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Outsourcing decisions and the purchasing process: a systems-oriented approach

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Abstract

Purpose – To propose a framework for purchasing and outsourcing decisions together with a process model for evaluating and assessing possible suppliers. The paper focuses in particular on the “planning” and “qualifying” phases of the process which, respectively, set the criteria and prepare a shortlist for invitations, before the final selection.

Design/methodology/approach – By reference to the literature, past experience and a priori reasoning, a conceptual framework and quantitative model are combined in a checklist to guide responsible managers through a formal, systematic decision-making procedure.

Findings – The model is fully described, its strengths and weaknesses are discussed, and the modus operandi of the derived decision-making framework is explained. The system and process are strongly advocated as the most appropriate instrument for the selection of suppliers of outsourced products and services in the contemporary business environment.

Research limitations/implications – The system suffers to an extent from one of its defining strengths: relative simplicity, which may limit its applicability in more complex situations. This emphasises the importance of the procedures undertaken in the “qualification” phase. Assigning evaluative values codes to the various decision parameters involves a good deal of subjectivity, which could lead to misguided decisions. Further research and development is needed.

Practical implications – The advocated selection offers outsourcing decision makers a structured and systematic selection framework, which does not compromise their own professionalism, but rather encourages imagination, innovation, investigation and opinion based on critical observation. Its potential applicability covers the full range of industry sectors, beyond the outsourcing of product and component manufacture which have been the focus of the great majority of published studies.

Originality/value – The paper examines a widely investigated “hot topic” that is in fact surrounded by confusion and misunderstanding. It focuses on aspects of outsourcing practice that have so far attracted little attention from researchers.

Keywords Purchasing, Sourcing, Outsourcing, Selection

Paper type Conceptual paper

Introduction

Continuously increasing competitive pressure on companies, especially during an economic downturn, demands streamlined, cost-effective and measurable management processes. Managers have realised that they cannot achieve corporate objectives without the collaboration of satisfactory vendors (Handfield and Nichols, 1999). The consequent increasing importance of supplier-selection decisions is forcing companies to re-think their purchasing and outsourcing strategies, and the topic has received



considerable attention in the literature (De Boer *et al.*, 2001; Karpak *et al.*, 2001; Park and Krishnan, 2001; Bhutta and Huq, 2002; Handfield *et al.*, 2002).

Though the title of this journal implies a primary focus on the marketing function, purchasing has always been an essential and critical function in nearly all business, and its impact on the other major functional divisions cannot be ignored by marketing strategists and planners. Nowadays, purchasing in its broadest sense is increasingly recognised as a strategic issue, since in-sourcing and outsourcing decisions have a crucial influence on an organisation's success (Carr and Pearson, 2002; Cousins and Spekman, 2003). A striking example of the role of importance of sourcing and purchasing in commercial success is provided by the Dell Computer Corporation (Fine, 1999).

Normally, there is a clear distinction between purchasing and sourcing decisions. Purchasing includes all activities associated with identification of needs (initiation), identification of decision criteria (planning), initial screening of preferred suppliers (qualifying), selecting suppliers (winning), and monitoring performance. Sourcing decisions, on the other hand, are high-level strategic decisions answering the question "what to make and what to buy".

The main aim of this paper is to give an overview of the purchasing process, and to focus on sourcing decisions, specifically outsourcing. We propose a conceptual framework and an outsourcing and purchasing model, and concentrate specifically on:

- (1) the planning phase, since we believe it is crucial in selecting the right attributes upon which the potential suppliers will be judged;
- (2) the qualifying phase, which is a pre-selection step necessary to the construction of a list of preferred suppliers from a larger pool; and
- (3) the transition-of-responsibility phase of the outsourcing decision, from company to sub-contractor, because it is often underestimated and should be prepared in parallel with the (1) and (2).

In addition, the paper looks into the decision-making methods and procedures reported in the literature and applied in practice, revealing some trends in supplier selection process.

After discussion of the basic concepts of the purchasing process and sourcing decisions, with particular giving emphasis on outsourcing, the planning and qualifying phases of purchasing will be examined in detail. Attention will then turn to the identification and evaluation of suppliers, because these two steps in the process determine the quality of the final outcome, and a procedural model will be proposed. An illustrative example shows how the proposed method works in practice. The paper concludes with general conclusions, and implications for both management and research.

The purchasing process and sourcing decisions

The purchasing process

Purchasing is nowadays recognised as a strategic function, not only because the decisions made by purchasing managers have such a profound influence on overall company performance, but also because businesses have to manage the process that links them with their upstream suppliers.

Figure 1 shows schematically the five phases of the purchasing process. In practice, the effort that a company spends on each of these activities differs from one situation to the next. It is, of course, axiomatic that the better they are performed, the more competitive the company becomes.

Initiation phase. The purchasing process starts with the identification of a need, for either service(s) or product(s). At this point, the flows and exchanges of information amongst the interested parties can be very extensive, and require good communication internally. A feasibility study is required, entailing analysis of expected benefits, likely costs and consequent risks, and a plan for managing the outcomes.

Planning phase. Central to the purchasing cycle is the planning phase, in which criteria against which the potential suppliers will be assessed are defined. This implies the setting of standards for bids, the defining of requirements in detail and the preparation of a pool list for invitations to tender. At this stage, it is clearly necessary to ensure that the user's needs are communicated to potential suppliers in the most efficient and accurate way possible. The necessary descriptions can take the form of market-grade or industry-grade specification or performance characteristics, the latter focusing attention on the customer's desired outcome rather than on the precise configuration of the product or services. For example, a company soliciting service from a third-party logistics ("3PL") provider might demand delivery within 24 hours and twice-daily deliveries, leaving it up to the provider to decide how to meet those requirements. Planned choice criteria can thus be both qualitative and quantitative; to select the best supplier, it is in practice necessary to balance tangible and intangible factors. Research studies of that trade-off among attributes have suggested a number of relevant criteria: quality, on-time delivery, cost (Verma and Pullman, 1998, Karpak *et al.*, 2001), environmental issues (Handfield *et al.*, 2002), and manufacturing costs, technology and service (Bhutta and Huq, 2002). Park and Krishnan (2001) examined supplier-selection practices among 78 small business executives and

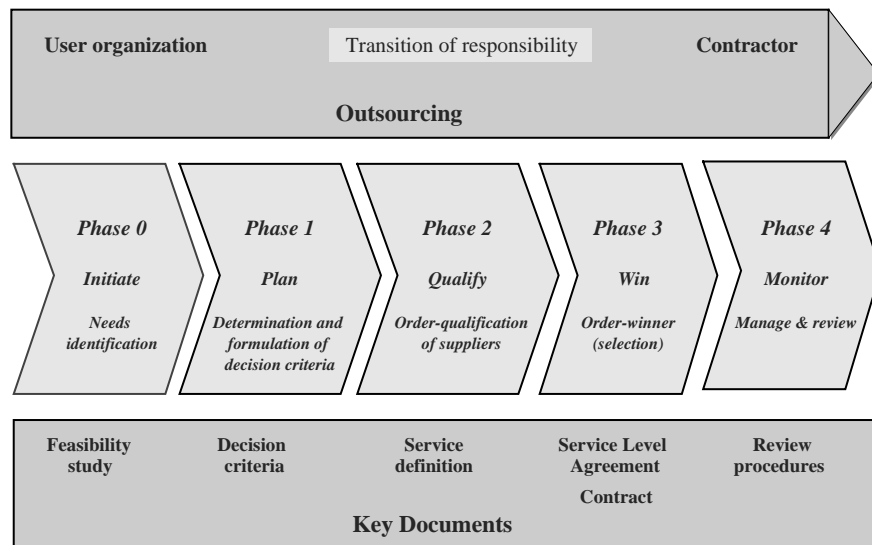


Figure 1. Schematic of purchasing and outsourcing methodology

adapted 15 criteria from a study by Ellram (1990). Although the choice criteria reported differ across products and services, there is a marked convergence with respect to four in particular: price, quality, delivery and service. Some common issues surrounding this phase, apart from selection of the most appropriate criteria, are: assignment of relative weights to each and every one of them, and decisions concerning their critical, objective and subjective status (Houshyar and Lyth, 1992); and identification of the true decision maker, given that authority may reside with a single person or function or with several people or functions.

Qualification phase. Equally important in the purchasing cycle is the qualifying process, which screens the pool of potential suppliers against the criteria established at the planning stage, and draws up a shortlist of qualified contenders. As De Boer *et al.* (2001) put it, the objective is to reduce the set of “all” suppliers to a smaller set of “acceptable” suppliers. The first step in this process is always to define a set of acceptable suppliers, while possible subsequent steps serve to reduce the number for active consideration. Thus, qualification is a sorting process rather than a ranking operation, and is therefore sometimes described as “pre-qualification”. The factors that achieve qualification for a supplier are not necessarily the major determinants of competitive success, but are important in the sense that supplier performance has to be above a particular level for a contender to be included in the shortlist. Performance below the qualifying level will normally disqualify a supplier from being considered for preferred status, but performance above it will not on its own confer particular competitive advantage (Slack *et al.*, 2005).

Winning phase. The final choice begins once the company has completed the initiation, planning and qualification phases. Suppliers who demonstrate a minimum level of expected performance are given the first opportunity for new (or repeat) business. To win it, a supplier has to achieve a superior level of performance with respect to the key reasons for purchasing the product or service. These order-winning factors constitute an element of the value chain that is more important to the purchasing company and dominate the other elements of value. According to Hill (1987), they are market and time specific. He categorized them into manufacturing-related criteria – such as price, delivery reliability, delivery speed, quality, demand increases, product range, design and distribution – and non-manufacturing criteria, which might include design leadership, marketing and sales capabilities, brand name, technical liaison support and after-sales support. Corbett and Van Wassenhove (1993) argued that what is an order winner today may evolve into a mere order qualifier in the future, due to competitive pressures.

Monitoring and review phase. The process does not end with selection. Purchasers must regularly review the performance of suppliers against agreed levels. As well as being an important control check, this operation can build strong and efficient long-term relationships if handled constructively. Sometimes, it calls for negotiation, to take account of changed or new requirements. These should be handled separately from those already under consideration, for confusion can result from trying to manage them in the same way. Normally, good relationships solve most of the problems. Contracts are a necessary part of the working relationship, but hiding behind them can cause many problems.

The outsourcing decision

Outsourcing decisions are often distinguished from purchasing activities on the grounds that the latter are typically high-level, strategic decisions regarding what to make and

what to buy; while the former include all activities associated with recognition of the need for new suppliers, setting of decision criteria, location and selection of suitable suppliers, negotiation of terms, and monitoring of supplier performance.

It is clear that the outsourcing process itself is a critical, strategic operation. Though the “make-or-buy” question asked of themselves by manufacturers and the “do it ourselves or buy it in” question asked by service providers may be answered at the level of the purchasing function, those responsible for sourcing have to consider the issues of single versus multiple sources of outsourced products or services. The phenomenon of outsourcing is sweeping through industry, affecting employees and managers beyond the so-called core-competences. In concert with other techniques, it is creating a new, sophisticated environment for customer-supplier relations, and therefore calls for real partnerships in successful outsourcing ventures. It is considered one of the most important developments of recent years, involving diverse sectors from manufacturing companies, through services to government and the public sector. A prime and longstanding example of outsourcing is the UK government’s Market Testing Programme (Market Testing for IS/IT Provision, 1993), which is regarded as a benchmark by other governments and has already been adopted by other countries, such as Australia (Environment Australia Annual Report 2001-2002, 2002).

It is not the intention of this paper to discuss both outsourcing and “in-sourcing”. The pros and cons have been covered extensively and sufficiently in the literature by literally hundreds of articles from both academics and practitioners (Harland *et al.*, 2005). The aim is instead to approach the debate from another angle: the methodology for a company outsourcing appraisal, as shown in Figure 1, and more specifically the transition of responsibility from the organization to the contractor, which is often underestimated and can be prepared for in parallel with the planning and qualifying phases of the purchasing process, as described in the previous section.

Transition planning. Transition from the internal management of an activity or function to working with an external provider requires significant up-front involvement in the provision of initial data, industry or customer expertise, and overseeing of the process during the transfer of responsibilities. Therefore, transition planning is vital for an orderly and planned transfer to the new provider of the outsourced product or service (or both). Its objective is twofold: to keep track of customers as the service responsibility is transferred and to focus on the people involved in the process.

The key point is not to lose sight of the customers in all of this. On the contrary, it may be a good opportunity to exploit the public relations value of the new initiative. After all, the basic motivation dictating the need for outsourcing is the success of customers. Therefore, communicating the change to them in an effective manner assumes high importance.

From the staff point of view, the issue that will need to be addressed is what new roles within the outsourcing organization will require to be discharged, and which may be no longer needed. It will certainly be necessary to identify, and perhaps train, the people who will work with the supplier and oversee the relationship. Usually, the best solution is to delegate these responsibilities to key personnel in the newly-outsourced part of the organization, taking advantage of their knowledge to effectively oversee the supplier’s work, especially in the critical early stages of the transition. It also gives them a strong incentive to make the transition successful.

Time frames for completing s to complete transition from internal supply to outsourcing will typically vary according to the situation. Probably, it is generally best to aim for a speedy changeover, because spreading the process out allows more scope for delay, or even sabotage. Difficulties will certainly occur as new relationships are established. With a rapid transition, the incentive is to deal with problems that arise quickly and efficiently. On the other hand, a more prolonged transition process can provide the opportunity to test and develop the new relationship, while limiting the risk to ongoing work.

The transition plan should at least include such items as those shown in Figure 2. Some companies fail to appreciate the number of players involved in the transition process and the amount of coordination and communication needed for both sides to be on the same track during implementation. An extensive study of critical trends and issues in 3PL among key markets and key customers in North America and Western Europe found, amongst other things, that users reported unsatisfactory experiences of transition during the implementation stage, which may have been explained partly by an apparent lack of strategic management skills (Langley *et al.*, 2001). Change is by its nature difficult; change that involves new people in new roles is often overwhelming. Therefore, good preparation will improve the quality of transition planning.

Sourcing strategies. Once the decision has been made to outsource a product or service, a company is faced by the need to make a strategic choice between single and multiple sources. In the past, the practice for the buying companies was typically to

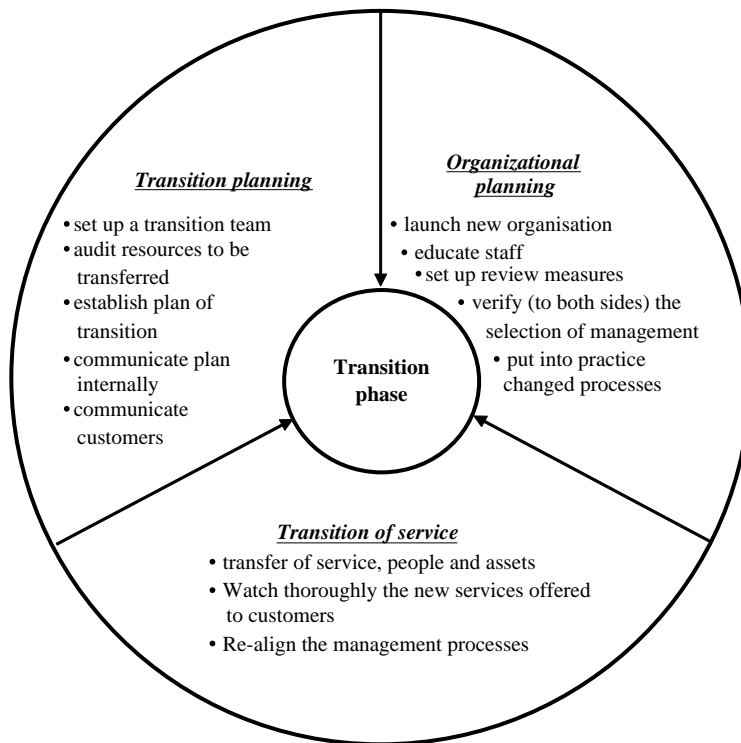


Figure 2.
The transition phase of the
outsourcing methodology

share their business among multiple suppliers, even for the same product or service. The reasons given for this multiple-sourcing approach were that competition is the basis of the economic system, purchasing must not become source dependent and multiple sources spread the risk (Shin *et al.*, 2000).

However, the example set by Japanese firms and the just-in-time production philosophy affected the attitude of western companies, which are nowadays seeking reduction of their supplier base. Some of the potential benefits of such a decision include (Chen and Paulraj, 2004):

- fewer suppliers to contact in the case of orders given on short notice;
- reduced inventory management costs;
- volume consolidation and quantity discounts;
- increased economies of scale based on order volume and the learning curve effect;
- reduced lead times due to dedicated capacity and work-in-process inventory from the suppliers; reduced logistical costs; coordinated replenishment;
- an improved buyer-supplier product design relationship; trust due to communication; improved performance; and
- better customer service and market penetration.

Moreover, the administrative or transactional costs associated with managing a large number of suppliers often outweigh the benefits (Dyer, 2000).

Today, companies typically weigh up the pros and cons of single and multiple sourcing. "Parallel sourcing" describes the use of multiple sole sources for each type of component, providing the performance incentives for suppliers associated with multiple sourcing while preserving the claimed benefits of sole sourcing (Richardson, 1993). "Dual sourcing" describes the use of just two suppliers for the same product or service, to ensure a continuous supply at a favourable price (Pochard, 2003).

Supplier identification and evaluation

This section will elaborate upon two major activities within the planning and evaluation phases of the overall purchasing process (Figure 1), since successful outsourcing choices are heavily dependent on the quality of decisions taken with respect to supplier identification and evaluation. Obviously, both endeavour and significance increase in parallel with increases in the complexity of the outsourced product or service increases, the costs, and the time-span of the anticipated buyer-supplier relationship.

Supplier decision criteria

Supplier selection is a complex decision-making process, and has been the subject of many research studies and practitioner commentaries for more than 40 years. One of the most important published studies was carried out forty years ago by Dickson (1966). On the basis of data collected by questionnaire from 170 answered purchasing agents and managers, he ranked 23 criteria in terms of their perceived importance. At that time, the most important were seen to be quality, delivery performance history, and warranties and claim policies. A quarter-century later, Weber *et al.* (1991) reviewed 74 articles published since 1966 and observed that the most frequently cited criteria

were price, delivery, quality production capacity and location. Clearly, the evolution of the industrial environment had affected the relative weighting of these criteria. For example, the criterion of location is crucial to the just-in-time production philosophy, while communication systems, ranked tenth in Dickson's study, are highly important in the current IT environment.

For the interest and information of readers with a particular interest, Table I summarises the content of relevant research studies published in the first five years of this century.

We have already briefly noted a marked convergence in supplier-choice criteria despite micro-variation across the range of products and services bought-in. This was confirmed by Frost and Long (2000), who tested both procurement managers' and marketing managers' perceptions of the importance placed by buyers on various attributes of a supplier. The results suggested that these perceptions do not differ significantly, except for reciprocal arrangements and the reputation or image of the organization within the industry, and do indeed major on four key attributes: to price, quality, delivery and service.

Authors and dates	Brief description
Akarte <i>et al.</i> (2001)	Groups 18 criteria into four categories
Avery (2000)	Looks at the experiences of three IT purchasing professionals and their decision criteria
Bowman <i>et al.</i> (2000)	Studies the factors and their relative importance in supplier selection from the global business perspectives
Frost and Long (2000)	Attempts to find out through a survey both the procurement manager's perception of the importance placed by buyers on various attributes, and the marketing manager's perceptions of the importance they place on these attributes when sourcing a supplier
Gonzalez <i>et al.</i> (2004)	Examines the quality, cost and productivity factors and their relative importance in supplier selection
Humphreys <i>et al.</i> (2003a)	Draws attention to integrate environmental criteria in the supplier selection process
Humphreys <i>et al.</i> (2003b)	Attempts through a decision support tool to incorporate environmental criteria into supplier selection process
Kannan and Tan (2002)	Examines through an empirical study the purchasing selection and assessment criteria of the American manufacturing industry for goods already used in production
Katsikeas <i>et al.</i> (2004)	Examines the purchasing selection and assessment criteria of the UK distribution companies in the IT industry
Krause <i>et al.</i> (2001)	Develops measures of purchasing competitive priorities
Lee <i>et al.</i> (2001)	Develops a methodology based on information obtained from the supplier selection process
Lin <i>et al.</i> (2005)	Attempts to find out what factors affect the supply chain quality management
Sharland <i>et al.</i> (2003)	Aims at exploring the impact of cycle time on supplier selection
Svensson (2004)	Looks at the models of supplier segmentation and the different supplier selection criteria.
Swift and Gruben (2000)	Investigates the different supplier selection criteria between the male and female purchasing managers
Yan and Wei (2002)	Proposes a compromised weighting for group decision making by incorporating supplier selection criteria

Table I.
Research studies of
supplier selection criteria,
2000-2005

Variations in the nature and weighting of decision criteria can be attributed to a number of factors, such as the relative size of the buying organisation (Pearson and Ellram, 1995), the kind of products or services purchased (Bowman *et al.*, 2000; Akarte *et al.*, 2001; Kannan and Tan, 2002; Sharland *et al.*, 2003; Gonzalez *et al.*, 2004; Katsikeas *et al.*, 2004; Svensson, 2004), the adoption of a single or multiple sourcing strategy (Krause *et al.*, 2001; Lee *et al.*, 2001; Lin *et al.*, 2005), the demographic and cultural characteristics of purchasing managers (Chao *et al.*, 1993; Mummalaneni *et al.*, 1996; Swift and Gruben, 2000; Yan and Wei, 2002), and factors reflecting modern concerns environmental issues (Humphreys *et al.*, 2003a, b). Also, the trend to relationships between outsourcers and their suppliers that are based on partnership rather than on adversarial transaction, favours such additional criteria such as capacity for co-operation, control of co-ordination and types of communication system.

Consequently, the skills of purchasing professionals have changed considerably over time, moving from a role focused predominantly on the four traditional criteria to one emphasising the professional management of strategic, long-term, complex agreements between internal stakeholders and suppliers (Faes *et al.*, 2001). Outsourcing is no longer a simple price-reduction game but an activity in which managers concern themselves with supplier coordination and development, market research, cost analysis, sourcing strategies and benchmarking, as well as the outsourcing choice itself (Carr and Smeltzer, 2000). The intensely competitive environment typical of today demands more integrated ways of working, involving more sophisticated skills and competences on the part of purchasing professionals (Anderson and Katz, 1998; Carr and Smeltzer, 1997, 2000; Giunipero and Pearcy, 2000; Cousins and Spekman, 2003; Giunipero *et al.*, 2005).

Figure 3 shows all possible decision criteria under six categories. Although it may not be possible to gather all necessary information, the greater the quality and quantity

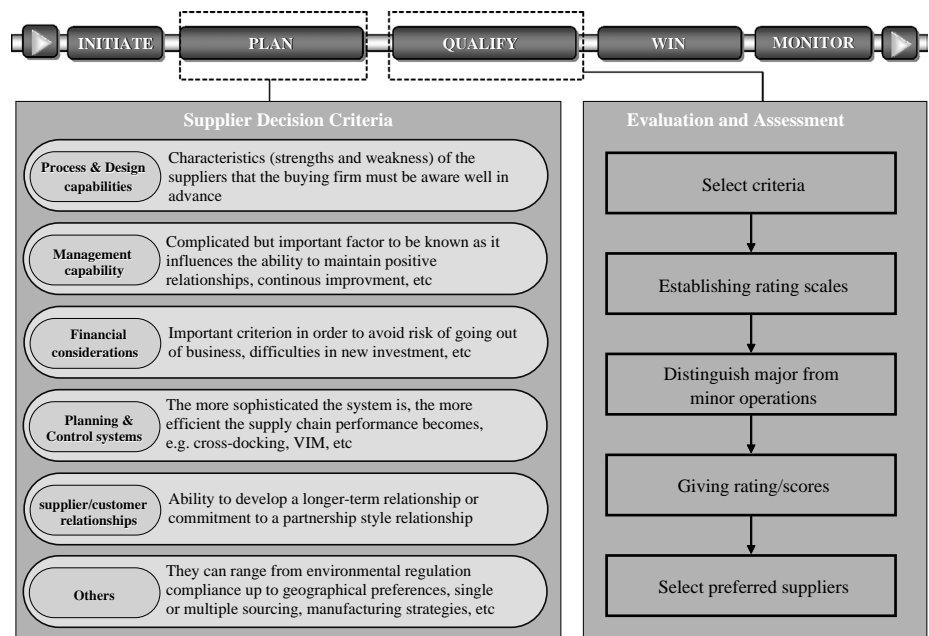


Figure 3. Supplier decision criteria of the planning phase and evaluation steps in the qualify phase

of the data relating to each criterion, the more successful the match between buyer and supplier.

Process and design capabilities. The outsourcing company needs to be clear about the provider's capabilities, and to take them into account in the selection process. In an increasingly information-driven decision-making environment, the ability to obtain and act upon performance information is often seen as a prerequisite for business success, and a buyer of outsourced products or services will not wish to be associated with a supplier deficient in this respect. For instance, if a potential supplier does not have extranet capabilities, the buyer may regard an electronic data interchange capability as a minimum requirement for obtaining required information in the shortest, quickest and most intuitive way. Similarly, previous experience and current know-how in the specific industry will typically be considered a necessary capability.

Management capability. This requirement is complex to assess, but a key selection-decision criterion. It reflects the capacity and quality of the top people of the supplier, the behaviour of whom can affect cooperation and collaboration in a strongly positive or negative way. It can be the engine which powers a culture of continuous improvement, creates and diffuses organisational behaviour, strengthens positive values in the relationship, and maintains a partnership ethos. Important aspects of management capability include the availability of top management to the outsourcing company (Menon *et al.*, 1998), the depth of management expertise (Sink and Langley, 1997), management skills (Foster, 2003), creativity in management, rate of personnel change, and many others.

Financial considerations. There is no doubt that the main motive of each partner in a collaboration is to gain advantage over time. It follows that each company has its own motives, even if they are hidden. Though benefits sought can be both financial and non-financial, we concentrate here on the first category. Financial advantage can be achieved by focusing on relationship activities, which can reduce cost, enhance asset utilisation, realize joint investment, reduce inventory, share business risk, eliminate duplication and waste, and achieve economies of scale (Parker, 2000; Horvath, 2001; Henry and Mayle, 2002; McLaren *et al.*, 2002). A potential supplier in a weak financial position inevitably presents a source of risk, not only because it cannot commit itself to any financial investment, but also because it may not have the necessary resources to invest in personnel, equipment and development efforts. In the worst case, it may go out of business. Such measures of financial health as liquidity, operating, profitability, and leverage ratios are thus vital test of suitability, from the outsourcer's point of view. Normally, most can be calculated from data in balance sheets and income statements.

Planning and control capability. These capabilities reflect the presence or absence in the supplier's operations of, for instance: systems for planning material, equipment personnel and capacity needs; performance measures related to the four key selection criteria, at least; and IT systems capable of interacting with provider's systems. Planning and control capability is crucial because it significantly affects performance in the supply chain. Therefore, verification by visiting and auditing the provider's planning function is a key precaution.

Working relationships. We have noted an evolution in the buyer-seller relationships from the traditional adversarial, transactional and short-term model to longer-term and more mutual partnerships (Lamming, 1993; Krause, 1999). "Partnership" is a much

abused term, the true meaning of which is poorly understood by most organisations. That is precisely why so few companies have achieved successful partnership agreements. A simple transactional relationship is based on the presumption that buying is concerned with simple exchanges, and buyer-seller interaction is conducted at arm's length. The ulterior motive of the buyer in this rather simple scenario is to acquire as much resource as possible for as little expenditure as possible, but that is seldom possible in a changing environment of apparently endless resources, where all trading parties need to act in a responsible and supportive manner. Therefore, much more attention has been paid in recent years to the development of properly mutual working relationships, in which the benefits of doing business together are rooted in ideas of sharing as well as exchanging: the emphasis is on building a satisfactory outcome together. Confidence and support are invested by both sides with the intention of adding value, a process not possible with a simple transaction. The organizations concerned seek to come closer together, and to identify overlapping interests. It is to be stressed that forging such relationships is a complex undertaking. If it can be achieved, however, a major benefit can be the elusive "win-win situation" in which both parties gain a fair advantage from the relationship and have no reason not to maintain it. While it is true that collaboration can benefit trading partners unequally, companies in working partnerships can fail to appreciate that the efficiencies of collaboration in fact lie in the cumulative effect of all benefits delivered.

Supplier identification

Once a decision has been reached to outsource and the selection decision criteria have been formulated, the next step is to draw up a shortlist of potential suppliers that fulfil them. This is often summed up as the process of finding the right suppliers to provide the buyer with the right products and/or services, at the right price, in the right quantities, and at the right time (Sarkis and Talluri, 2002). Evaluation and selection of suppliers is an important task for supply-chain management, generally seen as a typical multiple criteria decision-making (MCDM) problem with multiple qualitative and quantitative dimensions. As a consequence, it demands a systematic, methodical and realistic selection model.

Despite a wealth of candidates in the literature, it is generally agreed that four factors make the supplier-selection decision inherently difficult. First, the typically large number of potential suppliers available, all competing fiercely, plus the buyer's personal preferences result in a high number of options to choose from (Weber *et al.*, 2000a, b). Second, since no single candidate normally offers the best performance in all chosen criteria, all contenders must be compared on the basis of multiple criteria (Weber *et al.*, 2000a, b). Third, suppliers may change their credentials with respect to important selection criteria; one presently regarded as "order loser" could, for instance, immediately become an "order qualifier" or "order winner" simply by means of a price reduction (Hill, 2000). The last factor is conflicting objectives and internal and external constraints imposed on the buying process (De Boer *et al.*, 1998; Karpak *et al.*, 1999a, b; Muralidharan *et al.*, 2001).

To offset these difficulties, various approaches have been developed in the literature. Table II lists and classifies the main decision-making methods found in a literature review, together with their main advantages and disadvantages. Obviously, each method is best suited to particular evaluation criteria and circumstances.

Decision method	Main advantages	Main disadvantages	Sources
Analytic hierarchy process (AHP) and Analytic network process (ANP)	Based on decision maker's judgment concerning importance of criteria and extent to which they are met by each alternative Since, designed to resemble human judgement, do not need formalisation in decision-making process, and therefore, can handle high complexity and uncertainty; easy for non-experts because based on computer-aided systems	Because of subjective scale, vulnerable to human error. Adding an extra criterion may cause the classification process to change Require constant maintenance to remain effective Resource- and time-consuming process	Nydicck and Hill (1992), Barbarosoglu and Yazgac (1997), Masella and Rangone (2001) and Sarkis and Talluri (2000) Mandal and Deshmukh (1994), Vokurka <i>et al.</i> (1996), Albino and Garavelli (1998) and Khoo <i>et al.</i> (1998)
Artificial intelligence models (expert systems; neural networks)	Classifies supplier as efficient or inefficient, so can be used as tool for negotiating with inefficient suppliers	Suitable for situations in which multiple inputs and outputs make comparisons difficult	Weber and Desai (1996), Weber <i>et al.</i> (1998) and Liu <i>et al.</i> (2000)
Data envelopment analysis (DEA)	More objective than rating models; generally used in JIT scenarios	Often considers only more quantitative criteria; Assumes predefined levels of quality and service; Needs to be combined with other methods	Weber and Ellram (1993), Current and Weber (1994), Ghodspour and O'Brien (1998), Karpak <i>et al.</i> (1999a, b) and Degraeve and Roodhooft (2000)
Multi-objective programming	Deal with stochastic uncertainty, e.g. order lead time Relatively simple to use; can include all quantifiable costs incurred throughout purchased item's life cycle	Deal with uncertainty one criterion at a time Only for single-deal cases; difficult to incorporate service and delivery performance criteria	Ronen and Trietsch (1988) and Mummalaneni <i>et al.</i> (1996) Smytka and Clemens (1993) and Ellram (1995)
Statistical models			
Total cost of ownership (TCO)			

Table II.
Classification of main
decision-making
methods, with
advantages and
disadvantages

Model

Figure 1 shows the process model for evaluating and assessing potential suppliers to receive the first opportunity for new business. These preferred suppliers are those whose performance capabilities match the outsourcer's specific needs and priorities.

In this section, we introduce a simple, straightforward, numerically graded measurement method. It is qualitative and system-oriented in nature, able to carry out a well-executed selection process. A system-oriented method was used in preference to a function-oriented alternative. The latter would offer an in-depth examination and evaluation of one particular element or function within the outsourcer's organisation; the former examines and evaluates all decision criteria involved across the organisation. Thus, when it is applied to several different suppliers, differences in interpretation quickly become evident. It is a sorting rather than ranking method, and is, therefore, not the best technique for evaluating the overall effectiveness or continuity of a particular operation, except if measured against referenced standards or specifications.

Rating scale

Following each assessment, a formal report is prepared, which presents a point-by-point summary of performance against the checklist items, on a four-level grading scheme: S = satisfactory; F = fair; U = unsatisfactory; NA = not applicable (or not seen). The descriptions "satisfactory" and "unsatisfactory" are self-explanatory, and cover situations in which evaluation has determined conditions to be clearly acceptable or unacceptable with respect to the relevant. The term "fair" implies a minor divergence from requirements. If a more detailed audit is required, it could be expanded to "adequate" and "inadequate".

Normally, some operations are considered to be more important than others, and are designated "major operations". In Table III, they are indicated by the boldening of the description of the operation. Thus, the major operations in that case are management (A), value added services (C), service characteristics (E) and performance measurements (F). By contrast, "minor operations" are those considered less important, which accordingly affect the overall rating to a lesser degree than the major ones. They are identified in Table III by the not being in bold face: availability of transport choices (B) and rate profile/quality services (D).

Within each group of operations, whether major or minor, some parameters are weighted to have more influence than others. They can be identified by italics and parenthesis around the parameter. In Table III, they are:

- *Major operation A, management.* Organisation, financial stability, willingness to work as a partner.
- *Major operation C, value added services.* Attitudes towards quality, electronic data interchange capability, regulatory knowledge.
- *Major operation E, service characteristics.* Dependability, problem solving assistance, speed.
- *Major operation F, performance measurements.* Attitude, measurements available.
- *Minor operation B, availability of transport choices.* Less-than-truckload, geographical coverage, temperature control requirements.
- *Minor operation D, rate profile and quality services.* On-time delivery, quality processes to eliminate waste, reduce costs and improve service.

			Purchasing and outsourcing decisions
Operation A: management		F	
(1)	Organisation	[F]	
(2)	Vision	[S]	
(3)	Corporate culture	[S]	
(4)	Business reputation	[S]	
(5)	Financial stability	[S]	
(6)	Willingness to work as a partner	[F]	
(7)	Commitment to continuous improvement	[S]	
(8)	ISO 9000 certification	[S]	
(9)	Present customer contracts	[S]	
Operation B: availability of transport choices		F	
(1)	Truckload (TL)	[U]	
(2)	Less-than truckload (LTL)	[F]	
(3)	Parcel; express shipments	[S]	
(4)	Equipment availability	[U]	
(5)	Geographical coverage	[S]	
(6)	Temperature control requirements	[S]	
Operation C: value added services		F	
(1)	Attitude towards quality (total quality management)	[F]	
	Attitude towards safety (spill procedures, emergency response, safety records)	[F]	
(3)	Electronic data interchange capability	[S]	
(4)	Environmental concerns	[S]	
(5)	Regulatory knowledge	[S]	
(6)	Reputation with customers	[U]	
(7)	Willingness to invest resources in the relationship	[S]	
Operation D: rate profile and quality services		S	
(1)	Contingency planning considerations	[S]	
(2)	Documentation processes and procedures	[F]	
(3)	On-time delivery	[S]	
	Quality processes to eliminate waste, reduce costs and improve service	[S]	
(4)	Volume -/proportional distance and delivery notes-/on demand-rates	[U]	
Operation E: service characteristics		S	
(1)	Claims handling	[F]	
(2)	Dependability	[S]	
(3)	Problem solving assistance	[S]	
(4)	Responsiveness,	[S]	
(5)	Security	[S]	
(6)	Shipment tracing	[U]	
(7)	Speed	[S]	
Operation F: performance measurements		U	
(1)	Attitude	[F]	
(2)	Measurements available	[U]	

Table III.

Evaluation form for the selection of a provider

Notes: Code: S, satisfactory; F, fair; U, unsatisfactory; NA, not applicable or not seen

Calculation technique

One of the codes S, F, U and NA, as defined above, is assigned to each operation. The weighting is generally $U > F > S$. Code NA carries no weight, because it is not an evaluation. A numerical rating for each provider is then based upon the total number of major and minor corrections, as follows:

- *Grade I: satisfactory provider.* All major operations rated satisfactory; no more than three minor corrections rated unsatisfactory.
- *Grade II: fair provider.* Maximum of one major parameter correction in any major operations rated unsatisfactory; maximum of three minor parameter corrections in any minor operations rated satisfactory.
- *Grade III: unsatisfactory provider.* Two or three major parameter corrections in major operations rated unsatisfactory; more than three minor parameter corrections in minor operations rated unsatisfactory.

Strengths and weaknesses of the model

The recommended procedure has six main advantages:

- (1) simple;
- (2) not time consuming;
- (3) produces the minimum of paperwork;
- (4) can easily evaluate a considerable number of providers in a short period, thanks to numerical evaluation;
- (5) can be used as a pre-selection method, to separate the important few from the irrelevant many; and
- (6) provides evaluators with a vehicle, that does not inhibit their professionalism, but rather encourages imagination, innovation, investigation and opinion based upon critical observation.

There are however four disadvantages:

- (1) suffers from brevity, and is thus difficult to apply to complex operations;
- (2) does not tell the “full story” in its limited narrative;
- (3) assignment of codes to parameters involves subjective judgement; and
- (4) may induce an evaluator who does not think critically to jump to conclusions that may prove wrong, for the reasons just noted.

Conclusions and implications

Once a company decides that an outsourcing solution could be beneficial, the process for selecting a partner must be put in place. Selection methods can entail actions not discussed in this paper, such as up-front discussions with potential partners, aimed at assessing their ability to contribute to the goals of a partnership, or internal operations by cross-functional working parties, to gather input from departments that will be involved in the eventual decision-making process. What we aim to add to those worthwhile and sensible initiatives is a means of applying unique selection criteria that reflect specific corporate goals for the relationship and the particular operational circumstances. Those should balance the needs of the purchaser against the capabilities of the supplier, and have the potential to deliver benefits. They may range from general quality and service standards to such case-specific criteria as compatible corporate cultures, business reputation, responsiveness, electronic data interchange capability, financial stability, environmental concerns and willingness to invest resources in the relationship. The price criterion should not be forgotten, of course, but nor should it any longer be treated as the sole criterion, in the context of modern business.

Fundamental stages in selecting a provider are:

- (1) to prepare a list of carefully predefined parameters and operations which reflect the situation closely (Phase 1); and
- (2) to evaluate each potential provider in terms of fit with enterprise's objectives, and to derive thereby a list of the preferred suppliers amongst which the final choice will be made (Phase 2).

The aim of this paper was to propose a simple, straightforward, qualitative and quantitative measurement model, to be used as the basis of a systematic and structured pre-qualification process. It has further offered an in-depth analysis of key criteria that a company must use, at a minimum, to assess potential suppliers, with the proviso that the exact selection criteria will change according to the company's size and operational configuration and will, therefore, be governed in practice by particular operating characteristics.

Care, thoroughness and analytical insight are required in applying the model, because "correct" selection procedures are by no means guaranteed to choose the "right" supplier – as in many comparable choice situations familiar to management analysts. The match between the two processes can be examined with respect to the benefits that the outsourcing company aims to achieve; if it is primarily looking for a long contract, a large and stable supplier will probably satisfy the objective; if it wants to achieve higher cost efficiency, then a supplier with many similar customers who have economies of scale may be an attractive solution. Similarly, an outsourcing company that aims for service improvements may satisfy its objective through a customised logistics solution, while if it seeks the development of a new competence configuration in the outsourcing relationship, then a joint logistics solution seems to be the right prescription.

The initial decision to outsource should be the subject of a feasibility study, in which management cautiously considers all decision criteria, positive and negative, and does not rely simply on financial or technical factors, as is so often the case in practice. Given that business is in a constant state of change, it is very important to choose a type of arrangement that is not only the most appropriate for the objective of the outsourcing at present time but also takes into account possible future developments. What will happen, for instance, if a new line of business is developed: how can it be incorporated into the contract with the outsource supplier? What effect could a business downturn have on costs? How could a change in business direction be accommodated, when initial cost savings and/or service improvements achieved through an expensive outsourcing contract are no longer needed but the company is locked into a routine that is no longer required? What would be the effect of possible mergers and acquisitions?

Another option worth considering is an arrangement in which 3PL has the potential to generate revenues that can support the building of core competences and ultimately contribute to the outsourcing company's competitiveness. Halldorsson and Skjøtt-Larsen (2004) advise "viewing 3PL [third-party logistics] as a means to configure logistics competencies" and recommend "joint logistics solutions". It is important for the outsourcing company to preserve some expertise with respect to the outsourced activities, as the driver for enrichment and development of new competences and innovation in the relationship. This calls for a true collaboration

between the two parties, moving from the arm's length relationships of the past to a durable one which, according to Teece *et al.* (1997), offers the potential to develop dynamic capabilities, especially if the company acts as a qualified and competent partner and opponent (Eisenhardt and Martin, 2000). In that case, decision criteria related to management capability assume particular importance in the qualification phase of the selection process.

The systematic approach described and advocated in this paper can be thought of as a complement to existing outsourcing methodology, embodying good practice in decision making. It focuses mainly on two critical phases: planning and pre-qualification phase. Although the approach has been empirically tested in new 3PL arrangements, more research is needed to check its validity, and in-depth case studies of outsourcing arrangements. These will supply the body of evidence needed for consolidation and evolution of the methodology by defining its strengths and weaknesses, and devising strategies to overcome the possible barriers raised. Such progress is very important because, though it is normally assumed that outsourcing is a well-trodden path, many relationships do not in practice fulfil the expectations of the players in the game. Therefore, it is vital to explore failures as well as successes. Was the breakdown a function of agreements and working arrangements? Or did it result from faulty outsourcing methodology in which the wrong decision criteria were selected or the qualification phase failed to shortlist suppliers who truly had the competence and ability to do the job?

Much work clearly remains to be done.

References

- Akarte, M.M., Surendra, N.V., Ravi, B. and Rangaraj, N. (2001), "Web based casting supplier evaluation using analytical hierarchy process", *Journal of the Operational Research Society*, Vol. 52, pp. 511-22.
- Albino, V. and Garavelli, A.C. (1998), "A neural network application to subcontractor rating in construction firms", *International Journal of Project Management*, Vol. 16 No. 1, pp. 9-14.
- Anderson, M.G. and Katz, P.B. (1998), "Strategic sourcing", *International Journal of Logistics Management*, Vol. 9 No. 1, pp. 1-13.
- Avery, S. (2000), "Purchasing adds value to the supplier selection process", *Purchasing*, Vol. 129 No. 1, p. 96.
- Barbarosoglu, G. and Yazgac, T. (1997), "An application of the analytic hierarchy process to the supplier selection problem", *Product and Inventory Management Journal*, Vol. 38 No. 1, pp. 14-21.
- Bhutta, K. and Huq, F. (2002), "Supplier selection problem: a comparison of the total cost of ownership and analytic hierarchy process approaches", *Supply Chain Management: An International Journal*, Vol. 7 No. 3, pp. 126-35.
- Bowman, D., Farley, J.U. and Schmittlein, D.C. (2000), "Cross-national empirical generalization in business services buying behavior", *Journal of International Business Studies*, Vol. 31 No. 4, pp. 667-85.
- Carr, A.S. and Pearson, J.N. (2002), "The impact of purchasing and supplier involvement on strategic purchasing and its impact on firm's performance", *International Journal of Operations & Production Management*, Vol. 22 Nos 9/10, pp. 1032-55.
- Carr, A.S. and Smeltzer, L. (1997), "An empirically based operational definition of strategic purchasing", *European Journal of Purchasing & Supply Management*, Vol. 3 No. 4, pp. 199-207.

- Carr, A.S. and Smeltzer, L.R. (2000), "An empirical study of the relationships among purchasing skills and strategic purchasing, financial performance, and supplier responsiveness", *Journal of Supply Chain Management*, Vol. 36 No. 3, pp. 40-54.
- Chao, C., Scheuing, E.E. and Ruch, W.A. (1993), "Purchasing performance evaluation: an investigation of different perspectives", *International Journal of Purchasing & Materials Management*, Vol. 29 No. 3, pp. 33-9.
- Chen, I.J. and Paulraj, A. (2004), "Understanding supply chain management: critical research and a theoretical framework", *International Journal of Production Research*, Vol. 42 No. 1, pp. 131-63.
- Corbett, C. and Van Wassenhove, L. (1993), "Trade-Offs? What trade-offs? Competence and competitiveness in manufacturing strategy", *California Management Review*, Vol. 35 No. 4, pp. 107-21.
- Cousins, P.D. and Spekman, R. (2003), "Strategic supply and the management of inter- and intra-organisational relationships", *Journal of Purchasing & Supply Management*, Vol. 9 No. 1, pp. 19-29.
- Current, J. and Weber, C. (1994), "Application of facility location modelling constructs to vendor selection problems", *European Journal of Operational Research*, Vol. 76 No. 3, pp. 387-92.
- De Boer, L., Labro, E. and Morlacchi, P. (2001), "A review of methods supporting supplier selection", *European Journal of Purchasing & Supply Management*, Vol. 7 No. 2, pp. 75-89.
- De Boer, L., van der Wegen, L. and Telgen, J. (1998), "Outranking methods in support of supplier selection", *European Journal of Purchasing & Supply Management*, Vol. 4 Nos 2/3, pp. 109-18.
- Degraeve, Z. and Roodhooft, F. (2000), "A mathematical programming approach for procurement using activity based costing", *Journal of Business Finance & Accounting*, Vol. 21 Nos 1/2, pp. 69-98.
- Dickson, G. (1966), "An analysis of vendor selection systems and decisions", *Journal of Purchasing*, Vol. 2 No. 1, pp. 5-17.
- Dyer, J.H. (2000), *Collaborative Advantage: Winning through Extended Enterprise Supplier Networks*, Oxford University Press, New York, NY.
- Eisenhardt, K.M. and Martin, J.A. (2000), "Dynamic capabilities: what are they?", *Strategic Management Journal*, Vol. 21 Nos 10/11, pp. 1105-21.
- Ellram, L.M. (1990), "The supplier selection decision in strategic partnerships", *Journal of Purchasing and Materials Management*, Vol. 26 No. 1, pp. 8-14.
- Ellram, L. (1995), "Total cost of ownership: an analysis approach for purchasing", *International Journal of Physical Distribution & Logistics Management*, Vol. 25 No. 8, pp. 4-23.
- Environment Australia Annual Report 2001-2002 (2002), *Management and Accountability: Corporate Governance*, ISSN: 1441-9335. available at: www.deh.gov.au/about/publications/annual-report/01-02/governance.html
- Faes, W., Knight, L. and Matthyssens, P. (2001), "Buyer profiles: an empirical investigation of changing organizational requirements", *European Journal of Purchasing & Supply Management*, Vol. 7 No. 3, pp. 197-208.
- Fine, C. (1999), "The primacy of chains", *Supply Chain Management Review*, Vol. 3 No. 1, pp. 79-81.
- Foster, T.A. (2003), "Engineering the 3PL selection process", *Logistics Management*, Vol. 42 No. 6, pp. 3-11.

- Frost, F.A. and Long, F. (2000), "Quality management standards their importance in supplier selection criteria", *ANZMAC 2000 Visionary Marketing for the 21st Century: Facing the Challenge*.
- Ghodsypour, S.H. and O'Brien, C. (1998), "A decision support system for supplier selection using an integrated analytic hierarchy process and linear programming", *International Journal of Production Economics*, Vol. 56/57, pp. 199-212.
- Giunipero, L. and Percy, D. (2000), "World-class purchasing skills: an empirical investigation", *Journal of Supply Chain Management*, Vol. 34 No. 4, pp. 4-19.
- Giunipero, L.C., Denslow, D. and Eltantawy, R. (2005), "Purchasing/supply chain management flexibility: moving to an entrepreneurial skill set", *Industrial Marketing Management*, Vol. 34 No. 6, pp. 602-3.
- Gonzalez, M.E., Quesada, G. and Monge, C.A.M. (2004), "Determining the importance of the supplier selection process in manufacturing: a case study", *International Journal of Physical Distribution & Logistics Management*, Vol. 34 No. 6, pp. 492-504.
- Halldorsson, A. and Skjøtt-Larsen, T. (2004), "Developing logistics competencies through third party logistics relationships", *International Journal of Operations & Production Management*, Vol. 24 No. 2, pp. 192-206.
- Handfield, R.B. and Nichols, E.L. Jr (1999), *Introduction to Supply Chain Management*, Prentice-Hall, Englewood Cliffs, NJ.
- Handfield, R.B., Walton, S.V., Sroufe, R. and Melynyk, S.A. (2002), "Applying environmental criteria to supplier assessment: a study in the application of the analytical hierarchy process", *European Journal of Operational Research*, Vol. 141 No. 1, pp. 70-87.
- Harland, C., Knight, L., Lamming, R. and Walker, H. (2005), "Outsourcing: assessing the risks and benefits for organisations, sectors and nations", *International Journal of Operations & Production Management*, Vol. 25 No. 9, pp. 831-50.
- Henry, J. and Mayle, D. (2002), *Managing Innovation and Change*, 2nd ed., Sage, London.
- Hill, T.J. (1987), "Teaching manufacturing strategy", *International Journal of Operations & Production Management*, Vol. 6 No. 3, pp. 10-20.
- Hill, T. (2000), *Manufacturing Strategy: Text and Cases*, Irwin McGraw-Hill, Boston, MA.
- Horvath, L. (2001), "Collaboration: the key to value creation in supply chain management", *Supply Chain Management: An International Journal*, Vol. 6 No. 5, pp. 205-7.
- Houshyar, A. and Lyth, D. (1992), "A systematic supplier selection procedure", *Computers & Industrial Engineering*, Vol. 23 Nos 1/4, pp. 173-6.
- Humphreys, P., McIvor, R. and Chan, F. (2003a), "Using case-based reasoning to evaluate supplier environmental management performance", *Expert Systems with Applications*, Vol. 25 No. 2, pp. 141-53.
- Humphreys, P.K., Wong, Y.K. and Chan, F.T.S. (2003b), "Integrating environmental criteria into the supplier selection process", *Journal of Materials Processing Technology*, Vol. 138 Nos 1/3, pp. 349-56.
- Kannan, V.R. and Tan, K.C. (2002), "Supplier selection and assessment: their impact on business performance", *Journal of Supply Chain Management: A Global Review of Purchasing and Supply*, Vol. 38 No. 4, pp. 11-21.
- Karpak, B., Kasuganti, R.R. and Kumcu, E. (1999a), "Multi-objective decision-making in supplier selection: an application of visual interactive goal programming", *Journal of Applied Business Research*, Vol. 15 No. 2, pp. 57-71.

- Karpak, B., Kumcu, E. and Kasuganti, R.R. (1999b), "An application of visual interactive goal programming: a case in vendor selection decisions", *Journal of Multi-criteria Decisions Analysis*, Vol. 8 No. 2, pp. 93-105.
- Karpak, B., Kumcu, E. and Kasuganti, R.R. (2001), "Purchasing materials in the supply chain: managing a multi-objective task", *European Journal of Purchasing & Supply Management*, Vol. 7 No. 3, pp. 209-16.
- Katsikeas, C.S., Paparoidamis, N.G. and Katsikea, E. (2004), "Supply source selection criteria: the impact of supplier performance on distributor performance", *Industrial Marketing Management*, Vol. 33 No. 8, pp. 755-64.
- Khoo, L.P., Tor, S.B. and Lee, S.S.G. (1998), "The potential of intelligent software agents in the world wide web in the automated part procurement", *International Journal of Purchasing and Materials Management*, Vol. 34 No. 1, pp. 46-52.
- Krause, D.R. (1999), "The antecedents of buying firms' efforts to improve suppliers", *Journal of Operations Management*, Vol. 17 No. 2, pp. 205-24.
- Krause, D.R., Pagell, M. and Curkovic, S. (2001), "Toward a measure of competitive priorities for purchasing", *Journal of Operations Management*, Vol. 19 No. 4, pp. 497-512.
- Lamming, R. (1993), *Beyond Partnership: Strategies for Innovation and Lean Supply*, Prentice-Hall, Hemel Hempstead.
- Langley, C.J., Allen, G.A. and Tyndall, G.R. (2001), *Third-party Logistics Study: Results and Findings of the 2001 Sixth Annual Study*, Georgia Institute of Technology, Cap Gemini Ernst & Young, Ryder System, Inc..
- Lee, E-K., Ha, S. and Kim, S.K. (2001), "Supplier selection and management system considering relationships in supply chain management", *IEEE Transactions on Engineering Management*, Vol. 47 No. 4, pp. 307-18.
- Lin, C., Chow, W.S., Madu, C.N., Kuei, C.H. and Yu, P.P. (2005), "A structural equation model of supply chain quality management and organizational performance", *International Journal of Production Economics*, Vol. 96 No. 3, pp. 355-65.
- Liu, J., Ding, F.Y. and Lall, V. (2000), "Using data envelopment analysis to compare suppliers for supplier selection and performance improvement", *Supply Chain Management*, Vol. 5 No. 3, pp. 753-8.
- McLaren, T., Head, M. and Yuan, Y. (2002), "Supply chain collaboration alternatives: understanding the expected cost and benefits", *Internet Research: Electronic Networking Applications and Policy*, Vol. 12 No. 4, pp. 348-64.
- Mandal, A. and Deshmukh, S.G. (1994), "Vendor selection using interpretative structural modelling (ISM)", *International Journal of Operations & Production Management*, Vol. 14 No. 6, pp. 52-9.
- Market Testing for IS/IT Provision (1993), ISBN: 0946683645, London, May.
- Masella, C. and Rangone, A. (2001), "A contingent approach to the design of vendor selection systems for different types of co-operative customer supplier relationships", *International Journal of Operations & Production Management*, Vol. 20 No. 1, pp. 70-84.
- Menon, M.K., McGinnis, M.A. and Ackerman, K.B. (1998), "Selection criteria for providers of third-party logistics services: an exploratory study", *Journal of Business Logistics*, Vol. 19 No. 1, pp. 121-37.
- Mummalaneni, V., Dubas, K.M. and Chao, C. (1996), "Chinese purchasing managers' preferences and trade-offs in supplier selection and performance evaluation", *Industrial Marketing Management*, Vol. 25 No. 2, pp. 115-24.

- Muralidharan, C., Anantharaman, N. and Deshmukh, S.G. (2001), "Vendor rating in purchasing scenario: a confidence interval approach", *International Journal of Operations & Production Management*, Vol. 21 No. 10, pp. 1306-25.
- Nydick, R.L. and Hill, R.P. (1992), "Using the analytic hierarchy process to structure the supplier selection procedure", *International Journal of Purchasing and Materials Management*, Vol. 28 No. 2, pp. 31-6.
- Park, D. and Krishnan, H.A. (2001), "Supplier selection practices among small firms in the United States: testing three models", *Journal of Small Business Management*, Vol. 39 No. 3, pp. 259-71.
- Parker, H. (2000), "Inter-firm collaboration and the new product development process", *Industrial Management & Data Systems*, Vol. 100 No. 6, pp. 255-60.
- Pearson, J.N. and Ellram, L.M. (1995), "Supplier selection and evaluation in small versus large electronics firms", *Journal of Small Business Management*, Vol. 33 No. 4, pp. 53-65.
- Pochard, S. (2003), "Managing risks of supply-chain disruptions: dual sourcing as a real option", *Master of Science in Technology and Policy*, Massachusetts Institute of Technology, Cambridge, MA.
- Richardson, H.L. (1993), "Contracts build relationships", *Transportation & Distribution*, Vol. 34 No. 11, p. 53.
- Ronen, B. and Trietsch, D. (1988), "A decision support system for purchasing management of large projects", *Operations Research*, Vol. 36 No. 6, pp. 882-90.
- Sarkis, J. and Talluri, S. (2000), "A model for strategic supplier selection", In: De Boer, L., Labro, E. and Morlacchi, P. (2001), "A review of methods supporting supplier selection", *European Journal of Purchasing & Supply Management*, Vol. 7 No. 2, pp. 75-89.
- Sarkis, J. and Talluri, S. (2002), "A model for strategic supplier selection", *Journal of Supply Chain Management*, Vol. 38 No. 1, pp. 18-28.
- Sharland, A., Eltantawy, R.A. and Giunipero, L.C. (2003), "The impact of cycle time on supplier selection and subsequent performance outcomes", *Journal of Supply Chain Management: A Global Review of Purchasing and Supply*, Vol. 39 No. 3, pp. 4-12.
- Shin, H., Collier, D.A. and Wilson, D.D. (2000), "Supply management orientation and supplier/buyer performance", *Journal of Operations Management*, Vol. 18 No. 3, pp. 317-33.
- Sink, H.L. and Langley, C.J. Jr (1997), "A managerial framework for the acquisition of third-party logistics services", *Journal of Business Logistics*, Vol. 18 No. 2, pp. 163-89.
- Slack, N., Chambers, S. and Johnston, R. (2005), *Operations Management*, 5th ed., FT/Prentice-Hall, London.
- Smytka, D.L. and Clemens, M.W. (1993), "Total cost supplier selection model: a case study", *International Journal of Purchasing and Materials Management*, Vol. 29 No. 1, pp. 42-9.
- Svensson, G. (2004), "Supplier segmentation in the automotive industry: a dyadic approach of a managerial model", *International Journal of Physical Distribution & Logistics Management*, Vol. 34 Nos 1/2, pp. 12-38.
- Swift, C.O. and Gruben, K.H. (2000), "Gender differences in weighting of supplier selection criteria", *Journal of Managerial Issues*, Vol. 12 No. 4, pp. 502-12.
- Teece, D.J., Pisano, G. and Shuen, A. (1997), "Dynamic capabilities and strategic management", *Strategic Management Journal*, Vol. 18 No. 7, pp. 509-33.
- Verma, R. and Pullman, M.E. (1998), "An analysis of the supplier selection process", *International Journal of Management Science*, Vol. 26 No. 6, pp. 739-50.

-
- Vokurka, R.J., Choobineh, J. and Vadi, L. (1996), "A prototype expert system for the evaluation and selection of potential suppliers", *International Journal of Operations & Production Management*, Vol. 16 No. 12, pp. 106-27.
- Weber, C.A. and Desai, A. (1996), "Determination of paths to vendor market efficiency using parallel co-ordinates representation: a negotiation tool for buyers", *European Journal of Operational Research*, Vol. 90 No. 1, pp. 142-55.
- Weber, C.A. and Ellram, L.M. (1993), "Supplier selection using multi-objective programming: a decision support system approach", *International Journal of Physical Distribution & Logistics Management*, Vol. 23 No. 2, pp. 3-14.
- Weber, C.A., Current, J.R. and Benton, W.C. (1991), "Vendor selection criteria and methods", *European Journal of Operational Research*, Vol. 50 No. 1, pp. 2-18.
- Weber, C.A., Current, J.R. and Desai, A. (1998), "Non-cooperative negotiation strategies for vendor selection", *European Journal of Operational Research*, Vol. 108 No. 1, pp. 208-23.
- Weber, C.A., Current, J.R. and Desai, A. (2000a), "An optimization approach to determining the number of vendors to employ", *Supply Chain Management: An International Journal*, Vol. 5 No. 2, pp. 90-8.
- Weber, C.A., Current, J.R. and Desai, A. (2000b), "Vendor: a structured approach to vendor selection and negotiation", *Journal of Business Logistics*, Vol. 21 No. 1, pp. 135-67.
- Yan, H. and Wei, Q. (2002), "Determining compromise weights for group decision making", *Journal of the Operational Research Society*, Vol. 53 No. 6, pp. 680-7.

Further reading

- Bell, J. (1996), "Expanding a small world", *Distribution*, Vol. 95 No. 8, p. 56.
- Heskett, J.L. (1994), "Controlling customer logistics service", *International Journal of Physical Distribution & Logistics Management*, Vol. 24 No. 4, pp. 4-10.
- Richardson, J. (1993), "Parallel sourcing and supplier performance in the Japanese automobile industry", *Strategic Management Journal*, Vol. 14 No. 5, pp. 339-50.
- Ross, D.F. (1998), *Distribution Planning and Control*, Kluwer Academic Publishers, Boston, MA.

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1. Marise K. Santos, Angela M.F. Danilevicz, Rejane M.C. Tubino. 2017. Environmental service providers assessment: A multi-criteria model applied to industrial waste. *Journal of Cleaner Production* **159**, 374-387. [[Crossref](#)]
2. Riikka Kaipia, Virpi Turkulainen. 2017. Managing integration in outsourcing relationships — The influence of cost and quality priorities. *Industrial Marketing Management* **61**, 114-129. [[Crossref](#)]
3. Maria Creuza Borges de Araújo, Luciana Hazin Alencar, Joana Coelho Viana. 2015. Structuring a model for supplier selection. *Management Research Review* **38**:11, 1213-1232. [[Abstract](#)] [[Full Text](#)] [[PDF](#)]
4. Shad Dowlatshahi, Mehdi Karimi-Nasab, Hasan Bahrololum. 2015. A group decision-making approach for supplier selection in configuration design: A case study. *The International Journal of Advanced Manufacturing Technology* **81**:5-8, 1139-1154. [[Crossref](#)]
5. BooYun Cho, Gi-Choon Kang, MinCheol Hyun. 2014. Study of the Effects of Supplier Monitoring on Shop floor Productivity. *Journal of the Korea Academia-Industrial cooperation Society* **15**:12, 7025-7039. [[Crossref](#)]
6. Joana Coelho Viana, Luciana Hazin Alencar. 2012. Metodologias para seleção de fornecedores: uma revisão da literatura. *Production* **22**:4, 625-636. [[Crossref](#)]
7. Brigitte de Faultrier, Neil Towers. 2011. An exploratory packaging study of the composite fashion footwear buying framework. *Journal of Retailing and Consumer Services* **18**:5, 463-470. [[Crossref](#)]
8. Yee Shih Phua, Margaret A Abernethy, Anne M Lillis. 2011. Controls as Exit Barriers in Multiperiod Outsourcing Arrangements. *The Accounting Review* **86**:5, 1795-1834. [[Crossref](#)]
9. Anna Moses. 2011. Cross-functional make or buy decision process ownership. *Management Research Review* **34**:9, 1042-1060. [[Abstract](#)] [[Full Text](#)] [[PDF](#)]
10. Sylvain Charlebois. 2008. The gateway to a Canadian market-driven agricultural economy. *British Food Journal* **110**:9, 882-897. [[Abstract](#)] [[Full Text](#)] [[PDF](#)]