Development of the critical success decision criteria for an equitable order sharing in an extended enterprise

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Development of the critical success decision criteria for an equitable order sharing in an extended enterprise

Abstract

Purpose – This study identifies and ranks the appropriate critical success decision criteria (CSDC) for the bulk order distribution (sharing) amongst multiple manufacturers (suppliers) working as an extended enterprise (EE).

Design/methodology/approach – The study deploys a qualitative approach to generate the appropriate decision criteria. The Balanced Scorecard and Pareto’s chart (using Minitab® version 18) were used in gathering and analysing the pertinent criteria.

Findings – The process of evaluating and selecting the right manufacturers is essential. Manufacturer (supplier) selection is no longer decided solely based on cost/price criterion; currently, the quality and delivery criteria prevail. Additional incorporated criteria include price/cost, technical capability, production facilities and capacity, customer satisfaction and impression, geographical location, management and organisation, financial position, environmental concern, performance history, repair service, information technology and communication systems, procedural compliance, labour relation record, reputation, flexibility or diversification, attitude, operating controls, business desire, packaging ability, past business records, trust and loyalty, training aids, complaint handling service, warranties and claim policies, reciprocal arrangements, research and development and innovation, modern slavery concern, sustainable capability, collaborative/partnership, and responsiveness. The study proposed a conceptual framework of an EE alongside how manufacturers working as a single virtual entity can consider the Supply Chain Operations Reference (SCOR®) model.

Research limitations/implications – The identified CSDC are suitable for order allocation to domestic manufacturers. The deployed approaches could be extended to the mixed and quantitative approaches for increasing the generalisability.

Originality/value – The study establishes the pertinent CSDC that are important to execute equitable order distribution to manufacturers in an EE framework.

Keywords Decision-making, Extended enterprise, Supply Chain Operations Reference model, Buyer-supplier relationships, Small to medium-sized enterprise, Balanced Scorecard

Paper type Conceptual paper

1. Introduction

Most retailers source from a mix of suitable manufacturers (vendors or suppliers). In doing so, this becomes one of their most strategic and critical activities. Retailers conduct supplier selection and evaluation processes (SSEP) - as they have to deal with sourcing and supply of products from many vendors (Wu, 2009a; Mavi *et al.*, 2016). Such a process benefits retailers

but also enhances customer satisfaction (Li and Zabinsky, 2011). Conversely, the supplier (manufacturer) can suffer from these decisions, and there is a need to develop a systematic approach to allocate orders to suppliers in an equitable manner that ensures they have optimum use of manufacturing capacity at all times. Without this approach, the survival, and future growth, of any resurgence in manufacturing in higher labour cost countries is unlikely to succeed. The retailers perform SSEP based on either traditional approaches or the standard recommended approaches. SSEP can be conducted for multiple (dual) sourcing or single (sole) sourcing. When relying on single sourcing, all products are manufactured by one manufacturer, while for multiple sourcing, the products are manufactured by several manufacturers. Manufacturers (suppliers) same as retailers (customers) can be “small-to-medium-sized enterprises (SMEs)” or small, independent firms which require critical success decision criteria (CSDC) for executing equal order distribution. This research develops a novel approach to order allocation that focusses on equitable distribution specifically driven by the optimisation of capacity utilisation in the supplier matrix. Equitable order distribution (allocate or share) requires companies that work as an “extended enterprise (EE).” If companies work as an EE, it becomes easy to distribute the received orders amongst themselves. Having completed selecting suppliers, the companies are required to match their production capacities with the received customers’ requirements. Thus, this becomes a crucial turning point for the excellence of manufacturers (Narasimhan *et al.*, 2001).

Several studies considered SSEP problems due to its significant influence toward effective “logistics and supply chain management” such that SSEP is considered as one of the most vital “decision-making processes” (Sadeghieh *et al.*, 2012). There are at least four considerable SSEP studies that established critical success decision criteria through the wide-ranging systematic literature review approach.

The first noteworthy study was performed by Dickson (1966), who conducted a questionnaire-based study involving 273 managers and purchasing agents. Dickson's (1966) study established twenty-three decision criteria (Table I). In most cases, researchers use these twenty-three criteria as their benchmark. However, Dickson' (1966) study did not involve some crucial criteria which can encourage firms to work collaboratively. In filling such a gap, Weber *et al.* (1991) performed the second most influential study by re-ranking Dickson's (1966) decision criteria. They also explained Just-in-time (JIT) philosophy after reviewing seventy-four articles. JIT philosophy is referred to as a method which robustly started to establish close customer participation with the manufacturer or an organisation (Jagdev and Browne, 1998). With time, the twenty-three Dickson's (1966) decision criteria are no longer in the same

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chronological order. Most of those criteria have changed although few criteria are still highly considered among the key decision criteria. Dickson (1966) and Weber *et al.* (1991) also did not involve the information technology factor as one of the vital Industry 4.0 enablers and EE conceptual framework. Some of the extended enterprise’s features include advanced use of modern information and telecommunication technology as well as information and materials sharing amongst partners in a coordinated and synchronised way (Jagdev and Browne, 1998).

Subsequently, Jain *et al.* (2009, p.3034) conducted the third research which “aimed at providing a broad review of the main approaches to supplier-related issues especially supplier selection, supplier-buyer relationships, supplier-buyer flexibility in relationships in a dynamic supply chain, through the description of the main characteristics, techniques, ongoing developments and research activities.” The fourth prominent systematic literature review was conducted by Ho *et al.* (2010), who reviewed seventy-eight research articles from 2000 to 2008. The study by Ho *et al.* (2010) established the “decision-making techniques in supplier selection.”

Concerning the above noteworthy systematic research studies on SSEP, there are significant contributions to be noted out of them. Foremost, all the four types of research established decision criteria which can be applied to execute SSEP. Subsequently, from 2008 to 2018 (10 years), there is an excellent development regarding SSEP that has occurred. Essentially, there must be a large number of contributions, ideas, decision criteria, methods, techniques and tools which can contribute to this SSEP within several industries. Researchers, e.g. Dickson (1966); Weber *et al.* (1991); Jain *et al.* (2009) and Ho *et al.* (2010), did not also consider the contemporary issues in either detail or partially, such as ‘modern slavery’ issues and ‘environmental’ point of view. Furthermore, the above researchers did not consider ‘extended enterprise’ as an essential conceptual model which can enhance strong collaboration in the supply chain, especially for an equitable ordering process amongst manufacturers in today’s business era.

Notwithstanding the evidence and implications of the established decision criteria and methods for the same, there is possibly a lack of a “systematic literature review” (or methodical theoretical orientation) from 2008 to date. Thus, in bridging the identified gaps, this study aimed to identify the required decision criteria for enhancing equitable order distribution (sharing) amongst multiple firms working as an extended enterprise. The first objective is to identify numerous methods which can be deployed in evaluating multiple manufacturers. The second objective is to review the numerous reputable published articles about SSEP, then rank the current criteria and add the contemporary required decision criteria. The last objective is to

determine the necessary decision criteria for selecting domestic manufacturers. The authors are here now considering a firm receiving the bulk orders without enough capacity and capability to manufacture in agreed lead time. In such a situation, working as an EE with other companies becomes a crucial concept since the bulk orders can be shared (distributed or equitably allocated) amongst the willing partners to meet retailers' requirements and ensure justifiable capacity within the manufacturing units. Thus, this requires a well-identified CSDC.

The remaining parts of this paper follow the following structure. Section 2 gives an exhaustive "theoretical orientation" about the methods for executing decision and the related studies. The same section provides a proposed conceptual framework (diagrammatical) of an extended enterprise and the "Supply Chain Operations Reference (SCOR®)" model. Subsequently, Section 3 describes the evaluation methodology. Section 4 details the Balanced Scorecard and corporate social responsibility. Next is Section 5, which details the practical implication of the study. Last is Section 6, which describes the conclusion, limitations and highlights future study.

2. Theoretical orientation

2.1 Overview

SSEP studies started in the 1960s when the problem was known as "vendor selection" (Stojanov and Ding, 2015). SSEP of the competent suppliers (manufacturers) has been focused on by several researchers and practitioners (De Felice *et al.*, 2015). This process can be categorised into four phases: defining a problem; criteria formulation; preselection of the candidates (qualification process); and final choice (selection) (De Boer *et al.*, 2001; Parthiban *et al.*, 2013). Of these phases, criteria formulation phase is a fundamental one. SSEP can be described as the "process of quantifying the efficiency and effectiveness" (Neely *et al.*, 1995, p.80) of a manufacturer whenever customers (e.g. retailers, wholesalers, etc.) need to order directly from manufacturers. The terms "efficiency" and "effectiveness" have several connotations. However, for this study, the term effectiveness was considered based on an extent of meeting customers' requirements while "efficiency" is viewed as a measure of how economically the manufacturer achieves utilisation of resources in satisfying customers (Neely *et al.*, 1995).

SSEP can be conducted based on three purchasing situations (De Boer *et al.*, 2001). First, when a retailer is ordering a "new product." In such a situation, a retailer has no earlier experience since it is a new product, and there are no known manufacturers. Likewise, for this category, there is a high level of uncertainty in the supply chain. Hence, this becomes an

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extensive sourcing problem. Second, when a retailer is doing a “*modified ordering*”, i.e., a retailer orders a new product from known manufacturers. For this situation, there is a moderated level of uncertainty regarding specifications; hence, this is less extensive sourcing problem-solving. The last one is about “*straight ordering*” which details on placing orders within the present retailers and manufacturers’ contracts. For this category, the available information concerning manufacturers are considered as perfect (Robinson and Faris, 1967). Of course, this is based on buyer-supplier relationships.

In recent time, the process of evaluating and ranking the potential suppliers is considered as a “key strategic factor” for a company (Shemshadi *et al.*, 2011). There are several scholars published regarding SSEP. However, there are fewer articles which detail how to perform equitable order distribution (sharing) amongst companies which operate as an extended enterprise. Some of the available supplier selection criteria include the following. Chen (2011) performed research for the Taiwanese industry on the supplier selection issue. The criteria suggested by Chen (2011) include “quality”, “cost”, “delivery time”, service, production and technical capability, organisational management, and relation combination.

Then, Baskaran *et al.* (2012) performed research using sustainability criteria. Baskaran *et al.* (2012) proposed issues of abuse of the human rights; discrimination, child labour, unfair competition (society); pollution (environmental) and the long working hours to be considered. The study by Baskaran *et al.* (2012) mainly shown factors which are mostly related to modern slavery issues, which were also pointed out by Stevenson and Cole (2018). Amindoust and Saghafinia (2017) similarly performed a “real-life supplier selection decision” for the Malaysian textile industry using a “modular fuzzy inference system model (MFISM).” The used decision criteria include the economic merits (quality, cost, delivery, inventory level reduction); social merits (labour health, social equities and work safety); and environmental merits. Both researchers above did not discuss how to perform equitable order allocation for manufacturers working collaboratively. More criteria and methods for executing SSEP can be found from the studies performed by Dickson (1966); Weber *et al.* (1991); Jain *et al.* (2009) and Ho *et al.* (2010), among other many studies shown in Table II.

The process of deciding appropriate manufacturers who can meet most of the retailers’ requirements is not an easy task. This is probably due to that this process involves various decision criteria and complicated steps. SSEP is a multiple-criteria decision method (DM) problem (Jadidi *et al.*, 2008). In executing SSEP, both the quantitative and qualitative factors can be considered (Kannan *et al.*, 2013). Such a process can likewise be performed using either a “simple weighted scoring” or the “complex mathematical programming” approaches

(Songhori *et al.*, 2011). Some of the DMs for SSEP include: AHP (Analytical Hierarchy Process) (Kumar *et al.*, 2009; Rajesh and Malliga, 2013), MFISM (“modular fuzzy inference system model”) (Amindoust and Saghafinia, 2017), BWB (Best worst method) (Gupta and Barua, 2017), CSM (Conjunctive screening method) (Rezaei *et al.*, 2014), VIKOR (“Vlsekriterijumska Optimizacija I Kompromisno Resenje”) (Shemshadi *et al.*, 2011), QFD (Quality Function Deployment) (Babbar and Amin, 2018), TOPSIS (“Technique for order preference by similarity to an ideal solution”) (Jadidi *et al.*, 2008; Kannan *et al.*, 2014), NNs (Neural networks) and DT (Decision trees) (Wu, 2009a), SWOT (“Strengths, Weaknesses, Opportunities and Threats”) (Amin *et al.*, 2011), ANP (Analytic Network Process) (Gencer and Gürpinar, 2007), CA (Cluster Analysis) (Stojanov and Ding, 2015), ANFIS (“Adaptive Neuro-Fuzzy Inference System”) (Güneri *et al.*, 2011), Fuzzy SMART (Simple multi-attribute rating technique) (Chou and Chang, 2008), DEA (Data Envelopment Analysis) (Songhori *et al.*, 2011), FST (Fuzzy Sets Theory), GA (Genetic Algorithm) and G³ (Grey goal programming) (Sadeghieh *et al.*, 2012), GST (Grey system theory) (Baskaran *et al.*, 2012), GP (Goal Programming), ILP (Integer Linear Programming) (Rajan *et al.*, 2010), QFD and MOP (Multi-Objective Programming) (Babbar and Amin, 2018), MOMIP (Multi-Objective Mixed Integer Programming) (Songhori *et al.*, 2011), FMOMI (Fuzzy Multi-Objective Model Integration) (Jadidi *et al.*, 2008), MGGP (Multi-Choice GP) (Rouyendegh and Saputro, 2014), DCA (Discrete Choice Analysis) and LSSQ (Likert scale set of questions) (Verma, 1998).

2.2 Conceptual framework (diagrammatical) of an extended enterprise

The term ‘extended enterprise (EE)’ has been discussed at length for several years (Davis and Spekman, 2003). It is a concept whereby an industry (firm, factory or company) works synergistically rather than in isolation for the reason that its achievement is reliant upon a well-established network of the business partner relationships. The EE name was established back in the 1990s by Chrysler Corporation, whereby they “showed that communication and common purpose could build lasting relationships between companies” (Stallkamp, 2005). Stallkamp (2005) discussed how the principles under Chrysler’s EE concept helped to build up collaboration into practice in the 1990s. Spekman and Davis (2016, p.44) similarly defined an EE as a “collaborative relationships among the key supply chain members whereby both ‘buyers’ and ‘sellers’ share a common vision of gaining the competitive advantage and achieving a greater end-user customer satisfaction relative to other competing supply chains.” It is important to understand the EE concept by not only focussing on supply chain and how

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information link together but also by looking both upstream and downstream aspects of the entire system. This should also involve horizontal integration, which is the most explored in this study. In the context of our study, sellers are considered as manufacturers and buyers are customers (i.e. retailers, wholesalers, etc.). If a group of manufacturers (i.e. SMEs) working as an EE receives bulk orders, it is important to have the clearly defined and detailed relevant decision criteria on effecting equitable orders distribution (sharing) amongst all members. In doing so, successful implementation of EE requires information technology (IT) to enable communication amongst business partners, information sharing practice, building a strong relationship and enabling other pertinent auxiliary systems. EE necessitates close cooperation for all company's sections, particularly engineering and procurement, and the business relationship should continue over time (Stallkamp, 2005).

Thus, an EE explanation given by Chrysler in 1998 was: "A Chrysler-coordinated process that unifies and extends business relationships with suppliers and supplier tiers to maximise the effectiveness (...), minimise total systems costs and improve quality and customer acceptance" (Stallkamp, 2005). Other remarkable research on EE includes the one conducted by Browne and Zhang (1999, p.30) who stated that "enterprise partnerships suggest a relationship between companies and people who share common goals, strive to achieve them together and do so in a spirit of co-operation, collaboration and fairness." Therefore, whilst dealing with EE concept it is imperative to understand that sharing rewards and risk amongst the business partners, communications channels, technology sharing, and interdisciplinary teams establish significant ingredients to boost "collaboration" and accomplish joint "strategic intent" (Spekman and Davis, 2016).

Figure 1 depicts a proposed conceptual framework (diagrammatical) of an extended enterprise. This conceptual model identifies the top level of ordering processes from retailers to manufacturers. The model can be used as a fundamental concept for creating the conceiving process of the required products in an extended enterprise point of view. Retailers can order products either directly to their preferred manufacturers (i.e. traditional approach) or through an organisational form as an extended enterprise set up. For an EE, it means a group of manufacturers receive orders and use decision criteria to distribute (allocate) equitably the received orders while also retailers use their decision criteria to decide the right manufacturers. A number of manufacturers working as a single virtual entity (extended enterprise) distribute received orders. That means the manufacturers (SMEs) act as single sourcing for retailers' products. Thus, it is important to have critical success decision criteria to effect SSEP.

[Insert Figure 1 near here]

2.3 The Supply Chain Operations Reference (SCOR®) model

The SCOR® model was established in 1996. It is nowadays the product of APICS after merging APICS with the “Supply Chain Council (SCC)” in 2014 (APICS, 2017). The “American Production and Inventory Control Society (APICS)” was formed in 1957. Nowadays, it is an international association recognised as APICS (APICS, 2017). The SCOR® model gives benchmarking tools, diagnostic and methodology to assist several organisations in achieving substantial and quick improvements in supply chain processes (Huan *et al.*, 2004; Huang *et al.*, 2005; APICS, 2017). The SCOR model’s uniqueness lies on how it interlinks people skills, performance metrics, business processes and practices into an integrated structure. The GreenSCOR (a previous version), and the current SCOR version 12.0 helps to manage the business activities related to customers’ demand satisfaction. “Plan, Source, Make, Deliver, Return, Enable” are the major capabilities within the SCOR model (APICS, 2017; Lemghari *et al.*, 2018). Sometimes these capabilities are referred to as the six distinct management processes of the SCOR model.

Several scholars employed the SCOR model to evaluate and facilitating supply chain improvement, such as (Li *et al.*, 2011; Long, 2014; Lemghari *et al.*, 2018), among others. Performing SSEP is not an easy task. Sometimes can require integration of several techniques and tools. SCOR is acknowledged to have managed to evaluate and selecting supply chain partners. Notwithstanding the benefits from the SCOR model, still, this SCOR is a static tool (Long, 2014). Long (2014) had to integrate the SCOR model with agent-based distributed simulation. This shows that there is a need for integrating the performance models such as the Balanced Scorecard (BSC) with the SCOR model. According to Butilcă and Ilieş (2011, p.42), BSC facilitates an organisation to “align its management processes and focuses the entire organisation on implementing a long-term strategy.” The outcomes of both - SCOR and BSC models - when implemented to manufacturers working as the extended enterprise can improve the SSEP. SCOR helps to map the supply chain (Huan *et al.*, 2004), while the BSC model can help to control the supply chain (Butilcă and Ilieş, 2011). Considering that the SCOR model can help to illustrate state of the art of the key performance attributes and metrics; thus, development of the critical success decision criteria for an equitable order sharing should also involve the SCOR model.

Furthermore, the supply chain includes suppliers and also involve complementors and strategic arrangements. This study focuses more on horizontal integration rather than vertical integration. The reason is that the members of a single virtual entity – manufacturers (SMEs) -

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must operate at the same level of the value chain in their corresponding sector. The study aims to develop decision criteria that equitably allocate orders as one way of fulfilling orders and being responsive to customers - retailers. Therefore, there is a useful link through the use of the SCOR model in bridging the gap of interlinking and interaction amongst manufacturers. Thus, the combination at each stage would impact excellent order allocation equitably because basically, the study discusses the virtual organisation working synergistically to produce enhanced results. For instance, based on Figure 1 - the proposed conceptual framework of an EE, the SCOR model can be helpful for the metrics at different levels during order allocation to several manufacturers (MX, MY and MZ). Based on the five major capabilities of the SCOR model, for this study, ‘make’ can be associated with a single virtual entity which helps to allocate received orders equitably. For the retailers, they can consider ‘make’ as their single source build in a house with a virtual entity, whereby they do not require ordering from different manufacturers.

The attributes for the SCOR model include responsiveness, agility, costs, reliability as well as asset management efficiency (APICS, 2017). APICS (2017) elaborates the five attributes as follows. *Responsiveness* concentrates on the speed at which tasks are completed. Examples of responsiveness consist of the order fulfilment cycle-time metrics. Concerning this study, the task can be, for example, how quick the orders received can be equitably distributed (allocated) amongst manufacturers through a single virtual entity framework. *Costs* include operation costs for the considered supply chain processes. The cost metric is the “cost of goods sold.” *Asset management efficiency (assets)* involves looking at the ability to utilise assets efficiently. This involves management strategies for in-sourcing versus outsourcing. SMEs – manufacturers - can assess whether they would need to buy (products) from an outside supplier or produce within their operational infrastructure. Assets metrics comprise inventory days of capacity and supply utilisation. *Reliability* focuses on the ability to accomplish duties as anticipated. The reliability attributes consist of the “right quality, the right quantity and on-time (dependability)”, and to have the perfect order fulfilment. *Agility* focuses on the ability to react to external impacts, marketplace variations to gain or sustain “competitive advantage.” The metrics for agility consist of overall value at risk and adaptability. All these five major attributes of the SCOR model are much crucial in executing SSEP.

Another interesting section of the current SCOR model version 12.0 is the inclusion of elements of sustainability (strategic environmental metrics and social dimensions of sustainability). Of course, sustainable environmental accounting and business models are now

increasing business concerns in today's nature of the operation (APICS, 2017). The sustainability issues must also feature in conducting SSEP.

Furthermore, the SCOR model is a hierarchical process model with four levels (refer to Figure 2). Development of the critical success decision criteria can be much successful by efficiently integrating all levels. One of SCOR's model strengths is that it gives a "standard format to facilitate communication" (Huan *et al.*, 2004, p.25). Therefore, despite that the main concept for this study focused on an order distributed across a number of manufacturers acting as a single virtual entity, it is noteworthy to consider the SCOR model as this happens within a supply chain. Thus, in the broader context, each of these manufacturers connects to suppliers, etc.

[Insert Figure 2 near here]

3. Manufacturer selection and evaluation methodology

It is essential to explore the critical criteria which can help SSEP intensively. This study involved qualitative approach which deployed "systematic literature review" as detailed by Kitchenham *et al.* (2007). This approach was performed mainly to achieve objectives about the supplier or vendor selection, evaluation process, the current criteria and the contemporary required "decision criteria." To identify the pertinent decision criteria for this study, the twenty-three Dickson's (1966) and Weber's *et al.* (1991) criteria (see Table I) were used as a benchmark list. The communication system criterion was renamed as "information technology and communication systems" to fit the current requirement. The authors identified relevant studies to achieve all objectives. The "AND/OR boolean expressions" were used in searching, as suggested by Tavakoli *et al.* (2018). The keywords used include "manufacturer selection", "supplier evaluation", "vendor selection", "supplier rating", "supplier selecting techniques" and "supplier assessment."

[Insert Table I near here]

3.1 The scope of the surveyed articles

To establish a list of the "decision criteria" for selecting the appropriate manufacturers (suppliers) of the required products, searching was performed from 2008 to 2018 (10 years). This time-bound was selected based on the last intensive literature survey regarding SSEP, which was conducted in 2010 by Ho *et al.* (2010). They reviewed the "multi-criteria decision method" for the SSEP by involving seventy-eight articles published from 2000 to 2008. The decision criteria were grouped into three classes, i.e. the most common, second common and

the third common criteria. Ho *et al.* (2010) did not re-rank the Dickson’s (1966) twenty-three and Weber’s *et al.* (1991) criteria.

3.2 *Developing the decision criteria*

Primarily, this study reviewed eighty-five articles published from 2008 to 2018. Selection of the relevant studies considered “inclusion” and “exclusion” criteria.

3.2.1 *Exclusion criteria (EC)*

EC1: Mini review papers.

EC2: All research outputs, including working papers, reports, and articles from predatory publishers.

EC3: Research articles that have no full text, cannot be accessed and which are not written in the English language.

3.2.2 *Inclusion criteria (IC)*

IC1: Articles reporting decision criteria related to supplier selection, manufacturer selection, supplier evaluation criteria, “supplier selection and evaluation”, and supplier evaluation.

IC2: In conjunction with IC1, research articles reporting comprehensive empirical research methods, e.g., surveys, case studies and surveys were included.

IC3: Research articles, review articles and conference papers were the only outputs included.

IC4: Whenever more than one research article contains related research, the authors considered the latest research.

Figure 3 depicts the followed stages in selecting pertinent 85 research articles. Then, Appendix I depicts a review of the eighty-five articles. The mark “√” in Appendix I indicates that the article cites the particular criterion, and 1 to 23 are the decision criteria shown in Table I. Appendix II depicts the new decision criteria which used and/or suggested by the authors apart from the given decision criteria in Table I.

[Insert Figure 3 near here]

3.3 *Results of the reviewed criteria*

Eighty-five articles were reviewed (see Appendix I). Of these, forty-nine papers were from “Elsevier’s ScienceDirect” (57.65%), twenty papers from “Emerald” (23.81%), five papers from IEEE (5.88%), two papers from “Taylor & Francis” (2.35%), one paper from Springer

(1.18%), and the other eight papers from the “Google Scholar” (9.41%) database. Table II and Figure 4 depict the distribution of the referred reputed papers corresponding to ten years. The collected data were thoroughly analysed using the Minitab® version 18 (Figures 4 and 5), as proposed by Taifa and Desai (2016; 2017a; 2017b).

[Insert Table II near here]

[Insert Figure 4 near here]

Figure 5 shows the Pareto’s diagram of the 33 CSDC. The major decision criteria identified in chronological order include QLT, DLV, PRC, PFC, TEC, FPO, MO, ENV, PH, SER, ICS, LRL, PCE, GEL, RPI, FLE and ATT (see Table I for the full form). These criteria were chosen using the Pareto’s principle (“also known as the 80/20 rule”) which states that, roughly eighty per cent of the effects originate from twenty per cent of the causes (Taifa, 2016).

In addition, there are the contemporary decision criteria which must also be considered including “collaborative or partnership planning”, “modern slavery factors”, and “complaint handling service” due to their importance in the modern era. Having completed an intensive literature review (Appendix I), now, Table IV depicts the new ranking of the 33 criteria, including the Dickson’s (1966) and Weber’s *et al.* (1991) ranking criteria and the added contemporary decision criteria. Apart from the review of the major 23 criteria used as a benchmark list (see Appendix I), some researchers (see Appendix II) suggested and/or used some other decision criteria, as summarised in Table III.

[Insert Figure 5 near here]

[Insert Table III near here]

[Insert Table IV near here]

Based on the ranking (Table IV), “quality” and “delivery” criteria appeared together in 71 articles (83.5%); “quality”, “delivery” and “cost/price” in 63 articles (74.1%); and “quality”, “delivery”, “cost/price” and “technical capability” in 36 articles (42.4%). Therefore, this concludes that “quality”, “delivery” and “cost/price” are the major three decision criteria for SSEP which must be considered together.

4. Balanced scorecard and corporate social responsibility

4.1 The balanced scorecard

Robert Kaplan and David Norton initiated the *Balanced Scorecard* (BSC) in the early 1990s. BSC is a “strategic planning and management system that organisations use to communicate what they are trying to accomplish; align the day to day work that everyone is doing with strategy; prioritise projects, products, and services; and measure and monitor progress towards

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strategic targets” (BSI, 2018). BSC was classified into four different point of view – financial or stewardship, internal process, and customer or stakeholder, and innovation and learning (organisational capacity) (Kaplan and Norton, 1996). Having collected and analysed the various decision criteria for the manufacturer selection (Table IV), the BSC was used to categorise the relevant decision criteria into four distinctive perspectives (Figure 6).

[Insert Figure 6 near here]

4.2 Corporate Social Responsibility (CSR)

The CSR concerns have rapidly increased due to an increase in the reported cases. It is now essential to consider CSR issues when making business deals. There is high pressure both from the legal and public on the avoidance of the “modern slavery issues (MSI)”, and all issues which can harm an “environment.” In selecting an appropriate manufacturer, it is important to find out whether a particular company or firm is not involved in child labour, human trafficking, forced labour, long working hours, etc. MSI is a critical global problem (Stevenson and Cole, 2018). Up to 2016, an estimate of 24.9 million people were victims of modern slavery, specifically for an issue of the forced labours. Of these 24.9 million victims, 16 million people are from the private sector - agriculture, domestic work and construction (ILO, 2017). Stevenson and Cole (2018) and Marshall *et al.* (2016) pointed out that companies are now required to disclose various information related to the provenance, social information, supply chain membership and environmental information – together with the human rights (e.g. child labour), labour policies (e.g. “working hours” and “wages”), and social impact (for instance, local community impact). Here and now, in the process of evaluating companies working as an “extended enterprise”, it is essential to look at the aspect of the MSI to be on a safer side. Table V shows the considered CSC perspective.

[Insert Table V near here]

5. The implication of the study

Based on the conducted systematic literature review of several articles, an important practical implication is consideration of the developed critical success decision criteria (CSDC). This study gives a view of an essential thirty-three decision criteria, which are most significant in enhancing equitable distribution (allocation) of orders to manufacturers working as an extended enterprise (EE). The fundamental concept behind an EE is to enhance collaborative relationships amongst the main business partners in achieving their supply chain aims and gain maximum competitive advantage. In doing so, both partners should have a common agenda,

precisely mission, vision, core values, goals and strategies in achieving customer satisfaction and increasing profitability. Therefore, having identified the CSDC, this study is of practical significance for the reason that retailers (or other companies) can adapt the same for better performance synergistically instead of competing in isolation. The study has pointed out this and so attempted to fill the gap between theory and practice through an intensive literature survey. Thus, managers from several firms can use these criteria with a slight modification, especially those working in the same country. The same factors also can be used when a researcher deploys some mathematical approaches and other simple methods to execute SSEP. By using these criteria in deciding an appropriate manufacturer, at least there is a great chance of getting the right manufacturer who can meet retailers' requirements.

6. Conclusion, limitations and further research

6.1 Concluding remarks

This study discusses the fundamental nature of the knowledge regarding decision criteria, reality and practicality, especially when considering manufacturers working as an extended enterprise. We have developed criteria that are important to bridge the gap for firms that require to work collaboratively. We now state that an EE is a fundamental concept whereby firms operate synergistically rather than in isolation to achieve companies' mission, vision, core values, goals and strategies by relying upon a well-established network of the business partner relationships. In contributing to this important study, a conceptual model of the EE has been established together with the required decision criteria that are imperative to execute an equitable order distribution (allocation/sharing) amongst firms. The theoretical orientation also found that, despite that the main concept for this study focused on an order distributed across several manufacturers acting as a single virtual entity, it is noteworthy to consider the SCOR model as this happens within a supply chain. Thus, in the broader context, each of these manufacturers connects to suppliers, etc. That is the 'source' connecting to the 'make.' Now, the study looked at the distribution of orders on the horizontal level (stage). A cluster of SMEs - manufacturers - at the same stage doing the same manufacturing processes that are going to act as a single entity, so within the boundaries of the virtually organised group of a single-stage are going to be assessed by a single metric. Of course, the SCOR model has metrics, such as responsiveness to order, agility, reliability, costs and asset management efficiency. One of the key things is that, such as, if an equitable order allocation is executed horizontally, then this could improve responsiveness. For instance, if one company could manage to process order for at least five weeks, then a cluster of manufacturers working as a single virtual entity and

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assessed by the SCOR model could reduce the lead time, perhaps to 2-3 weeks. The other metric is reliability which involves having the perfect order fulfilment. Thus, integrating the SCOR model in executing order allocation process to a cluster of manufacturers can help to achieve the SSEP through an assessment of the five attributes – responsiveness, agility, costs, reliability as well as asset management efficiency.

Moreover, the critical successful decision criteria were developed through an intensive review of eighty-five articles published from 2008 to 2018. The Pareto’s chart and the Balanced Scorecard assisted in performing analysis and in categorising the decision criteria, respectively. From the eighty-five articles, it was found that SSEP is no longer grounded on the issue of cost/prices like how it used to be reported by many researchers. Nevertheless, for firms which use a traditional approach in selecting the manufacturer and suppliers/vendors, still, they consider “cost” as their key pertinent decision criterion. In fact, the quality and delivery criteria are now prevailing. Based on this study, quality, delivery and cost/price criteria are the major three decision criteria for the SSEP. The other critical criteria are as summarised in Figures 5 and 6, and Table V. One of the new decision criteria which should not be ignored in today’s business is a “modern slavery” issue. This criterion does not directly relate to an equitable order distribution (sharing) process; instead, it gives an assurance of not collaborating with firms which engage in human trafficking, forced labour, long working hours, servitude or child labours issues, among other issues.

6.2 Limitations and further research

The first limitation is based on all the excluded criteria in selecting relevant articles. We excluded mini-review articles, articles with no full text, not written in the English language, articles which cannot be accessed, and the search was limited from 2008 to 2018. This probably excluded essential decision criteria for our study. Nonetheless, this study put forward an opportunity for future research which would integrate various methods and include an international (global) sourcing process. The second limitation is that the recommended decision criteria are suitable for companies working domestically. Factors to consider for the global (international) sourcing were not considered including issues like political stability, free trade, international business paradigms, etc. The third limitation is that the findings of the study and the recommended decision criteria were not implemented. The study was also based on a qualitative approach. It is essential to deploy the quantitative approaches or mixed-model approaches for further refinement of the criteria. It is further recommended integrating more techniques for better comparison (Chawasemerwa *et al.*, 2018). Integration of more approaches

can lead to better results (Taifa and Desai, 2015; 2017b; Taifa *et al.*, 2019). Furthermore, the findings from this study will be used as an input to a future study which will involve simulation packages.

[Insert Appendix I near here]

[Insert Appendix II near here]

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Figure 1. The proposed conceptual framework (diagrammatical) of an extended enterprise (MX, MY and MZ stand for manufacturers)

Level	Description	Comments
Level 1	Major processes	Plan, Source, Make, Deliver, Return, Enable. Define the content, scope and performance target of the supply chain
Level 2	Process categories	Define the operation strategies; set process capabilities
Level 3	Process elements	Focus is on processes, skills performances, best practises and capabilities, inputs/outputs
Level 4	Improvement tools/activities	Use of Kaizen, six sigma, lean, beanchmarking

Figure 2. SCOR model process hierarchy (APICS, 2017).

Figure 3. Stages in selecting appropriate research articles. Note: N = number of the research articles

Figure 4. Distribution of the nominated 85 prime research studies from 2008 to 2018

Figure 5. Pareto's chart for illustrating the ranking of the relevant decision criteria

Figure 6. Proposed Balanced Scorecard for the manufacturer evaluation (Note: see all criteria in Tables I and III)

Table I. Dickson’s twenty-three criteria adapted from (Dickson, 1966; Weber *et al.*, 1991)

Decision criterion	Code	Description	Ranking	
			Dickson	Weber <i>et al.</i>
1. “Quality.”	QLT	Ability to meet or exceed specifications.	1	3
2. “Delivery.”	DLV	The delivery commitment to customers.	2	2
3. “Performance history.”	PH	Execution records of the past period.	3	10
4. “Warranties and claim policies.”	WCP	Claim policies and assurance.	4	23
5. “Production facilities and capacity.”	FPC	Available machines and production capacity, i.e. per week, month, etc.	5	4
6. Price [cost]	PRC	Net price and costs including logistics costs.	6	1
7. “Technical capability.”	TEC	Ability to modify, acquire, use, assimilate, adapt, or generate technology and innovate.	7	6
8. “Financial position.”	FPO	Financial stability and payment terms.	8	9
9. “Procedural compliance.”	PCO	Bidding and operating procedures; complying with international standards.	9	16
10. “IT and communication systems.”	ICS	Communication system regarding the progress of the placed orders and IT facilities.	10	18
11. “Reputation and position in the industry.”	RPI	The status of the company in a particular industry.	11	8
12. The desire for business	DFB	Persistence desire to negotiate upon price, delivery, quality, etc.	12	21
13. “Management and organisation.”	MO	The presence of stable management and organisation.	13	7
14. “Operating controls.”	OPC	Quality control measures, inventory management systems, etc.	14	14
15. “Repair service.”	SER	The repair service from manufacturers.	15	11
16. “Attitude”	ATT	The way of thinking towards retailers.	16	12
17. Customer satisfaction and impression	CSI	Impression towards retailers and how to satisfy customers.	17	20
18. “Packaging and handling ability.”	PHA	Ability to meet packaging requirements.	18	13
19. “Labour relation record.”	LRL	Labour relation records of each manufacturer.	19	17
20. “Geographical location.”	GEL	The distance between the retailer and the manufacturer.	20	5
21. “Amount of past business.”	APB	The experience of what was produced or sold.	21	22
22. “Training Aids”	TRA	Presence of the training aids.	22	15
23. “Reciprocal arrangements.”	REA	Recovery options in case of an emergency.	23	19

Table II. The statistics of the refereed articles

Year	Number of articles (%)
2008	2 (2.35)
2009	10 (11.76)
2010	5 (5.88)
2011	10 (11.76)
2012	5 (5.88)
2013	5 (5.88)
2014	10 (11.76)
2015	16 (18.82)
2016	8 (9.41)
2017	9 (10.59)
2018	5 (5.88)

Table III. The additional decision criteria

Criteria	Code	Number of articles
Sustainable capability	SUC	7
Safety of environment (environment management or sustainability or green factor)	ENV	36
Flexibility or diversification	FLE	23
Complaint handling service (problem resolution)	CHS	11
Trust and royalty or honest	TRH	12
Research and development and innovation	RDI	10
Risk factors	RFI	10
Collaborative or partnership planning	CPP	7
Responsiveness	RES	5
Modern slavery issues	MSI	9

Note: see Appendix II for these criteria.

Table IV. Ranking of the revised decision criteria

Decision criterion	Number of articles*	of (%)**	Ranking		
			New rankings (this study)	Dickson (1966)	Weber <i>et al.</i> (1991)
QLT	78	91.8	1	1	3
DLV	77	90.6	2	2	2
PRC	69	81.2	3	6	1
PFC	47	55.3	4	5	4
TEC	44	51.8	5	7	6
FPO	38	44.7	6	8	9
MO	37	43.5	7	13	7
ENV	36	42.4	8		
PH	32	37.6	9	3	10
SER	30	35.3	10	15	11
ICS	29	34.1	11	10	18
PCE	27	31.8	12	9	16
LRL	27	31.8	13	19	17
GEL	26	30.6	14	20	5
RPI	25	29.4	15	11	8
FLE	23	27.1	16		
ATT	22	25.9	17	16	12
OPC	18	21.2	18	14	14
DFB	16	18.8	19	12	21
PHA	12	14.1	20	18	13
APB	12	14.1	21	21	22
TRH	12	14.1	22		
CSI	11	12.9	23	17	20
TRA	11	12.9	24	22	15
CHS	11	12.9	25		
WCP	10	11.8	26	4	23
REA	10	11.8	27	23	19
RDI	10	11.8	28		
MDI	9	10.6	29		
SUC	7	8.2	31		
CPP	7	8.2	32		
RES	5	5.9	33		

Note: * represents the number of articles to which the criterion appeared.

** represents the counted fractions of the decision criterion to the total in percentages.

If it is blank means Dickson (1966) and Weber *et al.* (1991) did not rank and/or include the criterion

Table V. The CSR perspective

The CSR Perspectives	Performance criteria description
Modern slavery issues	Looking at whether there are no issues related to child labour, human trafficking, forced labour, long working hours, etc.
Environmental concern	Safety of an environment or environment management policies, presence of green factor, pollution discharge, etc.

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Appendix I. Criteria scrutiny based on the selected research articles

Sources	Decision criteria																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
(Aboutorab <i>et al.</i> , 2018)	√	√				√	√	√					√		√								
(Parthiban <i>et al.</i> , 2013)	√	√			√	√	√								√				√				
(Rhee <i>et al.</i> , 2009)		√				√			√									√					
(Paparoidamis <i>et al.</i> , 2017)	√						√			√					√								
(Keskin <i>et al.</i> , 2010)					√	√	√	√	√					√				√	√	√	√		
(Mokadem, 2017)	√	√			√	√	√	√		√	√		√		√				√				
(Beikkhakhian <i>et al.</i> , 2015)	√	√			√	√				√		√			√								
(Ghadimi and Heavey, 2014)	√	√			√	√	√	√	√						√			√	√			√	
(Vahidi <i>et al.</i> , 2018)	√	√				√	√		√													√	
(Vedel and Ellegaard, 2013)	√	√			√	√				√				√			√		√				√
(Mafakheri <i>et al.</i> , 2011)	√	√	√	√	√	√		√	√				√	√									
(Wu, 2009a)	√	√		√	√	√		√					√	√									
(Mavi <i>et al.</i> , 2016)	√	√	√		√					√													
(Kara, 2011)	√	√	√			√							√										
(Tidwell and Sutterfield, 2012)	√				√	√										√	√						
(Rouyendegh and Saputro, 2014)	√	√	√	√	√	√	√		√	√	√		√							√			
(Rajesh and Malliga, 2013)	√	√	√			√	√	√						√		√				√	√		
(Ho <i>et al.</i> , 2010)	√	√			√	√	√	√			√		√		√				√	√			
(Amin <i>et al.</i> , 2011)	√	√			√	√					√		√										
(Kotula <i>et al.</i> , 2015)	√	√	√		√	√	√	√	√	√	√		√					√	√	√			
(Schätzle and Jacob, 2019)	√	√	√		√	√	√	√	√	√	√	√			√	√				√			
(Wu, 2009b)	√	√			√	√																	
(Azadeh <i>et al.</i> , 2016)	√	√	√		√	√	√	√	√			√	√		√	√		√					
(Araújo <i>et al.</i> , 2015)	√	√			√	√	√	√	√			√	√	√			√	√		√			
(Osiro <i>et al.</i> , 2014)	√	√	√			√	√	√	√	√	√												
(Hosseininasab and Ahmadi, 2015)	√	√				√		√	√	√	√												
(Lee <i>et al.</i> , 2015)	√	√	√		√	√	√	√	√	√	√	√	√		√		√			√		√	
(Abdollahi <i>et al.</i> , 2015)	√	√		√	√	√	√	√	√	√	√	√		√	√				√	√			
(Deng <i>et al.</i> , 2014)	√	√				√																	
(Alsuwehri, 2011)	√	√	√	√		√	√	√	√	√	√	√	√	√	√	√		√		√	√		√
(Paul <i>et al.</i> , 2011)	√	√			√	√	√	√					√	√	√								
(Punniyamoorthy <i>et al.</i> , 2012)	√	√			√	√	√	√					√		√				√				
(Kumar <i>et al.</i> , 2009)	√	√			√	√																	
(De Felice <i>et al.</i> , 2015)	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√			√	√	√		√	√
(Galankashi <i>et al.</i> , 2015)	√	√				√				√					√					√			
(Mukherjee, 2017)	√				√	√											√			√			
(Imeri <i>et al.</i> , 2015)	√	√				√				√	√						√						√
(Rezaei and Ortt, 2013)	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
(Kilincei and Onal, 2011)	√				√	√	√	√				√	√	√	√					√			
(Freeman and Chen, 2015)	√	√				√																	
(Kar and Pani, 2014)	√	√	√			√	√	√		√			√			√			√	√			√
(Chang <i>et al.</i> , 2011)	√	√			√	√	√	√		√					√								√
(Govindan <i>et al.</i> , 2017)	√	√	√			√	√	√	√	√		√								√	√	√	
(You <i>et al.</i> , 2015)	√	√			√	√																	
(Memon <i>et al.</i> , 2015)	√	√																					
(Sevкли <i>et al.</i> , 2008)	√	√	√		√	√	√	√	√	√	√	√	√	√	√	√			√	√		√	
(Kuo <i>et al.</i> , 2010)	√	√	√			√	√						√	√	√	√			√		√		
(Kannan <i>et al.</i> , 2013)	√	√			√	√	√							√	√								
(Guo <i>et al.</i> , 2014)	√	√	√						√				√	√	√	√			√		√		
(Yadav and Sharma, 2015)	√	√	√			√	√	√	√			√		√	√			√			√		√
(Rezaei <i>et al.</i> , 2014)	√	√	√				√		√	√	√	√	√	√		√			√	√			
(Kull and Talluri, 2008)	√	√			√	√				√									√				
(Jabbour and Jabbour, 2009)	√	√				√			√										√				
(Dey <i>et al.</i> , 2015)	√	√	√		√	√	√	√	√				√						√				
(Kar, 2014)		√			√	√	√	√		√			√				√	√					
(Ünal and Güner, 2009)			√				√																
(Guo <i>et al.</i> , 2009)	√	√	√	√	√	√	√	√		√			√	√	√	√	√	√	√	√	√	√	√
(Ghorbani <i>et al.</i> , 2012)	√	√				√		√			√		√			√			√				
(Liao and Kao, 2011)	√	√	√	√	√	√	√	√			√		√					√		√		√	
(Amin and Zhang, 2012)	√	√																					
(Jadidi <i>et al.</i> , 2014)	√	√			√	√																	
(Amin and Razmi, 2009)		√	√					√		√			√						√				
(Güneri <i>et al.</i> , 2009)		√	√								√		√						√				
(Galo <i>et al.</i> , 2018)	√	√																					
(Van and Yu, 2016)	√	√	√			√	√						√						√				
(Yee <i>et al.</i> , 2016)	√	√			√	√																	
(Chen <i>et al.</i> , 2016)		√			√	√														√			

Note: “√” means the particular paper used the corresponding criterion; 1 to 23 are decision criteria given by Dickson (1966) and Weber *et al.* (1991) (see Table I).

Decision criteria	Sources
SUC	(Aboutorab <i>et al.</i> , 2018; Memon <i>et al.</i> , 2015; Kant and Dalvi, 2017; Goebel <i>et al.</i> , 2012; Ghadimi and Heavey, 2014; Vahidi <i>et al.</i> , 2018; Amindoust and Saghafinia, 2017)
ENV	(Parthiban <i>et al.</i> , 2013; Yeh and Chuang, 2011; Hsu <i>et al.</i> , 2013; Goebel <i>et al.</i> , 2012; Keskin <i>et al.</i> , 2010; Mokadem, 2017; Mahdilo <i>et al.</i> , 2015; Ghadimi and Heavey, 2014; Vahidi <i>et al.</i> , 2018; Mafakheri <i>et al.</i> , 2011; Mavi <i>et al.</i> , 2016; Tidwell and Sutterfield, 2012; Ho <i>et al.</i> , 2010; Schätzle and Jacob, 2017; Azadeh <i>et al.</i> , 2016; Osiro <i>et al.</i> , 2014; Lee <i>et al.</i> , 2015; Abdollahi <i>et al.</i> , 2015; De Felice <i>et al.</i> , 2015; Galankashi <i>et al.</i> , 2015; Freeman and Chen, 2015; Govindan <i>et al.</i> , 2017; Kuo <i>et al.</i> , 2010; Kannan <i>et al.</i> , 2013; Kull and Talluri, 2008; Rezaei and Ortt, 2013; Guo <i>et al.</i> , 2009; Amin and Zhang, 2012; Lim and Zhang, 2016; Kant and Dalvi, 2017; Yadav <i>et al.</i> , 2018; Lau <i>et al.</i> , 2018; Shaw <i>et al.</i> , 2012; Punniyamoorthy <i>et al.</i> , 2012; Amindoust and Saghafinia, 2017; Dou <i>et al.</i> , 2014)
FLE	(Rhee <i>et al.</i> , 2009; Keskin <i>et al.</i> , 2010; Mokadem, 2017; Mafakheri <i>et al.</i> , 2011; Tidwell and Sutterfield, 2012; Ho <i>et al.</i> , 2010; Kotula <i>et al.</i> , 2015; Wu, 2009a; Lee <i>et al.</i> , 2015; Alsuehri, 2011; Kumar <i>et al.</i> , 2009; De Felice <i>et al.</i> , 2015; Imeri <i>et al.</i> , 2015; Chang <i>et al.</i> , 2011; Govindan <i>et al.</i> , 2017; Kull and Talluri, 2008; Ünal and Güner, 2009; Govindan <i>et al.</i> , 2010; Kant and Dalvi, 2017; Lau <i>et al.</i> , 2018; Stojanov and Ding, 2015; Rezaei <i>et al.</i> , 2014; Dou <i>et al.</i> , 2014)
CHS	(Paparoidamis <i>et al.</i> , 2016; Ghadimi and Heavey, 2014; Schätzle and Jacob, 2017; Osiro <i>et al.</i> , 2014; Alsuehri, 2011; De Felice <i>et al.</i> , 2015; Guneri <i>et al.</i> , 2009; Galo <i>et al.</i> , 2018; Van and Yu, 2016; Kant and Dalvi, 2017; Lau <i>et al.</i> , 2018)
TRH	(Paparoidamis <i>et al.</i> , 2016; Beikhhakhian <i>et al.</i> , 2015; Amin <i>et al.</i> , 2011; Kotula <i>et al.</i> , 2015; Alsuehri, 2011; Kumar <i>et al.</i> , 2009; Yadav and Sharma, 2015; Rezaei and Ortt, 2013; Govindan <i>et al.</i> , 2010; Panaihfar <i>et al.</i> , 2015; Kant and Dalvi, 2017; Boer, 2017)
RDI	(Mokadem, 2017; Ho <i>et al.</i> , 2010; Lee <i>et al.</i> , 2015; Abdollahi <i>et al.</i> , 2015; Imeri <i>et al.</i> , 2015; Kannan <i>et al.</i> , 2013; Rezaei and Ortt, 2013; Jabbour and Jabbour, 2009; Amin and Zhang, 2012; Dou <i>et al.</i> , 2014)
RIF	(Mokadem, 2017; Mavi <i>et al.</i> , 2016; Ho <i>et al.</i> , 2010; Kotula <i>et al.</i> , 2015; Memon <i>et al.</i> , 2015; Rezaei and Ortt, 2013; Lim and Zhang, 2016; Kant and Dalvi, 2017; Lau <i>et al.</i> , 2018; Deng <i>et al.</i> , 2014)
CPP	(Beikhhakhian <i>et al.</i> , 2015; Yadav and Sharma, 2015; Panaihfar <i>et al.</i> , 2015; Govindan <i>et al.</i> , 2010; Kant and Dalvi, 2017; Aboutorab <i>et al.</i> , 2018; Abdollahi <i>et al.</i> , 2015)
RES	(Amin and Zhang, 2012; Lau <i>et al.</i> , 2018; Van and Yu, 2016; Phusavat <i>et al.</i> , 2009; Kant and Dalvi, 2017)
MSI	(Morssi, 2016; Baskaran <i>et al.</i> , 2012; Haleem <i>et al.</i> , 2017; Dou <i>et al.</i> , 2014; Stevenson and Cole, 2018; Yadlapalli <i>et al.</i> , 2018; Torres-Ruiz and Ravindran, 2018; Grimm <i>et al.</i> , 2016; Rezaei <i>et al.</i> , 2014)

Note: see Table III for the full form of the given criteria.