

International Journal of Physical Distribution and Logistics Management  
2001, Vol 31, issue 5, 354-373

**SUPPLIER MANAGEMENT IN GERMAN MANUFACTURING  
COMPANIES: AN EMPIRICAL INVESTIGATION**

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# **SUPPLIER MANAGEMENT IN GERMAN MANUFACTURING COMPANIES: AN EMPIRICAL INVESTIGATION**

## **Abstract**

A key issue for manufacturers is supplier management – organising the optimal flow of high quality, value-for-money materials or components from appropriate innovative suppliers. Many companies now recognise the central role supplier management plays in achieving long term competitive advantage. This paper presents the results of a study of supplier management practices in Germany, contrasted against those in the United Kingdom. It identifies a key difference – German manufacturers have not reduced their supplier base as much as the companies in the UK. However, it appears that German manufacturers will be reducing their supplier base in the near future, although they are likely to follow a policy of multiple sourcing rather than single-sourcing from suppliers. The results of the research have strong implications for German companies – they clearly indicate the potential for performance improvement through the adoption of best practices in the field of supplier management.

**Key words:** supply chain management, supplier base trend.

## INTRODUCTION

Supply chain management has received much attention from both academics and practitioners in the last 20 years. One important aspect of supply chain management is the configuration of the supplier base. Consequently, in today's competitive business environment, many manufacturing companies are focusing on supplier management as a means of achieving long-term competitive advantage. Current thinking is that companies should reduce the number of suppliers with whom they do business in order to establish close long-term relationships with their remaining suppliers. As a result of this best practice – closer co-operation – suppliers can then play a key role by contributing to new product design, reducing costs, and constantly improving quality.

Several writers, in the US and the UK, have recognised that there is a trend among manufacturing companies to reduce their supplier base (e.g. Harland, 1996). However, there has been little empirical research on supplier management in other leading industrialised countries, such as Germany. The German manufacturing sector is very strong – 24.8% of the workforce is employed in manufacturing and this sector is responsible for 25% of the GDP (Anonymous, 1998). For many years the competitiveness of the German manufacturing industry has been the subject of much foreign admiration (Simon, 1992). However with high labour costs and taxes, this lead has been eroded. Over the last few years there has been much debate in Germany on the viability of locating manufacturing operations within that country – the so-called

*Standort Deutschland* debate (for some examples about this discussion see, Brinkler et al, 1997; Henkel, 1997). The view among many writers in Germany is that in order to become more competitive, its manufacturing sector should adopt more “best practices” from abroad (Lay et al, 1996; Kinkel & Wengel, 1997). Therefore, it is important to determine whether supplier management is an area where German manufacturers have adopted best practices. To achieve this, a study was conducted which investigated:

- the trend in the number of suppliers used by German manufacturers, contrasted with the trend previously identified in the UK
- how German manufacturing companies manage their suppliers, for example, the extent to which single-sourcing is used.

The research results indicate a surprisingly slow adoption of international best practice by German companies. This has strong implications for German managers – it indicates how performance could be improved; and for researchers – it shows that further research in this area is needed.

## LITERATURE REVIEW

### The Role of Supplier Management

Supplier management is an important issue for all manufacturing companies because suppliers can make a significant contribution to the achievement of manufacturers' performance objectives (Groves & Valsamakis, 1998; Monczka et al, 1993; Monczka et al, 1998; Tan et al, 1999). Effective supplier management has been defined as the "organisation of the optimal flow of high quality, value for money materials or components to manufacturing companies from a suitable set of innovative suppliers" (Goffin et al, 1997). Therefore close co-operation with suppliers can quickly bring lower unit costs (Sandelands, 1994; Christopher, 1997) and highest quality at lowest cost in the long-term (Burt, 1989; Larson, 1994). Good suppliers can also help manufacturers during the development of new products and processes, with long-term quality improvements and cost reductions, and can provide enhanced delivery performance (Monczka et al, 1993; Leenders et al, 1994; Waller, 1999).

German writers have also acknowledged the key role of supplier management and advocate companies in Germany to focus on this area (e.g., Godefroid, 1995; Wehrli & Wirtz, 1996; Becker, 1997). Consequently, the effective management of the supply chain is considered to be the major challenge facing German companies (Anonymous, 1999). However, some writers (e.g. Friedrich et al, 1995) contend that few German companies have adopted the practice of "partnership" with their suppliers and an

adversarial relationship with suppliers is more typical. Homburg (1995) is of the view that supplier management in Germany needs to be not only recognised as an important area by practitioners but also needs to be investigated further by researchers.

It is clear from the literature that supplier management has an important role and there are two key issues to be considered:

- the trend in the supplier base – the tendency for leading companies to reduce their number of suppliers (due to the advantages it offers)
- manufacturers sourcing policies – the approach taken i.e. whether or not companies are willing to reduce their supplier base to the extent that they mainly have “single-source” suppliers.

Each of these issues will be covered in turn, based on a review of the relevant English and German literature.

### Supplier Base Trend

Current management thinking recommends the establishment of long-term relationships with a reduced number of suppliers. These few suppliers will then play a critical role in contributing to new product development, reducing costs (significantly and regularly) and constantly improving quality. According to Harland (1996) and Leverick & Cooper (1998), there is a general trend among manufacturing companies to reduce their supplier base. There is a fair degree of anecdotal evidence to support this view. For example, Sheth and Sharma (1997) reported that a number of major

manufacturers in the USA have reduced the number of suppliers they use: Xerox by 90%, General Motors by 45% and Ford by 44%. Szymankiewicz and Canadine (1994) expected this trend towards a smaller supplier base to continue in the future, but offered no empirical evidence. Generally, there is little empirical evidence to support this assertion. The first major empirical investigation of supplier base reduction (outside the automotive sector) was undertaken in the UK by Goffin et al (1997). The study investigated the trend in supplier numbers in four industry sectors, and the key results are shown in Table I.

take in Table I

The results show that UK manufacturing companies in 3 sectors dramatically reduced their supplier base. Companies in the process, engineering and electronics industry sectors all reduced their supplier base by around 35%, between 1991 and 1995. In contrast, the household products sector exhibited a significantly smaller reduction over the same period.

The evidence from the USA and UK demonstrates a reduction in the supplier base. However, what is the trend in supplier base size for German companies? Although the importance of supplier management has been recognised by several German writers (e.g. Godefroid, 1995; Homburg, 1995), evidence for supplier base reduction is sparse. Rommel (1991), in a study of 40 engineering companies concluded that

“leading companies, we have found usually enter into long term, trust partnerships with their suppliers”, but gave no data on the change in supplier numbers. Homburg (1995), however, investigated managers’ expectations of the change in supplier numbers across 5 industries. Table II summarises the results of his investigation and indicates that the majority of manufacturers intended to keep the numbers of their suppliers stable in the near future.

take in Table II

The limitation of Homburg’s survey is that it was only based on managers’ perceptions of what would happen in the future. It neglected, for example, to establish the exact size of the supplier base at the time of the survey (or in the past). Therefore, it was not possible to establish whether manufacturers had actually narrowed their supply base prior to the survey and as a result intended to keep the numbers stable in the future. This means that the results are somewhat ambiguous. Consequently, there is a real need to obtain empirical data from German manufacturers on supplier base trends. Similarly, sourcing policy can be shown to require investigation.

### Sourcing Policy

In the past, many manufacturers purchased the same parts or components from a number of suppliers – “multi-sourcing” (Berry et al, 1994). However, since the end of the last decade, US and UK manufacturing companies have started to use single-



sourcing (Ramsay & Wilson, 1990; Groves & Valsamakis, 1998). Single-sourcing means using only one source of supply for a particular material, or component part (Newman, 1988; Ramsay & Wilson, 1990). Between multi and single-sourcing sits dual-sourcing, which involves buying the part/component from two suppliers (Berry et al, 1994).

Single-sourcing is claimed to lead to improved quality and better price (Tullous & Utecht, 1992; Christopher, 1998). In addition, it leads to closer relationships with suppliers, as well as more tangible benefits such as fewer incoming defective parts, greater delivery reliability and lower cost. Larson and Kulchitsky's (1998) survey of purchasing managers found that single-source suppliers normally delivered higher quality at a lower cost to the buyer. However, overall there has been very little empirical research carried out into the issue of single-sourcing (Brown & Inman, 1993).

It has been suggested that German companies can benefit from a single-sourcing approach (Seitz, 1991). However, Nachtweh (1999) also saw risks and proposed that an emergency plan should always be in place to deal with single-source suppliers failing to deliver. In common with the US and UK literature, there appears to be no empirical evidence as to the extent to which German manufacturing companies have adopted the single-sourcing.

## LITERATURE REVIEW – MAIN CONCLUSIONS

From the literature three main points can be concluded:

- The importance of supplier management is recognised in both practitioner and academic literature (describing the situation in the US, UK and Germany)
- Literature on the US and UK identifies a trend to reduce the supplier base and gives some empirical evidence of this. Some German writers indicate the benefits of a reduced supplier base. However, the only empirical evidence is a somewhat ambiguous survey which suggests that managers at German manufacturing companies are not intending to reduce their supplier base
- Writers discussing manufacturing in the US, UK and Germany mention the benefits of single-sourcing. However, no research has been carried out into the extent to which German manufacturing companies have adopted this approach.

## RESEARCH METHODOLOGY

Germany has a strong manufacturing base and the literature review showed the need for empirical data on supplier management in that national context. The research presented in this paper addressed this need through a survey of supplier management

practices, covering not only the trends in supplier base size but also sourcing strategies. There were five specific aims to the research:

1. To determine the trend in the size of the supplier base of German manufacturing companies in three sectors.
2. To compare the German trend with the findings from the same sectors of UK industry.
3. To determine whether German manufacturers intend to reduce this supplier base in the future.
4. To determine what German manufacturers consider to be the perceived benefits of having fewer suppliers.
5. To investigate the sourcing policies used by German manufacturers.

In order to achieve the aims of the research a two-stage research design was utilised, as illustrated by Figure 1.

take in Figure 1

In Stage 1, a survey was used to collect directly comparable supplier base trend data in Germany and the UK in order to be able to contrast differences (Aims 1 and 2). Stage 2 consisted of a telephone survey of German managers to gather specific data on their supplier management practices (Aims 3 to 5).

## Stage 1 – Survey Data Analysis

The first stage of the research utilised survey data taken from the Best Factory Awards database (BFA) in the UK and Germany. The Management Today/Cranfield School of Management Best Factory Awards have been running successfully in the UK in their current form since 1992 (Management Today is the leading monthly management magazine in the UK). Each year around 200 manufacturing companies enter the award scheme and this has created a large database of manufacturing performance data. The program has been extended to other countries to enable international comparisons to be made and the BFA was launched in Germany in 1996.

The awards are open to any manufacturing plant in Germany or the UK; a plant is defined as a relatively self-contained unit with its own management staff which can be identified either by separate facilities, by separate products or by separate management structure. Each plant has to complete a detailed 18 page questionnaire covering: descriptive data (e.g. cost structure); management policy data (e.g. market positioning); and performance data (e.g. delivery reliability). The questionnaire collects mainly quantitative (rather than qualitative) data at a specific level of detail so that comparability across plants can be maintained. It does not, for example, rely on subjective scoring (on, say, a 1 to 5 scale) which is open to considerable variability in interpretation. Instead, questions focus on obtaining reliable data on key manufacturing variables. A comparison between the BFA database and other survey studies of manufacturing operations, and a discussion of its suitability for research

purposes, may be found in New and Szwejczewski (1995). The BFA questions on supplier management focus mainly on supplier base changes over the past four years and have been discussed in a previous paper in this journal (Goffin et al, 1997).

The BFA database has been used to investigate manufacturing performance across different industry sectors and, more recently, internationally (see for example New & Szwejczewski, 1995; New et al, 1998a). International comparisons are made possible by the fact that the same questionnaire is used in both the UK and Germany.

Survey data taken from the German and UK databases for the year 1997 were used for Stage 1 of the research. The 1997 sample that was analysed consisted of 110 German and 110 UK manufacturing plants. The majority of the research dealing with supplier management has previously been conducted in the automotive sector, and so the current study adopted a broader approach. Therefore, it did not focus solely on one sector; instead it examined supplier management in the engineering, electronics, and process sectors. The German sample contained 78 engineering, 20 electronics, and 12 process plants, while the UK sample contained 56 engineering, 28 electronics, and 26 process plants. Using the German/UK BFA data, it was possible to answer the question of whether manufacturers in both countries had reduced their supplier base (over the period 1993 to 1997).

## Stage 2 – Telephone Survey

The second stage of the research focused exclusively on German manufacturing companies, primarily to determine whether or not they intended to reduce their supplier base in the future. In addition, this stage probed for the perceived benefits of having fewer suppliers and the most appropriate sourcing policies, as perceived by managers – information that was not covered by the Stage 1 survey.

A random sample stratified by three sectors was selected from the 110 German plants that entered the BFA in 1997 (i.e. from the German respondents to the Stage 1 survey). This approach was followed to ensure that a representative sample of the three industry sectors was identified and then a telephone survey of these German manufacturers was conducted. The managers interviewed were senior purchasing/materials management managers with responsibility for supplier chain management.

The questionnaire used during Stage 2 was based on one previously developed by the authors (Goffin et al, 1997). The original questionnaire had been piloted, and its reliability and validity established. A native speaker translated the questionnaire into German, and then an independent German expert from the supplier management field checked the clarity of the questionnaire. In addition, 5 pilot interviews were undertaken in order to affirm that the interview structure – the questions as well as the overall flow of the questionnaire – was relevant and applicable to German

manufacturers. The 5 pilot interviews did not form part of the final 34 interviews that were analysed (see Figure 1). The random stratified sample (of 34 interviews) consisted of 21 engineering companies, 9 electronics companies and 4 process companies. One of the research team (who is a native speaker) conducted all interviews (including the pilot) in German, in order to avoid possible errors resulting from multiple interviewers. All the interviews were tape-recorded and full transcripts of the interviews were produced and used in the analysis. Since all the 34 companies covered by the telephone survey had already completed the BFA questionnaire, full background data on their manufacturing operations and performance were available prior to the interviews.

## RESULTS

### Stage 1 – Survey Data

The results from the survey data taken from the BFA (1997) database for Germany and the UK are shown in Figures 2, 3 and 4 (and summarised in Table III).

Figure 2 shows the changes in the supplier base over the two countries for the period 1993 to 1997 for the electronics sector.

take in Figure 2

In the electronics sector, UK manufacturing plants have reduced the number of suppliers from an average of 472 (in 1993), to 341 (in 1995), to an average of 253 (in 1997) – this represents a reduction of approximately 46%. In contrast, the German electronics plants have only reduced the supplier number by 8%, over the same period, falling from 578 in 1993 to 532 in 1997. This result shows that the UK electronics plants have streamlined their supplier base to a much greater extent than the German electronics companies.

The general characteristics of the plants in the two sample populations were checked to determine if there were any differences in terms of size of plant, complexity of products (components/product) and number of employees. There was no statistical difference to be found between the manufacturing plants in Germany and the UK on these three characteristics, and therefore we may conclude that the samples were, in fact, relatively well matched across these characteristics.

take in Figure 3

A similar trend, to that seen in the electronics sector, can also be observed in the engineering sector. Figure 3 indicates that UK manufacturers have reduced their supplier numbers from an average of 243 in 1993 to 155 in 1997. This was a reduction in supplier numbers of around 36% for the period 1993-97, whereas over the same period of time German companies have only reduced the number of suppliers by 5%



(falling from 240 in 1993 to 228 in 1997). Just as in the case of the engineering sector, the general characteristics of the plants in the two sample populations were checked and no statistical differences were found.

take in Figure 4

In the process sector the results indicate a very different picture. Figure 4 shows that whereas UK manufacturers have reduced their supplier base from 332 (in 1993) to 260 (in 1997), the German companies have increased their supplier base from 124 to 143 over the same period of time. In the UK there has been a reduction of 22%, while in Germany there has been an increase of 15%. Again, no statistical differences were found to be present between the two groups of plants for the three characteristics.

take in Table III

Overall, the results indicate that the average size of the supplier base fell in the UK from 1993 to 1997, with the most dramatic reductions taking place in the electronics and engineering sectors. In contrast, the average size of the supplier base among German electronics and engineering plants fell by much smaller amount, and in the case of the process sector it actually increased.

Let us now examine the changes in the supplier base in more detail. Table IV indicates, by industry sector, whether the UK and German plants had increased, reduced or maintained a stable supplier base over the period 1993-97 (using the same base data as used for Figures 2, 3 and 4).

take in Table IV

Table IV indicates that a large majority (68%) of the UK electronics plants had reduced their supplier base, while only 32% had increased theirs over the period 1993 to 1997. However, in Germany only 55% of the plants had reduced their supply base and 40% had actually increased it.

In the case of the engineering sector we found that, again, a large majority of the UK plants (66%) had reduced their supplier base, with only 25% increasing the number of suppliers. However, in Germany the percentage of plants that reduced the size of the supply base only slightly exceeded the number that increased the size of the base (47% compared to 45% respectively).

In the process sector, the percentage of the UK plants that reduced their supply base, while smaller than in the case of the engineering and electronics sector, was still much greater than the percentage that increased their supplier base. However, in the

case of the German plants the percentage that increased their supplier base was nearly double the percentage that reduced the number with whom they dealt.

Overall, Table IV indicates that the majority of the UK plants in all three sectors had reduced the size of their supply base over the period 1993-97. However, in the case of the German electronics sector, while the majority (55%) of the plants had reduced the size of their supplier base, there was a sizeable percentage (40%) that had, in fact, increased the number of suppliers. In the case of the German engineering sector, the percentage of plants that had reduced their supplier base was only marginally ahead of the percentage that had increased their supplier base. However, in the case of the process sector, the position was reversed and the majority of German plants had actually increased the size of their supplier base.

### Stage 2 – Telephone Survey

The results from the telephone survey cover 3 key areas:

- Trends in supplier base size
- Benefits of a reduced supplier base
- Purchasing strategy

### Trends in Supplier Base

Stage 2 of the research examined in detail German manufacturers approaches to supplier management. At the start of the interviews, respondents were asked about the importance of supplier management. The telephone interviews indicated that the overwhelming majority (79%) of the respondents stated that the importance of supplier management had increased over the last 3 years. As one manager at an electronics company commented “the relationship with our suppliers is nearly as important as that with our customers” (Purchasing Manager, Electronics). Another manager commented “we are only as good as our suppliers are” (Purchasing Manager, Engineering).

The analysis of the data (from Stage 1) identified that 44% (15 out of 34) of the companies had reduced their supplier base over the period 1993-97. The respondents at the companies that had reduced their supplier base were asked to state what the future trend in their supply base would be. Table V shows the results.

take in Table V

The data presented in Table V indicates that overall, 41% of the plants intend to reduce their supplier numbers, while only a small percentage intend to increase their supply base. If we examine the trend by sector, we can see that in the process sector

the plants mainly intend to keep the number constant, while in the electronics and engineering sectors a large percentage intend to reduce their supplier base.

Further analysis of the data uncovered the fact that of the 14 plants who intended to reduce their supply base in the future, 12 (85%) had already reduced their supplier base over the period 1993-97. This finding suggests that supplier base reduction is an on-going rather than a one-off activity and also that the plants which have not reduced have also not yet recognised the need.

#### Benefits of a Reduced Supplier Base

Of the total 34 respondents to the telephone survey, 15 had reduced their supplier base over the period 1993-97. These 15 respondents were asked to identify the benefits of this reduction, Table VI shows their answers. In total five different advantages were mentioned.

take in Table VI

Just over half of the respondents mentioned that they had the benefit of lower prices from their suppliers. Reduction in the supplier base means that bigger order volumes can be offered to the remaining suppliers who, in turn, provide lower prices. The research results suggest that only 53% of the plants were experiencing this benefit. This may be due to the fact that the other 47% have not been able to offer

their remaining suppliers sufficiently big order volumes to warrant significant price reductions. Another benefit of the reduced supplier base is said to be lower administration costs for purchasing. While some plants did not experience the benefits of lower prices, they certainly mentioned that they enjoyed lower admin costs; another benefit that can come from supplier reduction. A large percentage (53%) of the respondents also mentioned that they found it easier to manage fewer suppliers.

While the most frequently mentioned benefits of a reduced supplier base were quantitative in nature, the respondents also mentioned qualitative benefits. Just over 25% of the respondents reported that they enjoyed improved communications. Also 27% of the respondents said they had experienced improved relations with their supplier base. It is interesting that more of the respondents did not mention that they enjoyed improved communications or relations with their suppliers. This may be due to the fact that these benefits do not come as quickly as the three quantitative benefits mentioned by the respondents. Improved communications or relations come about, in part from the company working with its suppliers, rather than simply happening as a result of supplier numbers being reduced. The reason why more of the respondents did not mention that they saw improved communications or relations might be because they have not put enough effort into realising these benefits. This could be due to the fact that, as Friedrich et al (1995) found, most companies do not have a “partnership” relationship with their suppliers, preferring instead to use the adversarial approach.

In addition, to determining the benefits of reducing the supplier base, the respondents were asked if the benefits had been measured. For example, had the respondents actually measured the financial impact on the bottom line of having reduced their supplier base? They were also asked if they had quantified the other benefits of having a smaller supplier base. The analysis indicated that only 7 manufacturing companies had quantified the benefits of having a smaller supplier base and so, for the majority, the benefits were perceived rather than actual. The companies that had quantified the benefits had only done so with regard to the cost savings they were making. None of them had examined the more qualitative benefits that were mentioned.

The literature indicated that there were a number of benefits to be gained from a reduction in the supplier base, especially lower cost and improved communication with suppliers. However, the results of this research appear to indicate that financial benefits (i.e. lower prices, lower costs) dominate for the majority of plants. The more qualitative benefits, suggested by the literature, appear to have been experienced by fewer plants only.

#### Purchasing Strategy

Respondents were asked about their overall purchasing strategy, in particular did they adopt a single-sourcing approach? The results indicate that very few of the companies actually used this approach. Table VII indicates that only 9% of the plants had a

single-sourcing policy (single active) for all or part of their supplier requirements. Around 50% of the plants adopted a multi-supplier strategy and the remaining plants used a dual-sourcing approach.

take in Table VII

It was apparent from the interviews that the companies appeared to prefer a dual or multi-sourcing policy rather than using the sole supplier approach. A few companies offered a reason for adopting a dual or multi-sourcing. Some of the respondents mentioned that they did not wish to become dependent on just one supplier - one manager stated: “in general, we dual-source our components, we have to be prepared if one supplier cannot supply ... we have to be flexible - focusing on one supplier results in dependency” (Purchasing Manager, Engineering). Two respondents stated that the reason they used dual/multi-sourcing approach was because of the need to ensure the supply of critical components. They did not want to jeopardise their production by only having one supplier – in the event of late delivery the plant could be forced to reduce, or even stop, production. For some plants, the critical nature of some of their raw materials and components may have caused them to adopt the dual/multi-sourcing policy, thereby ensuring that their production system was protected from interruptions caused by late delivery of their suppliers. While this may have been a reason why some decided not to adopt single-sourcing, for others it was more likely their conservatism – as one respondent noted “It would be nice to have



one supplier, but this is an absolutely Utopian concept” (Chief Executive Officer, Electronics).

The extent to which supplier performance was monitored was also investigated. The interviews uncovered the fact that the majority of the companies had a supplier monitoring system in place – 82% of the companies (28 out of the 34) monitored their supplier performance. Although the majority of the plants monitored their supplier performance, the interviews showed that the factors monitored were in fact ‘standard’ parameters – such as quality and delivery reliability.

The respondents were also asked which companies they considered to be leaders in supplier management. The answers to this question surprised the authors; around 82% of the respondents were unable to provide the name of a company, which they considered to be a leader in supplier management. As one of the managers interviewed commented “No, I cannot name any other company ... I think other organisations are no different from us” (Purchasing Manager, Electronics). For the 18% of the respondents (6 out of the 34) who were able to name a leading company, the names given came from the computer industry (e.g. Dell), and the automotive sector (e.g. BMW). It would appear that there is little understanding among German manufacturing organisations about which companies are “world class” in the area of supplier management. Therefore, it seems that managers in German manufacturing companies do not have a yardstick against which to compare themselves and are not

really aware of the improvements that can result from adopting best practices in the area of supplier management.

## SUMMARY & DISCUSSION

Achieving effective supplier management is a critical area for manufacturers and likely to remain so for some time to come. The US/UK literature suggests that there is a trend towards reducing the size of the supply base. However, while the German literature emphasised the importance of supplier management there has been very little empirical research examining the trend in supplier numbers used. The research presented in this paper has tried to rectify this deficiency and the key results can be summarised as follows:

- The research identified that over the last few years UK manufacturing plants had significantly reduced their supplier base, but German plants had only slightly reduced their supplier numbers.
- The telephone survey of German manufacturers showed that a large number of them were planning to make reductions in the near future.
- The analysis determined that a large proportion of the German companies that had reduced their supplier base in the past intended to continue the process in the future. This finding suggests that supplier reduction is not a one-off action, rather an activity that takes place over a period of time.

- The research suggests that those German companies that had reduced their supplier base (over the period 1993-97) considered the key benefit to be the lower costs that this activity delivers. A smaller proportion of manufacturers reported improved communication with their suppliers. However, only a few of the companies had actually quantified the extent of the benefits gained; the major quantified benefit was reduced cost.
- The results showed that a sizeable majority of the German companies still used a multi-sourcing approach. Few were prepared to be dependent on a single supplier.
- The research also found that there was very little knowledge in Germany about which companies are leaders in supply chain management.

The findings of the research have implications for both researchers and managers. For researchers, it shows the need for further study of supplier management in Germany. It is necessary to understand why some German companies have reduced their supplier base while many have not. A case study approach, contrasting companies which have reduced their supplier base against others that have not, might be appropriate for exploring this issue. Overall, the research indicates that the adoption of modern supplier management practices is not widespread in Germany. The use of leading edge approaches by German manufacturers could result in improvements especially with regard to cost efficiency. However, the adoption of modern manufacturing management approaches has generally been slow in German companies (Lay et al, 1996). Consequently supplier management offers an ideal

context in which researchers can study the diffusion of manufacturing best practice into Germany. Such a study would be longitudinal in nature and it would be important to identify the characteristics of the German companies which are faster to adopt best practices.

The findings on the German approach to supplier management indicate the need for researchers to study what is happening in other industrialised countries. Manufacturers in other countries may also consider supplier management to be important, but (like their German counterparts) may be in the early stages of recognising and applying best practice in this area. Therefore, the current study raises the research question: how quickly do manufacturing best practices spread across international boundaries? The authors have anecdotal evidence that supplier management is probably more advanced in the automotive sector, than in other sectors in Germany. However, this anecdotal evidence raises yet another issue – is the automotive sector a major contributor to the development and spread of best practices across international boundaries? Overall, much has been written on manufacturing best practices and “world class” manufacturing. However, it is interesting that researchers have not yet recognised the need to study the diffusion of this “management technology”, using longitudinal studies of sectors in several countries.

The research has many implications for German managers. It indicates that some German companies have not yet taken the advantage of a smaller supplier base.

Consequently, this suggests that German companies could obtain a competitive advantage – those manufacturers which had reduced their supplier base had achieved lower costs (and some had data to prove the financial benefit). Manufacturers, in most cases, are still using a multi-sourcing policy – very few used the single-sourcing approach. A move away from reliance on multiple sources and towards a greater use of single-sourcing could result in cost reductions. The use of modern supplier management techniques offers German companies a partial solution to the high costs of *Standort Deutschland* and would ensure the continued viability of manufacturing in Germany. Just as German companies have apparently been conservative in the adoption of best practices, this phenomenon may be found in other industrialised countries – this also requires further investigation.

The findings also have strong implications for managers in the companies that supply German industry. If more German manufacturers decide to implement supply base reduction, then suppliers will need to be ready to respond. The managers of suppliers will need to ensure that the products and services they offer are attractive and competitively priced. Overall, suppliers will need to adopt an appropriate strategy to ensure they are part of the chosen few, as supplier bases are reduced.

As with most research, the current study has limitations that are important to recognise, so that future researcher can address them. Firstly, the samples used mean that the results of the study are not representative of German industries as a whole.

The BFA database contains information on companies that are *self-selecting* – they choose, for benchmarking purposes, to enter the awards. If anything, by their willingness to benchmark, these companies may well be more advanced than the average organisation. To determine this, a wider study using, for example, government listings of manufacturing organisations as a sample frame is required. The telephone interviews also have a limitation in that the data collected is all “manager reported” with no triangulation, for example, against company documentation. However, telephone lists are a cost-effective vehicle for data collection in situations where the concepts are clear. Although the possibility for misunderstanding existed, the use of a native speaker to conduct this stage of the research minimised this problem. Overall, however, on-site one-to-one interviews with managers would allow more sources of data and a deeper understanding of supplier management in Germany. Therefore, further research using such an approach is planned.

## CONCLUSION

Over the last few years there has been an intensive debate taking place in Germany about the competitiveness of its manufacturing industry. However, new manufacturing management concepts such as lean production that could contribute to German cost competitiveness, are only being slowly adopted. One of the concepts that could help improve competitiveness is supplier management and in particular supplier base

reduction. This article has reported on research that, surprisingly, shows that German manufacturers are slow to adopt best practices in this area. In comparison with UK companies, fewer German manufacturers have reduced their supplier base, although many now intend to do so. A reduced supplier base has been shown by some companies to reduce costs and so others need to grasp this opportunity to become more competitive. Also surprising was the lack of knowledge amongst many German managers of supply chain best practice. It will be interesting to see how long it takes before more German manufacturers achieve the lower costs or other advantages of having fewer suppliers.

Although the study focused on supplier management in Germany, it identified a key issue that is important in all national contexts – the spread of best practice internationally. Studies of “world class” manufacturing practices are common but the diffusion of these ideas has not been researched. This is a rich vein which researchers need to investigate.

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APPENDIX A - QUESTIONNAIRE

Number of suppliers

The main question in the 18 page Best Factory Awards 1997 questionnaire, which relates to the size of the supplier base, is given below.

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

	Number
Currently	<input type="text"/>
In 1995	<input type="text"/>
In 1993	<input type="text"/>

<u>Average number of suppliers</u>					<u>Percentage</u>
<u>Industry Sector</u>	<u>Plants</u>	<u>1991</u>	<u>1993</u>	<u>1995</u>	<u>Reduction 1991-95</u>
Process	30	221	199	142	36
Engineering	63	496	400	316	36
Electronics	34	382	304	250	35
Household	74	107	99	97	9

Table I: Trend in UK supplier numbers (based on Goffin et al, 1997).

Expected Future Change in Supplier Numbers

	<u>Sample</u>	<u>Decrease</u>	<u>Stable/Minor change</u>	<u>Increase</u>
Chemicals	48	10%	83%	6%
Electronics	36	22%	67%	11%
Metal Processing	33	12%	85%	3%
Mechanical Engineering	31	13%	77%	10%
Automotive	17	24%	65%	12%
Total	165	15%	77%	8%

Table II: Expected change in supplier numbers (based on Homburg, 1995).



<u>Industrial Sector</u>	<u>Country</u>	<u>Sample</u>	<u>1993</u>	<u>1995</u>	<u>1997</u>	<u>Percentage Change (1993-97)</u>
Electronics	UK	28	472	341	253	-46%
	Germany	20	578	563	532	-8%
Engineering	UK	56	243	201	155	-36%
	Germany	78	240	234	228	-5%
Process	UK	26	332	297	260	-22%
	Germany	12	124	138	143	+15%

Table III: Change in the UK and German supplier base for the period 1993-97 (Results of Stage 1 of the research).

<u>Industrial Sector</u>	<u>Country</u>	<u>Increased</u>	<u>Stable</u>	<u>Reduced</u>	<u>Sample</u>
Electronics	UK	32%	0%	68%	28
	Germany	40%	5%	55%	20
Engineering	UK	25%	9%	66%	56
	Germany	45%	8%	47%	78
Process	UK	31%	15%	54%	26
	Germany	58%	8%	34%	12

Table IV: The direction of change in the UK and German supplier base for the period 1993-97 (Results of Stage 1 of the research).

<u>Industrial Sector</u>	<u>Sample</u>	<u>Increasing</u>	<u>Stable</u>	<u>Reducing</u>
Electronics	9	0%	44%	56%
Engineering	21	10%	52%	38%
Process	4	0%	75%	25%
Overall	34	6%	53%	41%

Table V: Future change in supplier base in Germany (Results of Stage 2 of the research).

<u>Benefits Stated</u>	<u>Percentage</u>
Lower prices	53%
Easier to manage fewer suppliers	53%
Lower administration costs	53%
Improved communication	27%
Improved relations	27%

Table VI: Benefits of reducing the supplier base – as perceived by 15 German managers (Results of Stage 2 of the research).

<u>Sourcing Policy</u>	<u>Percent of companies</u>
Single	9%
Dual	41%
Multi	50%
Total	100%

Table VII. The sourcing policy adopted by the 34 German companies (Results of Stage 2 of the research)

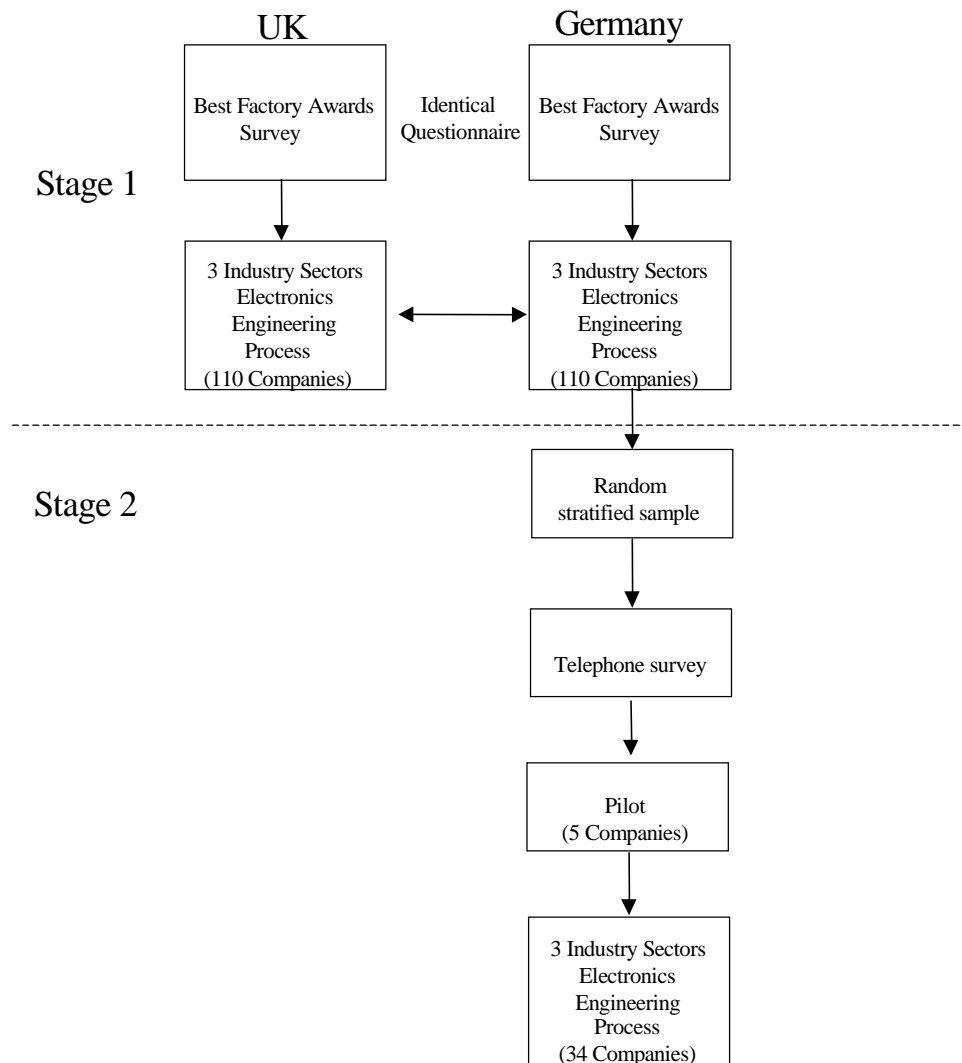


Figure 1: The two stages of the research

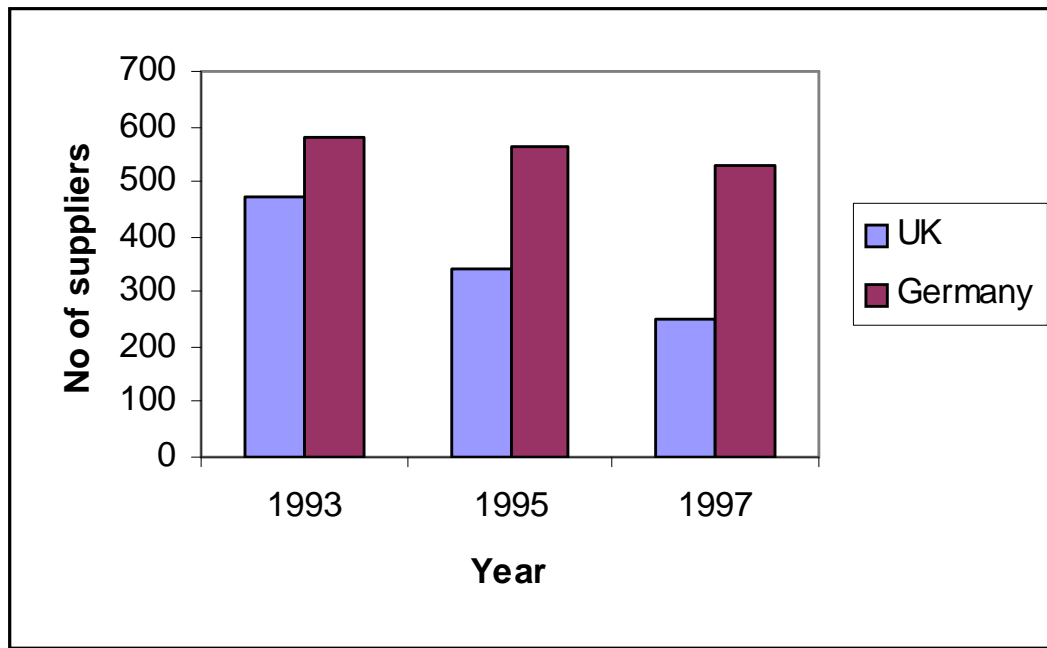


Figure 2: Change in the UK and German supplier base for the period 1993-97 in the electronics sector (Results of Stage 1 of the research).

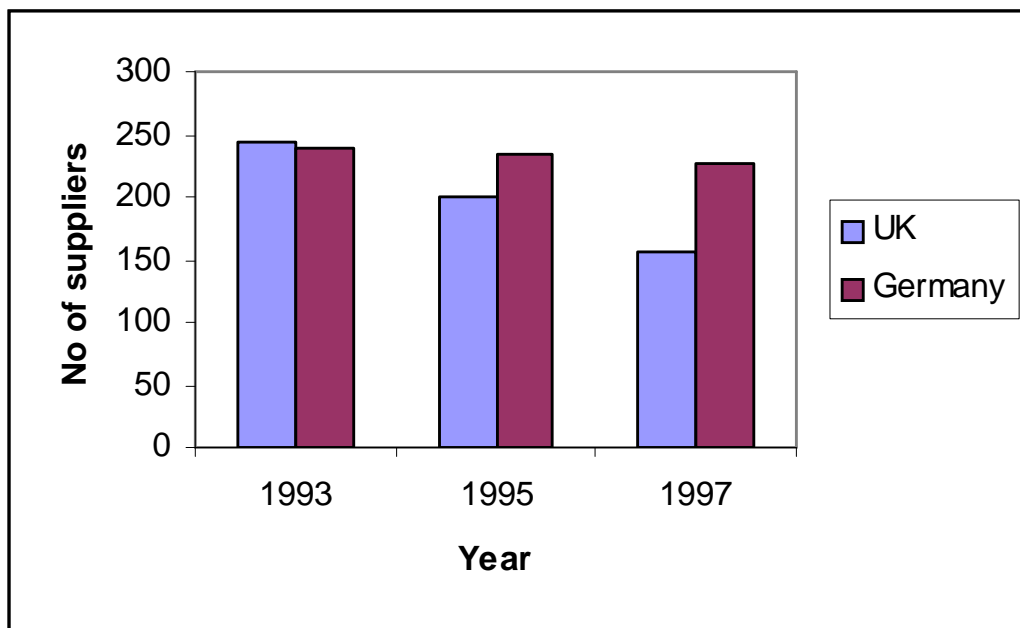


Figure 3: Change in the UK and German supplier base for the period 1993-97 in the engineering sector (Results of Stage 1 of the research).



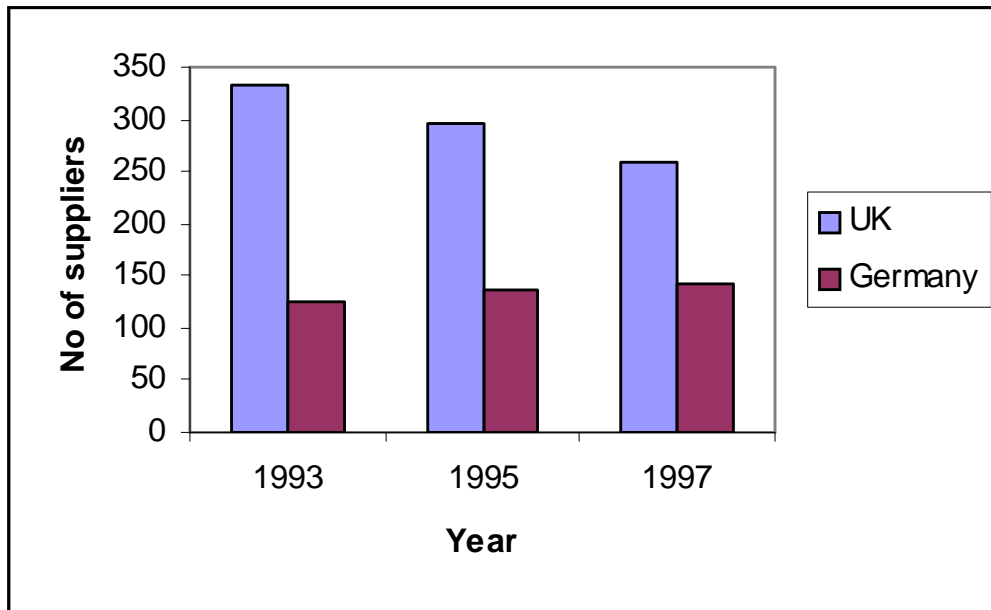


Figure 4: Change in the UK and German supplier base for the period 1993-97 in the process sector (Results of Stage 1 of the research).