

**SWP 7/96 SUPPLY BASE MANAGEMENT:
AN EMPIRICAL INVESTIGATION**

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Supplier Base Management: An Empirical Investigation

Keith Goffin, Marek Szwejczewski and Colin New

ABSTRACT

Manufacturing companies place a strong emphasis on the role of supply chain management—the management of supplies, suppliers, inventory and distribution. Supplier management is key and much of the literature talks about the trend to reduce supplier base. Database analysis gave empirical evidence of this trend in UK manufacturing companies—201 companies from different industrial sectors were all found to have cut their supplier base over the last four years, on average by 9% in the household products sector and approximately 35% in the process, engineering and electronics sectors. Further research at four companies looked at their experiences with suppliers and established that a key reason for supplier base reduction is to free time to more effectively manage the remaining suppliers. The criteria used for supplier selection and reasons why single-sourcing was avoided were also identified. These findings on supplier management have implications for both researchers and managers in industry.

KEYWORDS

UK manufacturing, supply chain management, supplier base and supplier relationships

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INTRODUCTION

In today's increasingly competitive international business environment, many companies are focusing on supply chain management as a means for achieving long-term competitive advantage [1-8]. The term supply chain management has been used since the 1980s [9], and is defined as "managing the entire chain of raw material supply, manufacture, assembly and distribution to the end customer" [3]. Modern supply chain management is a complex and demanding management task [2], for which a range of management software systems have been developed [10],[11]. Much has been published in the last few years on supply chain management and currently many firms are attempting to recruit suitable professionals to work specifically in this area [12].

One important aspect of supply chain management is supplier management—organising the optimal flow of high-quality, value-for-money materials or components to manufacturing companies from a suitable set of innovative suppliers. Consequently what used to be thought of as a purely tactical exercise—purchasing—is now recognised as a strategic function, since "external suppliers now exert a major influence on a company's success or failure" [13]. To obtain a competitive advantage, companies are streamlining the number of suppliers from which they purchase. The reduced supplier base means that closer, longer-term relationships can be established with a few (sometimes single-source) suppliers who then play a critical role—contributing to new product design [6], significantly reducing costs and constantly improving quality [13]. All this is a far cry from the traditional multi-sourcing approach, where adversarial buyer-supplier relationships were common and where short-term orders were simply placed with the supplier offering the lowest price.

It should be remembered that supplier management—the subject of this paper—is only one of the key issues of supply chain management [14]. Some of the other issues, such as managing inventory in the supply chain have been thoroughly investigated [14] but supplier management is an area which needs further investigation. Consequently, the first objective of this research was to investigate changes in the supplier base of UK manufacturing plants, to determine if the average number of suppliers used by companies in various industrial sectors has changed. The second objective was to determine the reasons why manufacturing companies reduce their supply base. This research throws new light on some important aspects of supplier management.

SUPPLIER MANAGEMENT

The topics in the literature on supplier management can be broadly grouped into three categories:

- The importance of supplier base management
- Supplier selection, auditing and supplier base reduction
- The effects of supplier base reduction (including closer buyer-supplier relationships)

The Importance of Supplier Management

Supplier management—also called supplier base management in some of the literature—is an essential issue for manufacturing companies. One author says, "it is futile for big businesses to reform their manufacturing operations without the strong support of suppliers" [15], another, "we are beginning to witness the positive and strategic contribution the purchasing and sourcing process can make to a firm's total performance" [13].

One reason for the increased importance of supplier management is that many manufacturers are concentrating on their core competencies, moving away from vertical integration, and therefore need to gain a competitive edge on the supply side of their operations [5]. Good suppliers can help manufacturers during the development of new products and processes, with long-term quality improvements, cost reductions and provide enhanced delivery performance [13]. Therefore, for manufacturers “the challenge is to maximise [supplier] performance better than competitors” [13].

For companies spending a high percentage of their revenue on parts and materials, savings are particularly important. In these cases, a saving of 1% on purchasing costs can have the same effect on profit as a 8-10% increase in sales [16]. Close co-operation with suppliers quickly brings lower unit costs [17] and, longer-term, even greater quality at lower cost [15][18].

Much of the research investigating supplier base management (and supply chain management in general) has focused on the automotive industry and stems particularly from the work of Lamming [19]. He first recognised the competitive advantages gained by the Japanese car companies through their use of close, long-term relationships with suppliers and developed a four phase descriptive model of the car industry’s move towards closer buyer-supplier relationships—partnerships. He has also published (rare) empirical data demonstrating the reduction in the number of suppliers used by automotive manufacturers [19, p181]. The drive to focus on supplier management comes from the fact that all car factories are highly efficient and so the search for a competitive edge had to shift [20].

Supplier Selection, Auditing and Supply Base Reduction

How should companies select their supplies? Although this is the critical question facing management [21], “there appears to be little documentation on the method used for supplier selection” [22]. However, there are a number of models and recommendations and Table I summarises the main changes between what has been termed the traditional approach and a more modern approach (supplier management).

Table I shows that the decision criteria in traditional approaches to purchasing were firstly unit price and then quality and speed of delivery. Price has often been the factor given the main emphasis: “the choice of lowest price, is perhaps one of the most defined characteristics of primitive purchasing” [19, p148]. Quality tended to be looked at from the conformance point of view i.e. if the supplier’s quality simply met the current required level, then this was acceptable. A better way to select suppliers is by looking not only at current quality but also at their quality record, their potential for further improvement [18][23], and their use of Total Quality Management (TQM) [21][24].

Current thinking proposes a wide set of factors to be considered during supplier selection. It is important to look not only at today’s unit price but also the total purchase costs (including ordering, transport and inventory costs [18]) and the potential for price reduction [18][23][25]. La Londe et al [4] list items to be considered during supplier selection, including the supplier’s financial stability and environmental standards record. In choosing suppliers, not only the original supply base needs to be examined; others including foreign suppliers should be considered [13].

Both Kolay [26] and Monczka [7] stress that it is essential to audit the strategic capabilities of potential suppliers, such as their ability to contribute to product development. What are their technological capabilities? How will the supplier

contribute towards the buyer's competitive advantage? These are the sort of questions that need to be asked when selecting suppliers. A complex model has been developed for use in regular audits of the relative value of suppliers—as an “asset base”—to the buyer (manufacturer). The drawback of this model is that the weighting factors for the decision criteria are highly contextual [26]. In a review of five other prescriptive models for supplier selection, Ellram [27] concluded that no model fits all situations adequately.

Table I: Traditional and Supplier Management Approaches to Purchasing

Issue	<u>Traditional Approach</u> - Purchasing	Supplier Management Approach
Key factors in the purchasing decision for the buyer	<ul style="list-style-type: none"> • Unit price (main emphasis) [19] • Quality conformance • Speed of delivery 	<ul style="list-style-type: none"> • Total costs [18][23] • Quality [15], quality record [18][23] and supplier's use of TQM [21][24] • Delivery and cycle times [4][5][6][21] including JIT delivery capability [15][22] • Financial Stability [4][15][27] • Environmental standards [4] • Supplier's technological capabilities [13][15][27] and strategic contribution [26] • Service (flexibility, guarantees, technical support, etc.) [21] • Industrial relations [15] • Organisational cultural aspects [5][9][27] • Consider all available suppliers [13] • Risks [6][27]
Buyer's relationship with supplier	<ul style="list-style-type: none"> • Transactional • Multi-sourcing [9] • Adversarial [29] 	<ul style="list-style-type: none"> • Long-term [9][19] • Often single-sourcing • Close relationship, dependence, trust [29]
Buyer's departments involved	<ul style="list-style-type: none"> • Purchasing department only (a service department) 	<ul style="list-style-type: none"> • Cross-functional team led by supply manager[5][15]

Table I also indicates that co-operation between buyers and suppliers has moved from a transactional to a long-term basis. This new relationship is radically different—it is of strategic importance to the business. Consequently, cross-functional teamwork is essential in choosing suppliers [5][15]. Most of the criteria for supplier choice are focused on quantifiable measures, however, other more qualitative factors need to be considered. For example, an assessment needs to be made of whether the culture of the supplier's organisation can effectively co-operate with the buyer's organisational culture [5][9].

A number of anecdotal reports on supplier base reduction can be found in the literature. For example, Sun computer systems reduced their supplier base from 100 suppliers in 1990 (85% of purchases) to 20 (86% in 1995) [10]. Suppliers are closely monitored on a quarterly basis, looking at quality, technological capabilities, delivery record, service levels and price. Similarly, the electronics manufacturer Motorola cut their number of suppliers from 4000 in 1985 to 1000 in 1993 and established long-term relationships [17].

A case study on the UK household goods manufacturer Black and Decker showed that supplier management should be based not only on “commercial” factors

(cost, equipment and financial performance) but also regular, comprehensive quality appraisals. This approach has led “to a vendor base with a smaller number of ‘world class’ suppliers producing high quality components within a more stable long-term business environment” [28]. Lucas, the automotive component manufacturer takes six to eight weeks to evaluate potential suppliers but sees a wide range of benefits for the buyer, supplier and also end-customer in having a reduced supplier base [16].

Many articles on supply chain management recommend a reduced supplier base and closer relationships with the remaining suppliers but without realistically discussing the consequences. Ellram [1] is more pragmatic, saying that supply chain management is not a panacea and disadvantages must be evaluated, such as the possibility of reduced competition slowing suppliers’ rates of innovation.

The Effects of Supplier Base Reduction

What are the effects of a reduced supplier base? Are there drawbacks as well as advantages? A number of studies have looked at this and, “it can be seen that, whilst there is general agreement on the reduction of multi-sourcing in networks, there is a range of views on the relative merits of single and multi-sourcing” [9].

One paper on supplier management looked closely at the advantages and disadvantages of supplier base reduction. It concluded; “we have been dismayed to find that OEM managers rarely consider the considerable risks of these strategic moves” and; “it is essential that both parties thoroughly understand these costs and benefits and the related short- and long-term impacts of these relationships” [6]. The paper goes further and summarises the advantages and disadvantages of partnerships, for the buyer and supplier. Ellram [1] takes a similar view that there are drawbacks and presents comprehensive lists of advantages and disadvantages compiled from the literature.

The main effect of a reduced supplier base is that it leaves the buyer more time to develop closer relationships with the remaining suppliers. When correctly managed, this should lead to a competitive advantage for the manufacturer, through reduced costs, higher quality and innovation resulting from the support of suppliers in product or process development [5]. One empirical study has shown that buyer-supplier co-operation is perceived by buyers to lead to higher product quality and lower total costs [18].

Stronger buyer-supplier co-operation necessitates closer communication. New technology has played a key role in making closer relationships easier e.g. through electronic data interchange (EDI) [3].

The factors which determine how close buyer-supplier relationships will become are the degree of mutual dependence, the length of the co-operation, the extent of joint projects and technological links and the degree of economic satisfaction with the co-operation [7] [29].

RESEARCH DESIGN

From the literature, it can be seen that although many authors have discussed supplier management:

- With the exception of the automotive industry, the evidence of the trend towards fewer suppliers is largely anecdotal—there is a need for wider empirical evidence
- Still too little is known about the experiences of companies who have reduced their supplier base. Are there lessons to be learned?

It was decided to check whether a trend towards a reduced supplier base could be identified in various sectors of UK industry and to investigate the experiences of some

companies who have experience of reducing their supplier base. This led to a two stage approach to the research.

Stage 1: Database Analysis

The Best Factory Awards (BFA) database of UK manufacturing companies was used to establish whether there is a trend towards reducing the supplier base. The BFA programme is run by Management Today (a leading UK management magazine) and Cranfield School of Management. The programme recognises manufacturing excellence and collects detailed information from industry for research and benchmarking purposes. The annual awards are open to any manufacturer with a UK-based plant which completes a detailed 14 page, confidential questionnaire covering performance data (e.g. delivery reliability), the products produced, management policies, etc. Questionnaires are analysed and this results in a short-list of manufacturing plants which have high performance relative to the norms of their industry. A panel of judges visits short-listed companies, verifies the performance data, probes managers on their manufacturing strategy and checks issues such as the active participation of employees in quality management. Each year seven categories of prizes are awarded; the selection process itself has been described elsewhere in more detail [30].

The database currently contains high-quality data on the performance of over 1000 manufacturing plants in the UK, covering all industrial sectors. The database was of particular interest for the research as one of the sections of the questionnaire looks directly at supplier management—collecting information on the number of suppliers each manufacturing plant has had over a four year period. In 1995 the questionnaire gathered data on the number of suppliers in 1991, 1993 and 1995. The relevant questions are given in Appendix A.

Stage 2: Case Study Research

The second part of the research required an in-depth approach to explore the experiences of companies which have reduced their supplier base. Consequently, the case study method was selected, which allowed a detailed understanding of the situation at each company to be developed, on which an analysis could be based [31].

As an exploratory investigation, four plants were selected from those who had entered the BFA in 1995. Plants were selected which had reduced their supplier base but were also growing in terms of output (and had therefore not simply reduced their product range). Two were chosen from the electronics sector and two from the process sector; the automotive industry was deliberately avoided as the focus was on other sectors.

The case studies presented are based on BFA data, company documents and one day factory visits to interview key managers. The most senior individual responsible for supply chain management was interviewed in-depth following a semi-structured format which covered the following main points:

- Why the supply base was reduced
- How selections were made
- Supplier auditing and monitoring
- Parts sourcing policy
- Lessons learnt

The interviews were tape-recorded and at the same time detailed notes were taken. Interview transcriptions were checked for clarity and footnotes added to explain any

specific terms used by the respondents. The transcripts, interview notes and copies of relevant company documents were collated in a file which also included a copy of the completed BFA questionnaire for that plant.

Analysis involved two stages. Each case was reviewed separately and the data analysed to give a complete picture of the company's supplier situation. Following this, it was possible to make cross-comparisons, to determine where similarities and differences existed [31].

RESULTS AND DISCUSSION

Database Analysis

A total of 236 plants entered the BFA programme in 1995, of which 201 fully answered the questions about suppliers. Table II shows the average number of suppliers used by manufacturing plants in each of the industry sectors (there are different numbers in each sector as this was the breakdown of entrants in 1995). It can be seen that there has been a large reduction in the average number of suppliers to the process, engineering and electronics sectors (all have an average of over 35% reduction in supplier base since 1991), whereas both the average number of suppliers and the reduction in the household sector is lower (a reduction of 8%). Although the BFA database is not necessarily representative of UK industry (entrants are self-selecting), these results give important empirical evidence of the much discussed trend of supplier base reduction. Further research would be necessary to identify the reasons why the household sector—which started with fewer suppliers—has reduced its supplier base less than the other sectors.

Table II: Average Number of Suppliers for the Period 1991-1995

Industrial Sector	Sample	1991	1993	1995	Reduction 1991-95
Process	<i>n</i> =30	221	199	142	36%
Engineering	<i>n</i> =63	496	400	316	36%
Electronics	<i>n</i> =34	382	304	250	35%
Household	<i>n</i> =74	107	99	97	9%
	N=201				

Case Study Analysis

Table III shows key information about each of the four manufacturing plants. The companies have been disguised to ensure confidentiality and will be referred to as Switchco, Electro, Packco and Lubco. The two plants Switchco and Electro are from the electronics sector (manufacturing switches and electronic equipment respectively), whereas Packco and Lubco are from the process sector (producing packaging and lubricants respectively). A point to note is that all four companies have a high percentage of bought-in materials purchased from suppliers—therefore supplier management is significant to their businesses. The magnitude of the supplier base reduction since 1991 varied from 6% (Electro who had made previous significant reductions in the late-1980s) to 46% (Lubco).

Case analysis gave insights on the following areas: the change in emphasis on supply chain management; the reasons for supplier base reduction; how suppliers are selected and audited; single- versus multiple-sourcing policies and; the lessons learnt from supplier base reduction.

The Change in Emphasis

The process of supplier base reduction was not carried out in isolation. As might be expected, it was part of a general emphasis on supply chain management at all of the companies. For example Switchco were “trying to re-engineer the supply chain” and reduce inventory throughout.

Table III: Background Information and Cross-Case Analysis for the Four Plants.

Background				
Company	Switchco	Electro	Packco	Lubco
Industrial Sector	Electronics	Electronics	Process	Process
Product	Switches, sensors	Electronic equipment	Packaging	Lubricants
No. of plant employees	750	1000	230	110
Product complexity	Medium	High	Low	Low
Bought-in materials (%) ¹	High	High	High	High
No. of suppliers in 1991	700	223	24	54
in 1993	500	216	21	35
in 1995	400	210	20	29
Reduction 1991-95	42%	6% ²	16%	46%
Interviewees	• Materials Planning Mgr. • Mftg. Director	• Materials Planning Mgr. • Mftg. Director	• Purchasing Manager. • Ops. Director	• Purchasing Manager • Ops. Mgr.
Analysis				
Main reason for reduction	Effectively manage fewer suppliers	Effectively manage fewer suppliers	Effectively manage fewer suppliers	Focus on ISO 9000 suppliers only
Main selection / audit criteria	Quality perf. Delivery perf. Cost Processes Equipment Quality system	Quality perf. Delivery perf. Cost Communication Cost reduction	Quality perf. Delivery perf. Cost Tech. capability ISO 9000	Quality perf. Delivery perf. Cost Safety record Environ. record Financial record Innovation
Sourcing policy (single/dual/multi-sourcing)	“not clear cut”; item-by-item; back-ups used	One active supplier, others approved	Back-up; “cross-fertilisation” of suppliers	Dual-sourcing; back-ups; item-by-item
Key lessons learnt	Reduction becomes progressively harder; have good reasons for reduction; buyer influences supplier’s performance; drop suppliers professionally	Suppliers are extremely supportive in solving problems; consequently treat them as partners	Significantly improved supplier performance; continuous improvement; dangers of partnership	Suppliers must understand the buyer’s exact requirements; relationships take time to develop; suppliers really support innovation
Notes: 1—The actual percentage values were available to the researchers but are not presented here for reasons of confidentiality. 2—Electro made a significant reduction in their supplier base in the late-1980s.				

At Electro the reduction in supplier base was part of the supply chain strategy introduced “ever since we moved to trying to do a better job for customers ... [when]

we realised that we would only be as good as the supply chain” (Electro—Materials Planning Manager). In a strategy document, Electro have planned how they will manage their supply chain in the future and have set annual targets for further reductions in their supplier base. This strategy was seen as essential because, “if we haven't got an effective supply chain no matter how good we are at planning and production we will not meet customer service requirements” (Electro—Manufacturing Director).

Packco have focused on the supply chain for about 8 years, since the introduction of a MRPII system made them look closely at supply chain management; in particular at inventory levels and contacts with suppliers. Lubco realised that “there wasn't enough emphasis in our organisation on effective supply chain management” (Lubco—Operations Manager) and now give it top management attention.

Why Reduce?

Three of the plants gave similar reasons for reducing their supplier base. Switchco, Electro and Packco strongly believed it would allow them to better focus their time and resources on more effectively managing the remaining suppliers—and lead to improved cost, quality and delivery performance from these suppliers.

By reducing “[we could] reward the best supplier with an increased slice of the business and overall get much better vendor performance” said Switchco's Manufacturing Director, explaining they had poorly managed suppliers in the past with sometimes five suppliers for the same part. At Electro the decision was partly driven by a new generation of products which required sourcing some new technologies. However, an additional “reason we reduced the number of suppliers is the fewer number of suppliers we have the more effectively we can manage the ones that are left” (Electro—Materials Planning Manager). Packco see “there are benefits in long term relationships with suppliers in they get better, not just over a month, but over the year they get better at producing what you want... [and also] things like continuous improvement are easier if you aren't chopping and changing suppliers all the time” (Packco—Purchasing Manager).

In contrast to the other companies, the main driver for Lubco to reduce the supplier base was a management decision to purchase from ISO 9000 registered companies only. Some suppliers were dropped and a few new ones were added as replacements. For Lubco the reduction means that much less time is wasted by purchasing employees travelling to visit (too) many suppliers.

Supplier Selection and Auditing

The traditional approach to purchasing focuses on price, quality and delivery. Table III shows that all four companies based their supplier selection on these criteria supplemented by other factors relevant to their businesses.

Switchco said “we started to work much, much closer with the vendors, we set up a formal vendor quality group, we started to get a better understanding of what each individual vendor's capabilities were” (Switchco—Materials Planning Manager). They look particularly at suppliers' process capabilities, their equipment and quality management—this in-depth knowledge of suppliers' competencies enabled Switchco to choose the most suitable partners.

Electro supplemented traditional purchasing criteria with an assessment of how suppliers would be able to reduce costs and how efficiently they would be able to communicate with Electro. Table III shows that technical capability and ISO 9000

registration were key criteria for Packco. For Lubco the safety, environmental and financial track record of a company are important. In addition, they consider whether “they [individual suppliers] are innovative and what value they could bring to the business” (Lubco— Purchasing Manager).

All four companies showed that the use of extra criteria in supplier selection is important, each company having a range of criteria which they felt had been useful to their own supplier selection process.

Sourcing Policy

Some authors recommend that companies adopt a single-sourcing policy and follow the lead of car manufacturers who have successfully implemented this approach. However, all four case companies have not adopted this policy; for good reasons they operate a mixture of single- and dual-sourcing.

Switchco do not have a clear-cut single- or dual-sourcing policy. Items like packaging are single-sourced but dual sourcing is used for key bespoke items. Some parts with high tooling costs “can drive you towards single-sourcing” (Switchco— Purchasing Manager). However, in these cases back-ups are deemed necessary by Switchco who make sure that one of their other suppliers has the capability to make these parts quickly, although they do not normally purchase the same part from both suppliers at the same time

Electro have a policy to, “have a prime supplier but with a back-up available — a back-up who we would be exercising” (Electro—Materials Planning Manager). Behind this policy: “the reason really for dual sourcing is really more for disaster planning it’s not the fact that we don't trust them [suppliers] it’s that the facts of life are that we could have things like a fire, an earthquake or anything” (Electro— Materials Planning Manager).

Packco have back-ups across their whole range of bought-in components: “what we do is we always have more than one approved supplier for every part number, but only one active supplier.....the other supplier is active on another part number so we are in contact with him” (Packco—Purchasing Manager). Packco encourage communications between suppliers (“supplier cross-fertilisation”) so that the back-up can quickly produce if necessary (Packco—Purchasing Manager). Lubco normally use dual-sourcing with business split 75% to 25% between suppliers but use single suppliers if appropriate—they have a pragmatic item-by-item approach to sourcing.

At all four case companies single-sourcing was seen to be too high risk and therefore back-up mechanisms had been implemented. Whether the use of back-ups is particularly common in the electronics and process sectors requires further investigation.

Lessons Learnt

Managers were asked what lessons they had learnt from the process of supplier reduction. Switchco and Packco articulated the most ideas and in total six issues were raised:

1. Reducing the supplier base is initially easy: “going from a thousand to six hundred is easy... it becomes increasingly more difficult thereafter and takes a fair bit of time to reduce” (Switchco—Materials Planning Manager).

2. “Don’t reduce suppliers just for the sake of doing it” (Switchco—Materials Planning Manager)—the process should be part of a well thought out strategy, with the reductions being carried out component group by component group.
3. Two companies were genuinely surprised at the loyalty of some of their suppliers, since they had been given longer-term contracts. Packco thought that longer-term contracts encouraged suppliers to take more responsibility, “they know that they are the sole supplier who is actually active on that part number and I think they do perform better” (Packco—Purchasing Manager). Electro treat their suppliers well because “we will normally find that our suppliers are really prepared to jump through hoops to help us even when we’ve been the cause of the issue”. Therefore, “treat the supplier as a partner rather than as an enemy” (Electro—Materials Planning Manager).
4. A key part of the buyer-supplier relationship is ensuring that suppliers understand all details of the buyer’s requirements. For example, “it is very very imperative [sic] that they understand why we are asking them to do specific things” (Lubco—Purchasing Manager). Lubco regularly invite their suppliers to visit their production lines to see first-hand the requirements. Switchco also recognised the importance of ensuring that the supplier was given a full view of the business needs saying, “over a period of time we have started to recognise that vendor performance is as much a derivative of what [we do] as the vendor, in terms of how we treat them, the quality of information, the specifications, etc.” (Switchco—Materials Planning Manager).
5. De-selected suppliers should be dropped in a professional and ethical manner—at the appropriate time. This is essential to ensure that the company has a professional image for its dealings with suppliers (Switchco).
6. There can be drawbacks to closer buyer-supplier relationships. The Purchasing Manager at Packco said, “There are dangers in this as well and there is a lot of talk about partnership and that’s a word that makes me nervous” but only identified one risk. Since “a lot of what we are buying now are commodities”, it makes little sense for Packco to enter into long-term contracts with suppliers on these items because of possible downward market fluctuations. (They had not considered contracts which would protect them against the originally agreed [higher] price, if market prices fell.)

CONCLUSIONS

The research produced rare empirical evidence of the trend towards reducing the supplier base, identifying the trend in a sample from four sectors of UK industry. Supplementing this, the exploratory case studies identified some of the key factors related to supplier base reduction and extend the understanding of supplier management in the electronics and process sectors, on which there is only scant previously published material.

The main reason for supplier base reduction was the need to more effectively manage suppliers. With so many companies making the transition to a smaller supplier base, what is the best way to manage the change in buyer-supplier relationships? Fewer suppliers means that more time is available for each supplier but how should this extra time be best invested? These are the sorts of questions that require further investigation.

The criteria used by each company for supplier selection are less comprehensive than the full list generated from the literature (Table I). However, supplier selection is probably highly contextual and companies probably use a set of

criteria they know and feel are relevant to the situation. Whether they are using the most effective criteria for their situation remains to be seen.

The sourcing policies of the four case companies were interesting; they all focused very strongly on back-up suppliers. Is this fear of single-sourcing widespread outside the automotive sector? Once again, this is another area for further investigation.

In reviewing the literature, the authors were surprised at the lack of empirical research on supplier management, despite extensive discussion of the topic in industry. This is a deficiency which needs to be rectified—many questions remain to be answered, and they should be answered empirically. Managers need to know exactly why fewer suppliers can mean more effective management.

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APPENDIX A

The two main questions in the 14 page Best Factory Awards 1995 Questionnaire which relate to supplier base management are given below. Note that the dates given in Question 1 change each year (i.e. they relate to the number of suppliers two and four years ago).

(1) Number of suppliers

How many suppliers do/did you have for manufacturing purposes:

	Number
Currently	
In 1993	
In 1991	

(2) What proportion of your suppliers currently deliver to you:

Daily	%
Twice weekly	%
Weekly	%
Monthly	%
Less frequently than monthly	%
	100%

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