational goals such as enhanced competitiveness, better customer care and profitability (Gunasekaran et al., 2001). Traditionally, Neely et al. (1995) defined performance measurement as a set of metrics or measures used to quantify the efficiency and/or effectiveness of an action. Similarly, logistics and supply chain performance measures have also been retrospective, quantitative and orientated around measuring cost, time and accuracy (Shaw et al. 2010). Despite the benefits of such metrics, one of the most prevalent issues associated with supply chain performance measurement is having too many metrics. Some organisations are using hundreds, which are often not aligned to the organisation's strategy (Hoffman, 2006). In a literature review of performance measures and metrics in supply chain management between 1995-2004, Gunasekaran and Kobu (2007) identified almost 90 supply chain metrics, many of which overlap. The most widely used metrics identified were financial (38 per cent), but 60 per cent of all measures were functionally based. This leads to confusion, often results in 'paralysis by analysis' and presents difficulties in conducting benchmarking exercises. There is a requirement to move from 'performance proliferation' to 'performance simplification' (Morgan, 2007) and to have a more holistic view of performance measurement in relation to the entire supply chain and not just specific nodes or functions (Shaw 2013).

To address this, several theoretical tools for performance measurement have been developed (Cagliano et al, 2014). The aim of which has been to enable supply chain managers to select a small subset, implement and measure the most appropriate measures for their supply chain, embracing the Plan-Do-Check-Act continuous improvement approach originally proposed by Deming (1986). The performance measurement tools suggest that performance measurement consists of a set of key performance indicators (KPIs) demonstrating how effectively a company is achieving key business objectives (Skaes, 2017). Rasmussen et al (2009) suggest that key business objectives, which are aligned with organisations strategic and tactical operations, demonstrate how effectively a vendor is achieving the KPIs. It is closely linked to targets, which set out a reference point (usually expressed in percentage/numerical value), allowing the measurement and comparison of processes over a period of time. This sets out a scope for KPIs with its targets/objectives, starting points and limitations upon which performance would be evaluated (Rasmussen et al, 2009; Eckerson, 2011). Cagliano et al. (2014) points out that the most productive way to monitor, measure and execute KPIs is by assigning a responsible business unit/team followed by detailed analysis of each KPI.

Regular reviews have to be carried out to ensure relevance and validity of criteria within the performance measurement against the company's objectives and future targets (Skaes, 2017) which may adapt based on revealing trends, technology and market fluctuations, as they can vary between leading metrics which specifies company's future direction and outstanding actions in contrast to lagging indicators that refer to the firm's past performance and success/failures (Kaplan & Norton, 1996; Gordon, 2008; Skaes, 2017). Caplice and Sheffi (1995) also noted that managers should continually review and evaluate their supply chain performance metrics in order to make sense of the growing number of metrics. Further, they provided eight criteria on which to judge the quality of metrics: validity, robustness, usefulness, integration, and compatibility, economy, level of detail and behavioural soundness. However the KPIs of the company may be aligned or misaligned with the vendors KPIs based on their missions and goals (Shaw et al. 2010). Hence to make the difference between the KPIs dictated by the focal company and those based on a supplier perspective, we have utilised the term KPI and vendors' key performance indicators (VKPI). Maestini et al. (2017) also noted that studies that truly investigate performance measurement beyond a single firm's boundaries are limited.

In order to accurately implement and execute the above-mentioned frameworks and efficiently measure company's productivity, authors have proposed for each theoretical tool a set of key performance indicators, evaluating the firm's performance (Gunasekaran et al, 2004). To assist companies in performance measurement several well-known theoretical tools have been developed, such as: logistiqual (Rafele, 2004; Grimaldi & Rafele, 2007); performance measurement and metrics model (Gunasekaran et al, 2004; Gunasekaran & Kobu, 2007); supply chain operations reference model (SC Council, 1996; 2010); performance prism model (Neely et al. 1996; 2001a; 2001b); Balanced Scorecard (Kaplan & Norton, 1993; 1996). Further, Bhagwat and Sharma (2007) proposed the Balanced Scorecard as an appropriate framework from which to create a more balanced set of supply chain measures and to make a clear distinction between operational, tactical and strategic measures (Gunasekaran et al., 2004). This suggests that the scope of supply chain performance measurement should be boundary spanning and not measured in isolation, company by company or node by node.

Although there are also other terms used such as by Skaes (2017) distinguishing between hard and soft metrics, researchers have stressed that there is no ‘universal’ set of key performance indicators that would suit needs and wants of all companies. Caplice & Sheffi (1994) argue that any numerical indicators reference the company’s past performance when non-numerical metrics are used to address future targets with (Gunasekaran & Kobu, 2007; Eckerson, 2011; Skaes, 2017; Neely, 1999; Skaes, 2017; Van Weele, 2005; 2010) advocating that a combination of both metrics when evaluating may be useful. However, it is suggested to keep number of measures close to minimum, to ensure clarity, to reduce variations in interpretations and demonstrate evidence of achievements/inefficiencies (University of Exeter, 2010).

The existing literature on supplier performance assessment is available on performance management tools and their implementation based on enterprise-wide productivity assessment. However the execution of performance evaluation and how it translates to suppliers is rather limited (Cagliano et al, 2014; Skaes, 2017) and there is limited research on how performance assessment is relevant to each supplier (Cannon and Homburg, 2001; Vereecke and Muylle, 2006). Maestini et al. (2017) also noted that studies that truly investigate performance measurement beyond a single firm’s boundaries are limited. Given this background, the purpose of this paper is to shed light on supplier performance assessment, taking into account both the manufacturing company’s and suppliers’ perspective. Hence the following research questions have been addressed.

RQ1: To what extent are the established performance measures aligned with manufacturing company and its supplier base?
RQ2: Are there any common performance categories that the company and suppliers highly value?

The remainder of this paper is organised as follows, after having discussed the theoretical background on performance measurement mechanisms and the supplier performance assessment categories in section 2. Section 3 discusses the process and categories of measures used to assess suppliers’ performance as presented in the academic literature, Section 4 describes the adopted methodology, while section 5 presents the results of this study. In section 6 we discuss the results and provide final remarks and future research directions in section 7.

3. Assessing Suppliers' Performance

Boyson et al (1999) and Gustafsson & Karlsson (2012) refer to performance metrics as the most reliable and efficient way to assess suppliers' performance. Gordon (2005) and Gustafsson & Karlsson (2012) agree that supplier performance assessment requires the determination of an appropriate performance measurement for each supplier. In fact, some suppliers may not require continuous monitoring and assessment when the others might demand attention to poor prior performance, and management approach (Gordon, 2005; van Weele, 2005; 2010). Gustafsson & Karlsson (2012) highlighted tat even a single supplier's performance management problem could be potentially detrimental to the whole supply chain. Therefore, as agreed by Kshatriya et al. (2017) supplier-buyer feedback exchange can be the key to success to identify, eliminate and prevent inefficiencies across the supply chain.

Performance measurement provides a detailed evaluation of processes, which assists the management to control suppliers' performance underlining their inefficiencies and the gap between 'where we are now' and 'where we want to be in the future' (Franceschini et al, 2007). A study conducted by the Aberdeen Group (2002) indicated that regular supplier performance appraisal has the potential to improve late deliveries, costs of damages and shrinkages of goods. Similarly, previous research has indicated the detriment of performance measurement tools, that might cause supply chain drop in customer service level, and in severe cases may even lead to bankruptcy (Aberdeen Group, 2002; Gordon, 2008; Gustafsson & Karlsson, 2012). Hence, the identification of such challenges may provide the opportunity to improve effectiveness of customer service level and demand of organisations (Gustafsson & Karlsson, 2012; Lai et al, 2004; Asmild et al 2007; Sang et al. 2006). Similarly, Kshatriya et al. (2017, p. 80) suggest that "unless you measure you cannot correct". Such a performance measurement process can involve a multi-stage process, which requires both internal and external assessment procedures (Kshatriya et al, 2017). Hence, implementation of multiple performance measurement criteria simultaneously can lead the entire process of performance measurement to be complex, lengthy and costly. Hence, Gunasekaran & Kobu (2007) advise that performance measurement criteria should be driven by supply chains taking into account the individual company's vision and mission as this can be strategic, tactical or operational (Gunasekaran & Kobu, 2007; Cagliano et al. 2014). However, the current research has been rather limited, with many of them having insufficient measures for assessing suppliers' performance, as they tend to be very prescriptive in their application to a particular industry or area of performance measurement (Franceschini et al, 2007; Gunasekaran & Kobu, 2007;

Cagliano et al. 2014; Styve & Stubberud, 2018) Hence, there is limited research on the following issues: (i) to what extent the performance measures established are aligned with manufacturing company and its supplier base? (ii) And whether there are any common performance categories that the company and suppliers highly value? In order to explore these questions, the academic literature on performance measures utilised to assess suppliers was reviewed, and linked to the following categories highlighting the importance of assessing suppliers' performance (see Table 1).

(1) Supplier Appraisal. Supplier appraisal is the process of measuring to what extent a supplier meets vendors' performance and management relevant to its requirements in the short-, medium and long-term. Therefore, the supplier performance appraisal is a method of quantifying suppliers' operations based on its productivity and effectiveness (Gadde et al. 2010). Sundtoft et al. (2011) noted that supplier appraisal has two main objectives within this context: to assist buyers' decision-making, and to uphold and maintain continuous improvement at the suppliers' end. The prescriptive nature of the supplier appraisal can be associated to cost of the supplier appraisal consisting of "measuring, evaluation or auditing products or services to assure conformance to quality standards and performance requirements" (Desai, 2008:29). In such cases the development of stringent supplier appraisals may lead to a complex and costly process, but also a reduction in warranty expenditures in the mid-long term (Mandal and Shah, 2002). Despite its challenges the supplier appraisal is paramount for companies as it provides an understanding of the suppliers' performance levels as well as a tool to incorporate suppliers' feedback and continuous improvement (Sancha et al., 2019; Salam and Khan, 2018).

(2) Net profits; Net profits conceptualized by Kim et al. (2006:70) as the extent to which supplier firms "perform relative to their expectations regarding profit margins". Laseter & Ramdas (2001) note that it is difficult to accurately estimate supplier profitability; hence, based on net profits they could observe a significant difference between clusters. According to Dabhilkar (2016) the alignment of strategic orientation with suppliers can have a positive effect on net profits. Bukh & Malmi (2005) study highlighted that elimination of ineffective and inefficient practices and procedures within any company frees up cash and time, improves productivity, reduces indirect and direct work, helps to move towards business rationalisation and reduces negative environmental impact (through reduction of waste, energy consumption, pollution, transportation of 'pallets of air', etc.). Kumar et al. (2019) noted that net profits are also a good indicator to suppliers' profitability as well as the impact upon the companies long-

term profitability and risk profile. Net profits also indicates the health of suppliers' performance as well as economic value (Styve & Stubberud, 2018).

(3) Delivery performance and time. As the discussion of delivery performance have been used as cost-based delivery performance measures, including the penalty costs for untimely delivery; scheduled deliveries over mid and long term, as well as penalty costs, evaluating the supplier delivery performance and what is needed to improve it (Bhattacharyya and Guiffrida, 2015). Guiffrida and Nagi (2006:4) also indicated that "failure to quantify supplier delivery performance in financial terms presents both short- term and long-term difficulties. In the short term, the buyer-supplier relationship may be negatively impacted". Bozarth et al. (2009) note that supplier delivery performance impact vendor manufacturing performance relative to other plants in the same industry/country group hence becomes one of the important performance measures identified. However a recent study highlighted that the formal and late delivery penalties, although a good indicator for performance, may cause unintended consequences of formal control process rather creating a systematic way for two-way communication (Jääskeläinen & Thitz, 2018).

(4) Training, Communication & Capacity utilization. Through the supplier-buyer communication and feedback, the gap can be identified and appropriate supplier strategy executed (Franceschini et al, 2007). This can also lead to training needs identification as well as the assessment of how the capacity can be utilised. Similarly, Cagliano et al. (2014) findings indicated that appropriate staff trainings, timely and accurate communication could lead to improved capacity utilisation as a result of both sides' interaction and work (vendors and buyers). Krause et al. (2000) and Akamp and Muller (2013) also find that the buying firm's direct involvement through training had an impact on performance and increase the communication between the vendor and the buyer. Mani et al. (2018) add that effective communication, training and capacity utilisation can also have an impact upon the accident reductions, disruptions, and delays in delivery.

(5) Advancing technologies. Gordon (2008) advises that advancing technologies are key to supplier-buyer effective and efficient communication, improving visibility across the entire supply chain. Kaplan & Norton (2004) mention that technologies play a big part in company's success. The supplier buyer continuum may be affected by the technology needs of the buyer for supply chain integration, whereas for the supplier this may be seen as an additional unnecessary investment, as each buyer may require the adoption of different technologies (Bak, 2016). Hence understanding and establishing common goals for this particular performance measure can prove to be difficult. Similarly McConalogue et al. (2019) study indicated that

advancing technologies benefits are evident despite the challenges especially for suppliers in terms of cost associated with initial set up, maintenance and learning.

(6) Query and Purchasing Order (PO) lead times. Sjobakk et al. (2015) note "measuring the average to the planned duration from the issuance of a purchase order until the receipt of the materials, suppliers' efficiency can be measured using the purchase order to material receipt duration indicator". Hence a reduction in query and purchasing order lead times can also reduce the production time lost in some cases. Similarly, Cagliano et al. (2014) suggest that swift, timely and accurate operations between supplier and buyer can lead to reduced query and overall purchasing order lead time, which are often seen as the source of competitive advantage for many firms. Kaplan & Norton (1996; 2004) also agree that reduced order lead-time is one of the metrics and direct indicators of an organisations high productivity and efficiency of its operations. Salam and Khan (2018) and Kumar et al. (2018) also adds that new queries and unexpected purchasing orders may be placed based on the preferred status of suppliers indicating also a high performance.

(7) Flexibility and responsiveness. Bhagwat & Sharma (2007) suggest that flexibility and responsiveness are essential metrics to measure and monitor the suppliers. Van Weele (2010) and Jordan and Bak (2016) highlight that modern global market expansion, increasing volatility and uncertainty require the supply chain to be flexible and responsive. Cagliano et al. (2014) in their study mention that flexibility and responsiveness metrics are important indicators of productive and excellent- performing organisations. This is due to the fact that flexibility provides the ability of the suppliers and the manufacturing company to adapt to unexpected changes in the market and contextual settings (Liao, Hong, and Rao 2010; Tan and Sia 2006).

(8) Product quality and availability. Gunasekaran et al. (2001) and Bhagwat & Sharma (2007) note that product quality, and availability is important indicator of well- performing businesses. Amorim et al. (2016) note that the buyers productivity is also related to the product availability amount of local supplies due to the uncertainties that corresponding suppliers are subject to. Similarly, Kannan and Tan's (2005) study findings highlighted that aligning the objectives and vision with suppliers has a positive impact on product quality, hence the performance of the supply chain. Hence as stated by Salimian et al. (2017) the company and its suppliers need to collaborate to improve product quality. Therefore, it is inherently necessary that the company needs to invest in suppliers' facilities to improve product quality as well as product availability (Tse et al. 2019).

(9) Forecasting. Gunasekaran et al. (2001) in their study have identified that accurate forecasting is an essential driver to success of both parties: for the suppliers as well as the

buyers. Gustafsson & Karlsson (2012) advise that accurate forecast could be a source of firm's competitive advantage, helping to shape company's business processes and navigating enterprise development in terms of assessing its capacity from learning to resources. Bukh & Malmi (2005) point out that accurate forecasting is especially important to service providers, logistics and distribution businesses.

(10) Cycle time. Huang and Keskar (2007:515) define cycle time of a supplier as "ratio of measured time required for completion of set of tasks divided by sum of the time required to complete each task based on rated efficiency of the machinery and labour operations". Considering that the cycle time may be different when compared to diverse suppliers, its performance impact a company's effectiveness and efficiency of purchasing order cycle time and overall supply cycle time, which are in turn important performance indicators (Cagliano et al, 2014). Hence, Kaplan & Norton (1996) argue that timely, productive and accurate operations execution is likely to become one of the firm's sources of competitive advantage.

Supplier Performance Categories	**Literature**	**Context**
Supplier Appraisal (SAP)	Caplice and Sheffi (1995)	Internal compatibility
	Desai (2008)	Conformance of Quality standards; Internal compatibility
	Goffin et al. (1997)	Supplier integration
	Caplice and Sheffi (1995)	Supplier-buyer co-operation
	Gunasekaran et al (2001)	Supplier selection; continuous improvement
	Kaplan & Norton (1992, 1996; 2004)	Supplier integration; standardisation of performance measures
	Mandal and Shah (2002)	Warranty expenditure
	Sang et al. (2006)	Stakeholder relationship
	Salam & Khan (2018)	Supplier feedback
	Sancha et al. (2019)	Sustainable Supplier Development; Supplier Collaboration
	Shaw et al. (2010)	Governance structures
	Sundtoft et al. (2011)	Decision making; continuous improvement
Net profits (NEP)	Bhagwat & Sharma (2007)	Supplier development; return on investment
	Bukh & Malmi (2005)	Customer satisfaction and customer profitability
	Cagliano et al (2014)	Cost of quality
	Dabhilkar (2016)	Strategic alignment with suppliers
	Kim et al. (2006)	Supplier clusters
	Kumar et al. (2019)	Supplier Profitability; Risk profile
	Laseter & Ramdas (2001)	Supplier Profitability
	Styve & Stubberud, (2018)	Economic value
Delivery performance and time (DEL)	Bhattacharyya and Guiffrida, (2015)	Delivery cost
	Kaplan & Norton (1992, 1996; 2004)	Supplier integration; standardisation of performance measures
	Guiffrida and Nagi (2006)	Short-long term financial performance
	Gunasekaran et al (2001);	Supplier selection; continuous improvement
	Bozarth et al. (2009)	Vendor manufacturing performance

	Bukh & Malmi (2005)	Customer satisfaction and customer profitability
	Bhagwat & Sharma (2007)	Supplier development
	Cagliano et al (2014);	Logistics performance
	Jääskeläinen & Thitz (2018)	Continuous improvement; communication
Trainings, communication & capacity utilization (CAP)	Akamp and Muller (2013)	Supplier management
	Kaplan & Norton (1992, 1996; 2004)	Supplier integration; standardisation of performance measures
	Gunasekaran et al (2001)	Supplier-buyer communication
	Bukh & Malmi (2005)	Customer satisfaction and customer profitability
	Bhagwat & Sharma (2007)	Supplier development;
	Cagliano et al (2014)	Capacity utilisation; communication
	Krause et al. (2000)	Continuous improvement; communication
	Mani et al. (2018)	Capacity utilisation
Advancing technologies (ADT)	Kaplan & Norton (1992, 1996; 2004)	Supplier integration; standardisation of performance measures
	Gunasekaran et al (2001)	Supplier development
	Bak (2016)	Supply chain integration
	Bukh & Malmi (2005)	Customer satisfaction and customer profitability
	Bhagwat & Sharma (2007)	Supplier development
	Cagliano et al (2014)	Logistics performance
	Gordon (2008)	Supply chain visibility
	McConalogue, et al. (2019).	Supply chain challenges
Query and PO lead times (QER)	Sjobakk et al. (2015)	Materials management
	Cagliano et al (2014)	Supply chain strategy
	Kaplan & Norton (1996; 2004)	Productivity; supplier integration; standardisation of performance measures
	Salam and Khan (2018)	Supplier Assessment
	Kumar et al. (2018)	Supply Risk
Flexibility and responsiveness (FLX)	Jordan and Bak (2016)	Supply chain skills
	Bhagwat & Sharma (2007)	Supplier monitoring
	Van Weele (2010)	Strategic purchasing
	Cagliano et al (2014)	Supply chain strategy
	Liao et al. (2010)	Supply flexibility; supply performance
	Tan and Sia (2006)	Outsourcing
Product quality and availability (QUL)	Gunasekaran et al (2001)	Quality management
	Bhagwat & Sharma (2007)	Supplier Development
	Amorim et al. (2016)	Product availability
	Kannan and Tan (2005)	Quality assessment
	Tse et al. (2019)	
	Salimian et al. (2017)	Supplier Collaboration
Forecasting (FOR)	Gunasekaran et al (2001)	Supply chain integration
	Gustafsson & Karlsson (2012)	Capacity development
	Bukh & Malmi (2005)	Resource utilisation
	Dey et al. (2015)	Supplier performance evaluation
Cycle time (CYT)	Huang and Keskar (2007)	Supplier selection
	Cagliano et al, (2014)	Supply chain strategy
	Kaplan & Norton (1996)	Productivity; supplier integration; standardisation of performance measures

Table 1: The summary of supplier performance categories

4. Methodology

The developed supplier performance assessment framework composed of ten performance measures was applied to an in-depth case study based on a UK manufacturing company and its suppliers. In using a case study to examine as a part of a theoretical lens, it allows inclusion of numerous examination techniques, which may include different research streams, both qualitative and quantitative (Yin, 2014). A case study, according to Yin (2014), is an empirical enquiry that investigates a contemporary phenomenon, wherein the boundaries between phenomenon and context are not clearly evident and multiple sources of evidence are sought and utilised. Yin (2014) states that a case study is the correct method by which "how" and "why" questions are asked, and does not require control over behavioural events. Case studies are the preferred method when the focus is on contemporary phenomena with some real-life context. The use of case studies is especially applicable in the early stages of research, when little is known about the phenomenon with little empirical substantiation (Eisenhardt, 1989). A single case study setting has been specifically selected to "close in" on real-life situation and to allow the researcher the opportunity "to test views directly in relation to phenomena as they unfold in practice" (Flyvbjerg, 2006, p. 235). In this study, the case study approach provided the profundity looked for, such as gaining understanding to what extent the performance measures established were aligned with manufacturing company and its supplier base which allowed the creation of sets of integral assessment of the practices in a contextual setting (Klonoski, 2013). Based on companies' supplier charter that sets out suppliers' duties, responsibilities and general requirements to suppliers – the selection criteria for samples of the survey were based on: (a) to have signed the supplier charter; (b) have been supplying the distribution centre at least for one year; and (c) supplier provides core range products. The survey instrument, was structured into three sections encompassing: questions of the demographics including years worked in company; questions on the ten established categories using a Likert scale; open ended questions at the end linked back to the research questions. Following the identification of the dimensions of supplier performance the next phase of the research was to develop and test scales for each of the factors. The procedures used to develop and assess the validity of the agility scale are described below. Scale development guidelines recommended by Churchill (1979), DeVellis (1991), Hinkin (1995), and Ambalkar et al. (2015) were followed. Each dimension measured by multi-item scales increased the reliability and validity (Ambulkar et al. 2015). Based on the literature review presented above, 10 dimensions were generated to reflect each of the supplier performance dimensions. Multiple items were used for the measurement of each of the constructs, as summarized in Table 1, with constructs being defined based on literature review (Kumar et al. 2019). Second, measurement items were generated from literature review and the constructs defined and discussed with three expert academics and two senior managers in the field of supply chain management. For quantitative data analysis, Pallant (2010) noted that it is important to examine the reliability of scales. For scales, the reliability mainly concerns their internal consistency, which refers to the degree of accordance of items that make up the scales. The Cronbach Alpha for the all categories were .792 (Table 3) above the threshold value of 0.6. Hence, these constructs are reliable (Nunnaally, 1967). Once the survey items were determined, the procedures suggested by Dillman (2007) for survey design were employed. All variables of interest were estimated through respondents' perceptual evaluation on a 5 point Likert scale: the response categories for each item were anchored by 1 (strongly disagree) and 5 (strongly agree). The variance of the descriptive statistics also indicates that there is a coherence based on the respondents assessment of dimensions with the variance ranging between >2 and <6 indicating a coherence across the variables (Table 3). The study entailed an online questionnaire distributed across the manufacturing company and its 30 suppliers from which a total of 77% response rate has been achieved with a total 41 responses, consisting of: sales manager 36%; Sales Coordinator 29%; Sales Advisor 18%; Sales and Planning Coordinator 11%; and Regional Sales Managers 6%

This in return supports Cagliano et al. (2014) suggest that swift, timely and accurate operations between supplier and buyer can lead to reduced query and overall purchasing order lead time, which are often seen as the source of competitive advantage for many firms.

	N Statistic	Range Statistic	Minimum Statistic	Maximum Statistic	Mean Std. Error	Std. Dev.Stat.	Variance Statistic
SAP	41	2	3	5	.072	.459	.211
NEP	41	2	3	5	.095	.610	.372
DEL	41	1	4	5	.041	.264	.070
CAP	41	2	3	5	.074	.475	.226
FOR	41	2	3	5	.086	.552	.305
ADT	41	2	3	5	.093	.596	.355
QER	41	2	3	5	.092	.591	.349
FLX	41	2	3	5	.092	.591	.349
QUL	41	1	4	5	.047	.300	.090
CYT	41	5	0	5	.139	.891	.794

Table 2. Descriptive Statistics

5. Findings and Analysis

The manufacturing company from this case company in question, is a supplier and distributor of building materials located in the United Kingdom. The performance management and especially the supplier performance measurement have been core to the supplier charter of the company, which dictates and sets out suppliers' duties, responsibilities, and general requirements to guide its suppliers. The importance of established and standardised performance measures have been also found in the literature as beneficial. For instance, Cagliano et al. (2014) found supplier productivity directly linked to company's performance measures and its effectiveness on its suppliers. The supplier performance has been investigated based on ten dimensions highlighting the impact on suppliers (Table 1). Although correlation doesn't imply causation, it's worth noting that the results indicated that supplier appraisal, net profits as well as capacity utilisation correlate significantly with quality and query and purchasing order time ($p < 0.01$) (Table 3).

		SAP	NEP	DEL	CAP	FOR	ADT	QER	FLX	QUL	CYT
SAP	Pearson Cor.	1	.488**	.498**	.372*	.127	.392*	.432**	.155	.583**	.237
	Sig. (2-tailed)		.001	.001	.017	.427	.011	.005	.333	.000	.136
NEP	Pearson Cor.	.488**	1	.785**	.358*	.147	.480**	.459**	.181	.646**	.181
	Sig. (2-tailed)	.001		.000	.022	.360	.001	.003	.257	.000	.258
DEL	Pearson Cor.	.498**	.785**	1	.068	.105	.415**	.443**	.121	.539**	.088
	Sig. (2-tailed)	.001	.000		.672	.515	.007	.004	.450	.000	.583
CAP	Pearson Cor.	.372*	.358*	.068	1	.079	.162	.113	.380*	.547**	.383*
	Sig. (2-tailed)	.017	.022	.672		.623	.313	.482	.014	.000	.013
FOR	Pearson Cor.	.127	.147	.105	.079	1	.091	.239	.009	.173	-.021
	Sig. (2-tailed)	.427	.360	.515	.623		.572	.132	.954	.280	.896
ADT	Pearson Cor.	.392*	.480**	.415**	.162	.091	1	.435**	.435**	.300	.593**
	Sig. (2-tailed)	.011	.001	.007	.313	.572		.004	.004	.057	.000
QER	Pearson Cor.	.432**	.459**	.443**	.113	.239	.435**	1	.283	.471**	.397*
	Sig. (2-tailed)	.005	.003	.004	.482	.132	.004		.073	.002	.010
FLX	Pearson Cor.	.155	.181	.121	.380*	.009	.435**	.283	1	.189	.492**
	Sig. (2-tailed)	.333	.257	.450	.014	.954	.004	.073		.237	.001
QUL	Pearson Cor.	.583**	.646**	.539**	.547**	.173	.300	.471**	.189	1	.134
	Sig. (2-tailed)	.000	.000	.000	.000	.280	.057	.002	.237		.402
CYT	Pearson Cor.	.237	.181	.088	.383*	.021	.593**	.397*	.492**	.134	1
	Sig. (2-tailed)	.136	.258	.583	.013	.896	.000	.010	.001	.402	

Table 3 Correlations between KVPDs

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

(1) Supplier Appraisal (SAP). Supplier assessment has been seen as an essential performance dimension to monitor. When the respondents have been asked in the questionnaire, the response rate reflected over 85% with "strongly agree" and an overall mean of 4.8. This indicates that supplier appraisal has been seen an imperative performance measure dimension when assessing suppliers, as this can bring positive impact on both supplier and the company (buyer) dimension. From the perspective of the company, the main purpose of supplier charter was to ensure effective and efficient vendor management and monitoring at the company, which also utilised supplier appraisal as one of the tools to measure the supplier

performance. Although Bukh & Malmi's (2005) findings indicated that absence of supplier assessment might have a negative impact upon the companies' customer service level, finance, competitive advantage and, in the worst-case scenario, leading a company to potential bankruptcy, the presence of supplier appraisal indicates a good performance indicator to address the above-mentioned concerns.

(2) Net profits. Cagliano et al. (2014) advice that effective and efficient company practices are a key to firm's net profit increase. In terms of net profits, one of the key performance indicators, the study indicated a positive impact with 78% participants having identified effectiveness and efficiency as an essential dimension to assess, within the supplier context, in order to improve firm's net profits. 17% partakers who opted for 'agree' only, indicating the positive impact upon net profits, followed the findings. The interviewees with reference to their industrial experience have noted a direct relationship between efficiency and effectiveness (or absence of them) on net profits reductions/increase. During the course of the interviews this dimension was associated with "productivity" and "accuracy of procedures," with reduction of "workload" and "man-hours", hence improvement of company's profits. Similarly, Bukh & Malmi (2005) study highlighted that elimination of ineffective and inefficient practices and procedures within any company frees up cash and time, improves productivity, reduces indirect and direct work, helps to move towards business rationalisation and reduces negative environmental impact (through reduction of waste, energy consumption, pollution, transportation of 'pallets of air', etc.).

(3) *Delivery performance and time.* Anderson et al. (2009) suggest that returns, recalls and replacements are often adding unnecessary costs to the final product, hence if handled inappropriately and inaccurately, they might result in reduced customer service level, damage to firm's reputation and competitive advantage. Similarly, in this study the respondents have almost unanimously agreed that delivery performance is an important aspect to measure, monitor with 95% having selected 'strongly agree' as the answer. One of the interviewees also noted that "to the companies' ongoing development and expansion, the inbound logistics experiences an increasing volume of goods overturn. Hence, it is increasingly important to monitor, assess and measure delivery performance aiming to reduce range of discrepancies, returns, shortages and overs". Bhagwat & Sharma (2007) findings also indicated that delivery performance is a crucial metric to monitor as it is directly linked to company's financial dimension, therefore from both perspectives, academic literature and industrial point of view, delivery performance is deemed to be an essential metric to evaluate.

The companies' mission statement highlights that continuous communication, cooperation, sharing of information is imperative when it comes to interaction between suppliers and the company. This is enabled through the use of enterprise wide systems to collect, analyse and store data, and take subsequent actions whenever it is required (Neely, 1999; van Weele, 2005; 2010, Hurdnakar et al. 2018). Based on the entire supply chain, especially close collaboration with suppliers would assist both parties to successful achieve their performance goals (Sancha et al., 2019).

(4) Forecasting. Gunasekaran et al. (2001) in their study have identified that accurate forecasting is an essential driver to success of both parties, for the suppliers as well as the buyers. Gustafsson & Karlsson (2012) advise that accurate forecast could be a source of firm's competitive advantage, helping to shape company's business processes and navigating enterprise development in terms of assessing its capacity from learning to resources. Within our study when asked, the respondents have almost unanimously agreed that forecasting is an important measure. However, the degree of importance varied with 58.5% having selected 'strongly agree' to 39% participants have identified this metric as important yet not crucial. One interview noted that "forecasting is an important tool to evaluate, measure and monitor the performance…. However, there is no straightforward connection between the company and how forecasting impacts learning and development processes". Other interviewees found the forecasting as an 'essential and critical' element to measure the performance of suppliers. Similarly, Solsky (2006) suggests that accurate and timely forecast assists businesses in trends/patterns establishment, efficient and appropriate sales/offers planning and execution and, on a long run, helps in achieving company's aims and objectives. Bukh & Malmi (2005) point out that accurate forecasting is especially important to service providers, logistics and distribution businesses.

The findings of the interviews in regards to capacity utilisation and communication indicated that "the absence of staff training and communication along with inefficient capacity utilisation may undermine health and safety and environmentally- friendly procedures and practices, increasing number of accidents on site". Similarly, interviewees strongly agreed (85% of respondents) followed by 12.2% selecting 'agree'. Bhagwat & Sharma (2007) point out that these sub-dimensions are being often overlooked and their impact on overall firm's performance is being underestimated. Furthermore, drawing on the findings of the Cagliano et al. (2014), appropriate staff trainings, timely and accurate communication and improved capacity utilisation are result of both sides work (vendors and buyers).

(5) Advancing Technologies. Gordon (2008) advises that advancing technologies are key to supplier-buyer effective and efficient communication, improving visibility across the entire supply chain. According to the questionnaire, advancing technologies were identified as a key aspect contributing to operational success with 58.54% strongly agree followed by 36.59% agree respondents. Kaplan & Norton (2004) repeatedly mention that technologies play a big part in company's success. According to the interviewees "…technologies enable the company to place, process, receive, as well as cancel a range of processes not only to purchasing order but also transfer/approve payments, book goods in, receive invoices, communicate across the entire supply chain on inter and intra- organisational level". Similarly, the companies' supplier charter states advancing technologies implementation and execution directly links to companies' success and operational excellence.

(6) Query and PO Lead Times. Cagliano et al. (2014) suggest that swift, timely and accurate operations, efficient communication, appropriate staff trainings, close collaboration with suppliers and integration of technologies, leading to reduced query time and overall purchasing order lead time, often are source of competitive advantage of many firms. Most of the respondents (65.85%) have agreed the impact of measuring order lead times this performance metrics to assist and measure, followed by 26.83% of participants that considered query and order lead reduced time important but not crucial indicator to monitor. Based on the literature suggestions, survey findings, objectives set by Supplier Charter (2015) and interview responses this sub- dimension is deemed essential to include into the CMC and strategy mapping. This is due to the fact that goods could be delivered to customers/stakeholders and/or invoices credited to suppliers faster and in more efficient manner without compromising on the overall service level. Kaplan & Norton (1996; 2004) advises that reduced order lead time is one of the metrics of customer/stakeholder dimension of the BSC and it is one of the direct indicators of enterprise's high productivity and efficiency of its operations. Supplier Charter (2015) emphasises on the fact that reduced query time and purchase order lead time.

(7) *Flexibility & Responsiveness.* Bhagwat & Sharma (2007) suggest that flexibility and responsiveness are essential metrics to measure and monitor under the customers'/stakeholders dimension. The 58.54% of the respondents have agreed that this sub-dimension is very important to evaluate and measure, followed by 36.6% who only selected 'agree' response. Van Weele (2010) advises that modern global market expansion, increasing volatility and uncertainty, innovation and computability among businesses; company's survival is often a question of how its SC is adaptive, flexible, agile and responsive. Cagliano et al (2014) in their study mention that flexibility and responsiveness metrics are important

indicators of productive and excellent- performing business models. Supplier charter sets this sub- dimension as a target to achieve through both-parties' efforts through cooperation, collaboration and communication across the entire SC. Interviews respondents were quite cohesive in terms of their opinions regarding this metric, all the participants agreed that this dimension is crucial to monitor, assess and measure.

(8) *Product quality and availability.* Bhagwat & Sharma (2007) with reference to Kaplan & Norton (1996; 2004), insist that high goods quality, excellent product availability, outstanding service levels are far most important indicator of productive and well- performing businesses within distribution, goods/service providers and logistics sector. Gunasekaran et al (2001) in their study refer this metric to stakeholders'/customers dimension of BSC. An interviewee noted, "the companies' successful growth and development, the service level and understanding of quality dimension is absolutely vital to measure and monitor". The survey results have shown solidarity regarding this matter between all the respondents with over 90% seeing this metric as critical to outstanding performance.

(9) *Cycle Time.* Cagliano et al (2014) has advised that effectiveness and efficiency of purchasing order cycle time and overall supply cycle time are important values to measure as they are leading to increases in profits, enhance overall supply chain responsiveness and competitiveness. Overall response rate was ranging from 78% for 'strongly agree' option, 17% for 'agree'. Drawing on the results of the survey, interview responses and Supplier Charter recommendations, effectiveness and efficiency of supply cycle time deemed to be essential dimension to monitor. Hence, improved customer service level and have impact on overall company's performance. Kaplan & Norton (1996) argue that timely, productive and accurate operations execution is likely to become one of the firm's sources of competitive advantage. The interviewee referred "the supply chain cycle and its efficiency measurement is in most cases either crucial, essential or critical".

We propose a framework for this study (Figure 1) that identifies the most highly valued performance measures from not only a company but also a supplier perspective. The framework provides a platform for future studies in this area. From both a theoretical and practical point of view, it encompasses three views, the academic literature perspective, the suppliers' and the focal companies. It also highlights the need to evaluate the execution of performance evaluation and how it translates to suppliers (Cagliano et al, 2014; Skaes, 2017) and the relevance and value of the performance assessment also from the suppliers' perspective for the benefit of the entire supply chain (Cannon and Homburg, 2001; Vereecke and Muylle, 2006).

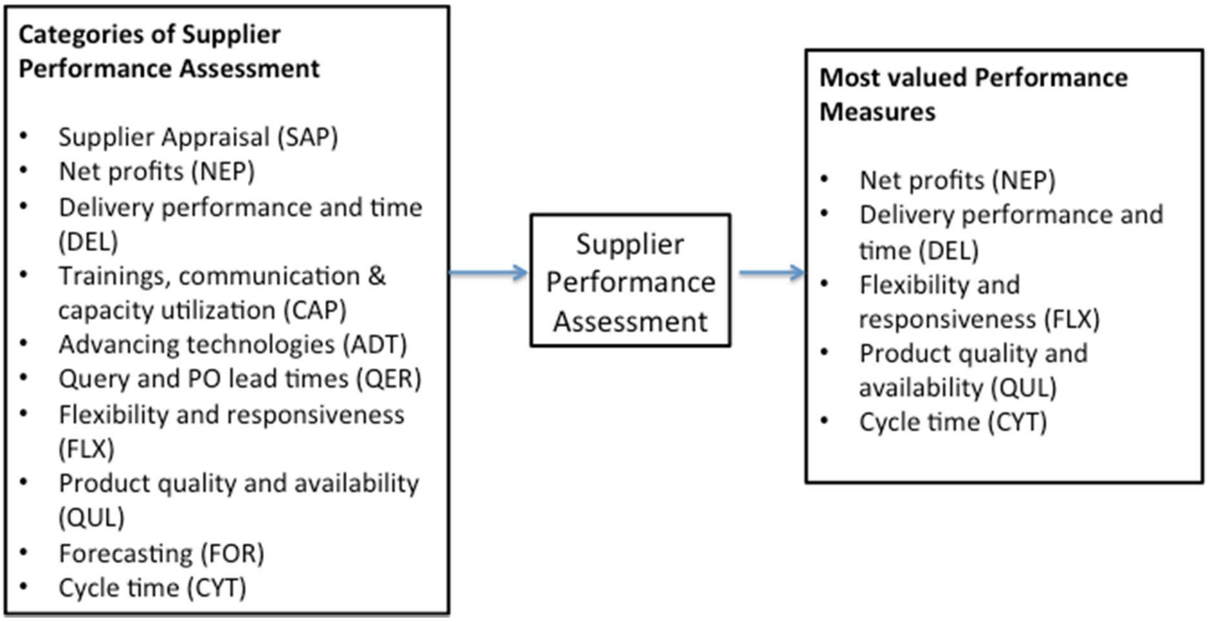

Figure 1: Supplier Performance Assessment Framework

6. Conclusion and Discussion

In this research we address the suppliers' performance assessment encompassing three distinctive perspectives, i.e. the academic literature on supplier performance assessment, suppliers' and the manufacturing company's perspectives. This investigation provides both theoretical and practical implications.

From a theoretical perspective, existing literature has appreciated the complexity of performance measurement and a need for a simplification of performance measures (Morgan, 2007). Several tools for performance measurement have been developed and this study contributes in providing a rationalization of categories of relevant performance measures to be used when assessing suppliers' performance. Furthermore, this is one of the first studies that includes also suppliers' perspective in addressing the topic of suppliers' performance assessment and stresses the importance of understanding the role of suppliers in the correct definition of the set of performance measures to be used, so that they can be of benefits to all parties in the supply chain. This is especially true due to tendency towards supplier base reduction, which calls for the development of long-term supplier-buyer relationships, crucial for the long term success of businesses and based on collaboration and trust. By encompassing both the manufacturing company's and suppliers' perspective, our work succeeds in highlighting the importance of collaboration and coordination for performance assessment, from the definition of the set of performance measures to be used to the implementation and operationalisation of the measurement framework.

From a practical perspective, this study identifies the categories of performance measures that are aligned to financial and internal business process goals of both the manufacturing company and its suppliers. Bak (2016) suggests that in order to create and implement effective, informative and efficient supplier performance it is critical to consider the suppliers as well as the companies 'needs and wants'. It has been suggested by numerous researchers that there is no standard set of KPIs that would satisfy the needs of all enterprises worldwide (Kaplan & Norton, 1992, 2004; Gunasekaran et al., 2004; Bukh & Malmi, 2005; Bhagwat & Sharma, 2007; Cagliano et al., 2014; Pérez et al., 2018). Hence, process of selection of individual and appropriate performance metrics should be subject to individual suppliers (Pérez et al., 2018). The current study findings identify, among a set of 10 supplier performance measures derived from the academic literature, the categories of measures that are deemed as critical and essential to business performance and operations from both the manufacturing company's and suppliers' perspectives, i.e. net profits, flexibility & responsiveness, purchasing order, cycle time and supplier appraisal. These dimensions are critical for the success of the manufacturing company and its competitive advantage in line with previous literature on the topic. At the same time, according to the findings they have also a positive impact on suppliers' performance and are aligned with their internal business goals. Our results also suggest that there is a interlinkage between quality and supplier appraisal, net profits and capacity utilisation. This is in line with Cagliano et al. (2014) findings that suggest that swift, timely and accurate operations between supplier and buyer can lead to reduced query and overall purchasing order lead time, which are often seen as the source of competitive advantage for many firms. Our study has also highlighted that supplier charter established by the buying organisation also creates a good groundwork for the performance management and its implementation and builds up a structure for evaluation. Hence, further studies need to be conducted on the differences between supplier performance assessment based on suppliers' size, location as well as the relationship duration. As a further practical implication, managers are urged to invest in collaborative processes, technologies and mechanisms that support the development of an appropriate and shared framework for performance measurement, effective and efficient supply chain processes, and the achievement of performance goals by both parties. While the previous literature widely investigated the crucial importance of collaboration in the supply chain and acknowledged its positive impact on performance and competitive advantage, its real implementation within companies and supply chains for supplier performance assessment is still underdeveloped, as emerged from this study findings. A deeper investigation on mechanisms of collaboration, communication, cooperation and sharing of information among partners of the supply chain is needed. This investigation should take into account operational and technical issues, as well as soft issues, including trust and power relationships. As a final practical contribution, the present study provides a complete list of categories of supplier performance measures that managers can use to address the complex issue of suppliers' performance assessment in collaboration/coordination with their suppliers.

7. Limitations and directions for future research

The current study has examined the supplier performance measurement based on ten dimensions and to what extent they were beneficial for suppliers. Notwithstanding its contributions, there are certain limitations that need to be addressed at this stage, which revolves around two main areas. The first limitation is the context whereby the results are derived from UK based company and its suppliers, hence the generalisability of our findings for other contextual settings need to be visited. Country-level variations due to variances driven by culture, values, politics, and management styles may have an impact upon the research and explain also the variances between suppliers as stated by Al-Mehrzi and Sighn (2016). Another limitation is related to the time limit during which we performed the longitudinal study to examine the development of measures and the understanding of how performance measurements are impacting supplier performance. It would be interesting to evaluate the long-term relationship and supply chain performance impact. This may also provide an understanding of Simpson et al. (2002) findings that point out that the long-term supplier-buyer relationships are under pressure. These limitations of the current study can be assumed as the bases for carrying out further research on supplier performance measurement, providing future research avenues, which may expand and test our findings in new contextual settings. Furthermore, the role of collaboration for appropriately defining and managing the process of suppliers' performance assessment needs to be further investigated in future research, taking into account a supply chain perspective.

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