Benchmarking Supply Chain Management: Finding Best Practices

By

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ABSTRACT This paper represents a more popularized adaptation of the complete report written (Fagerhaug, Randmæl, Andersen, 1998) as documentation of the benchmarking activity in the project SMArTMAN SME. The objective of using benchmarking in the SMArTMAN SME project was to increase the knowledge about the supply chain management process and to enable the industrial partners to learn from the best practice. This was done through identification and study of other enterprises in Europe and their processes. The two key findings from the benchmarking studies are:

1. A set of flow charts that portray what we consider to be a best practice process spanning the areas of procurement and supply chain management. This process has been designed by merging the best elements from each of the benchmarking partners' processes into one generic process.
2. Descriptions of practices observed at the benchmarking partners' that seem to be of "best practice" level and which were not suited for inclusion in the flow charts.

1 The SMArTMAN SME Project

The European machine manufacturing industry consists mainly of SMEs, since in most cases the product, a machine, is not suitable for mass production. These European Machine Manufacturing SMEs (MM-SMEs) are forced by the increasing

worldwide competition to redesign their business processes and their cooperation with suppliers. Therefore, new pragmatic methods and tools are needed on three levels:

1. Support for strategic Make-or-Buy decisions for complex parts and components.
2. Support methods and tools for the organization and management of the suppliers.
3. Adaptation and integration of operational Information and Communication Tools (ICT) for the operative management of product logistic, quality, and administrative information between the MM-SMEs and their suppliers.

The project is divided into six tasks:

1. Current State and Requirements.
2. Benchmarking.
3. Make-or-Buy Tool (in parallel to).
4. Organization Scenario.
5. ICT-Systems.
6. Validation and Demonstration.

2 What is Benchmarking?

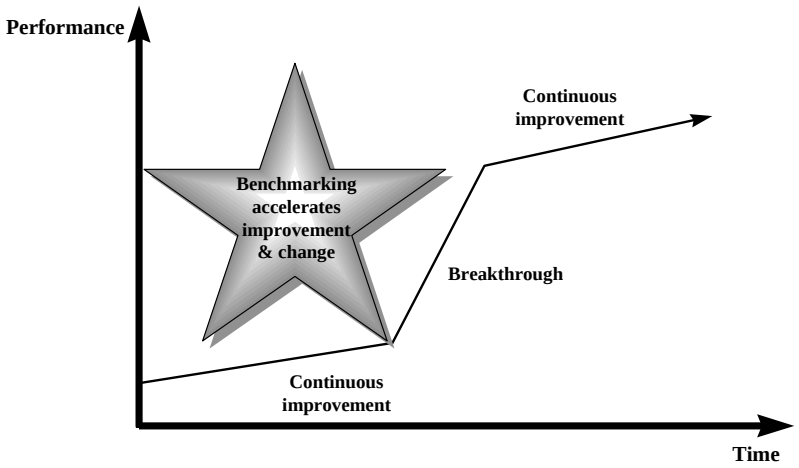
Benchmarking can somewhat philosophically be defined as follows (APQC, 1992):

> *Benchmarking is the practice of being humble enough to admit that someone else is better at something, and being wise enough to learn how to match them and even surpass them at it.*

This definition captures the essence of benchmarking, namely learning from others. The core of the current interpretation of benchmarking is:

- *Measurement*, of own and the benchmarking partners' performance level, both for comparison and for registering improvements.
- *Comparison*, of performance levels, processes, practices, etc.
- *Learning*, from the benchmarking partners to introduce improvements in your own organization.
- *Improvement*, which is the ultimate objective of any benchmarking study.

Benchmarking emphasizes attaining so-called breakthrough improvements, as shown below (Andersen and Pettersen, 1995):



Breakthroughs of the type illustrated by the star are usually accomplished by introducing practices that are new to an industry, through generic benchmarking. Some examples are listed in the table below.

Problem	Compared with

Long admittance times in hospitals	Hotel receptions
Too lengthy setup of machines	Formula 1 pit crews
Planning the delivery of fresh concrete	Hot pizza delivery
Unstructured maintenance of power turbines	Maintenance of aircraft engines
Difficult to manufacture shell cases with the right cylindrical shape and smooth surface	Manufacturing of lipstick tubes

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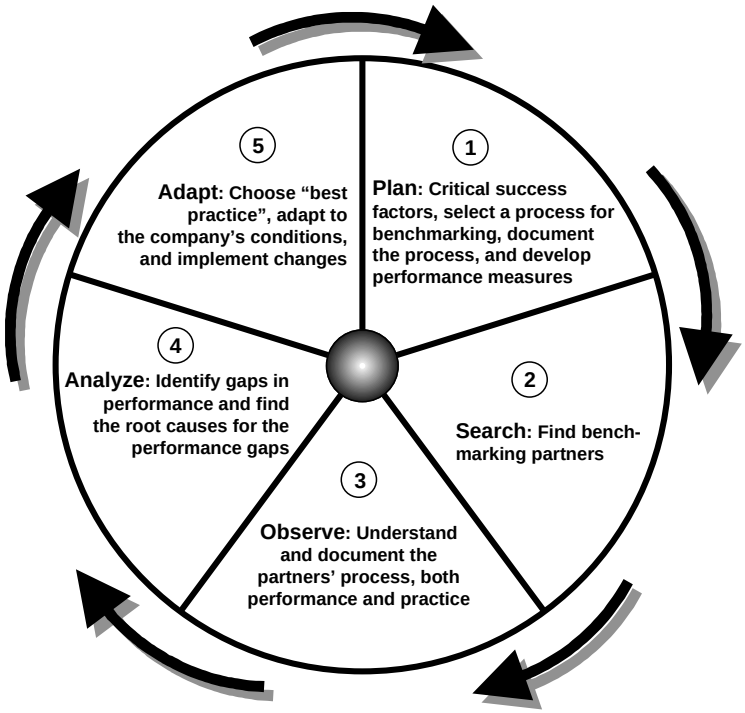
Benchmarking is conducted in separate projects whose individual objective is to improve one of the organization's business processes. There are a number of models describing the different steps that constitute a benchmarking study. One such model is the so-called benchmarking wheel, as portrayed in the figure below (Andersen, 1995).



As can be seen, this is a process of fives phase, each phase covering a natural part of the benchmarking study.

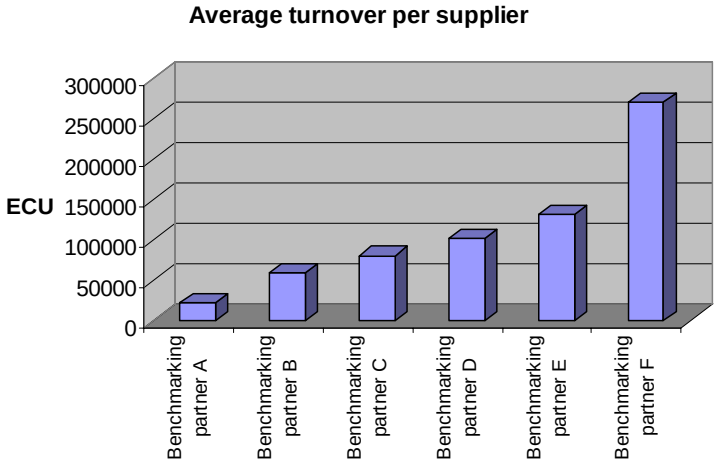
3 Benchmarking in the SMArTMAN SME Project

The objective of using benchmarking in the SMArTMAN SME project was to increase the knowledge about the supply chain management process and to enable the industrial partners to learn from the best practice. This was done through identification and study of other enterprises in Europe and their processes.

To reach this objective, a process benchmarking study was undertaken to compare the processes in this area of eight different benchmarking partners from countries as different as Spain, Austria, Norway, and Sweden. The purpose was both to gain information that could lead to improvements in the industrial partners of the project, but most importantly to gain an understanding of best practice in this area.

The primary information from the benchmarking activity is flowcharts and process descriptions. It was more important to find “best practices” than numerical performance data. The collection of data was done by visits to the benchmarking partners. To ensure consistent information from all the benchmarking visits, we developed a questionnaire to be used during the interviews (Andersen and Randmæl, 1997). This questionnaire consisted partly of questions asked during the current state analysis part of the project and partly questions developed specifically for benchmarking. In addition to the general questionnaire, the industrial partners prepared questions specific to their own requests.

To give an impression of the benchmarking partners utilized in this benchmarking study, the figure below portrays the annual sales divided by the number of employees for six of the eight benchmarking partners:



These figures indicate two things:

- They say something about the size of the enterprises, as the number of suppliers rarely increases proportionately with increasing sales.
- They indicate to what extent the enterprises have focused their procurement with a few suppliers or spread them out on a large number of vendors.

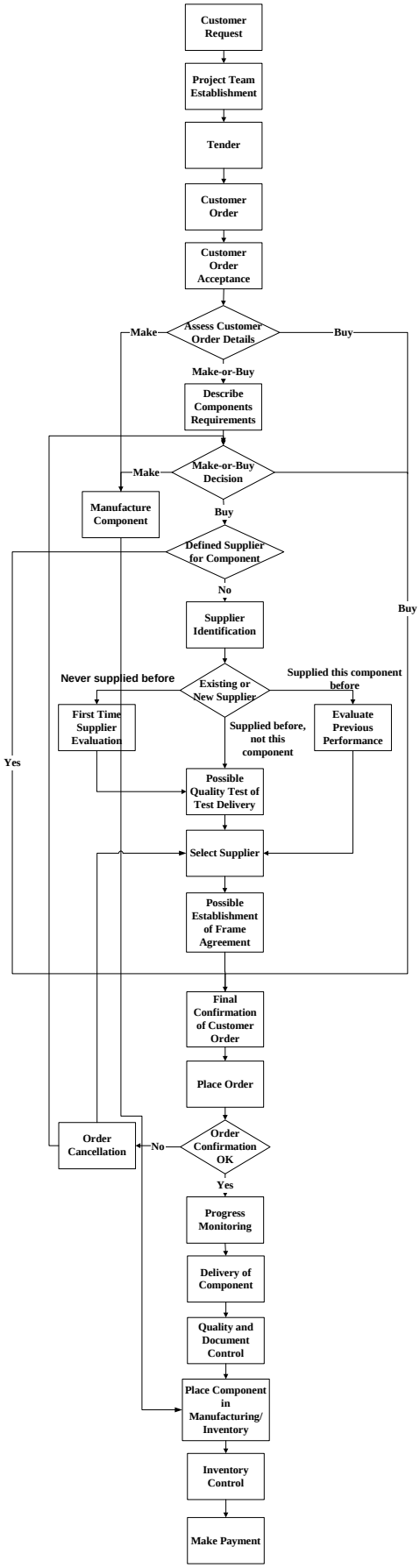
As can be seen, there are some significant differences among the benchmarking partners, but this was seen as an advantage as the span of practices became larger this way. The benchmarking partners represented the following industries:

- Hydroelectric energy systems.
- Aero-technical installations.
- Welding and cutting machines.
- Material flow and stock technology equipment.
- Agricultural equipment.
- Hydraulic valves and cylinders.
- Winding, grinding, drilling, and milling machines.
- Special and transfer machines for the automotive industry.

4 The Best Practice Process

This section of the paper presents one of the two key findings from the benchmarking studies, namely a set of flow charts that portray what we consider to be a best practice process spanning the areas of procurement and supply chain management. This process has been designed by merging the best elements from each of the benchmarking partners into one generic process. This way, it should represent superior performance compared to that of the individual processes it is based on, and thus, we have termed it “The Best Practice Process”.

Supply Chain Management

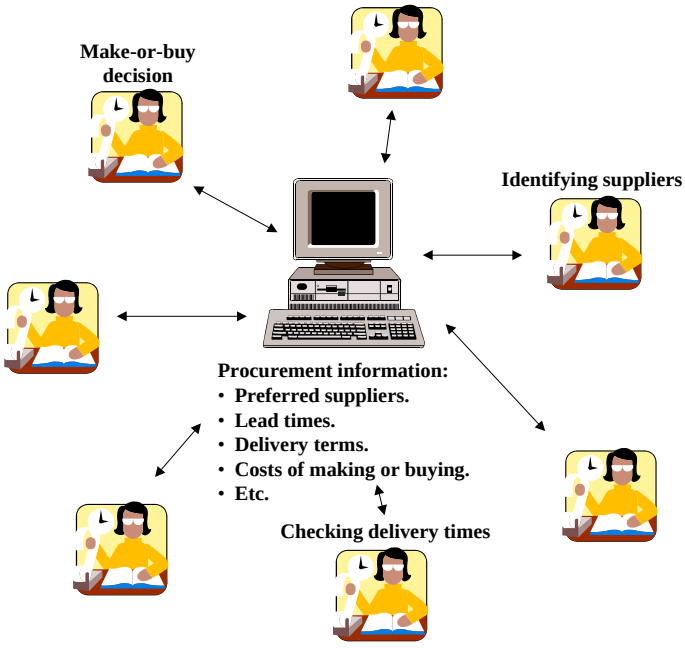


5 Best Practices

Under this heading, we present the practices observed at the benchmarking partners' that seem to be of a "best practice" level and which were difficult to include in the flow charts. For ease of comprehension, they have been grouped under different sub-headings.

5.1 IT Tools

One of the benchmarking partners has implemented one central database that is used and updated by all members of the company, see the figure below. The database contains different elements of information related to purchasing, not in the least on costs for either buying or making parts, preferred suppliers, lead times, etc. This way, everybody can access the actual costs of the parts they should need at any time and are able to decide which parts to order or make internally. In situations where such a database has not been implemented, e.g., at one of the industrial partners in the project, obtaining the information necessary takes much more time and requires the involvement of several other departments in the organization.



Another company has designed and implemented a software tool that has also been extended to integrate the suppliers. This system facilitates the integration of different traditionally isolated systems like Product Data Management (PDM), Bills-of-Material (BOM), automatic generation of production planning and orders, management of drawings with suppliers, etc. Such a software tool is highly useful for integrating the different actors in a supply chain and help to make communications easier and faster. In fact, one of the objectives of the SMArTMAN SME project is to design something similar to this system and make it available to European enterprises. Finally, a few of the companies visited were seen to use e-mail for placing orders with suppliers. In addition to being swift and inexpensive, e-mail also offers the possibility for attaching drawings and other more complicated information to the order.

5.2 Make-or-Buy Procedures

Not many excellent practices were observed in this area, but one way of organizing the team to make such decisions seemed well worth adopting. In one of the companies observed, an assembly of representatives from the finance department, technological department, and production department comes together to analyze the decision material and make a joint decision when considering make-or-buy alternatives. This way, the company avoids decisions based on assessments that sub-optimizes the performance of parts of the organization, but rather arrives at globally sound decisions. If this could be extended to also include representatives from the development department, the approach could be seen as a variant of concurrent engineering, where the key principle is to make parallel and joint decisions.

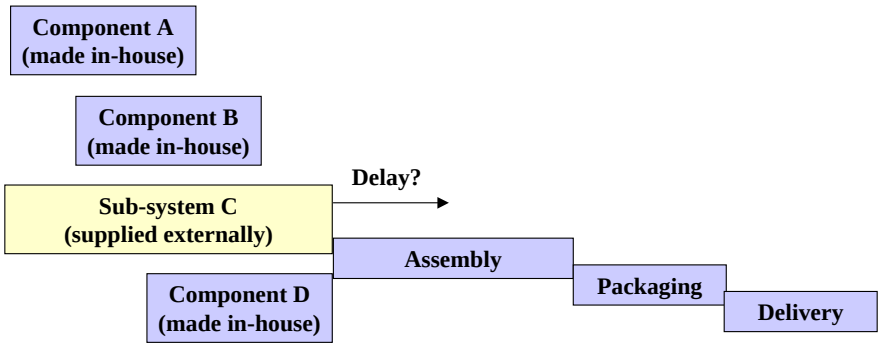
5.3 Supplier Searches and Progress Reporting

The common approach to identifying alternative suppliers for different parts is to utilize the company's existing network of professional and personal connections along with industry catalogues. Although becoming more and more used, one of the benchmarking partners displayed a rather advanced way of undertaking this task. The company consistently uses the Internet for effective and efficient supplier searches. This is usually highly successful, as there is a wealth of information to be found and it takes very little time to access it. However, one should screen the information found to avoid being inundated by also useless information. The products delivered by one of the benchmarking partners consists of more or less two sets of components:

1. Components based on the core technology produced by the company, i.e., which gives the products their functionality to make them competitive.
2. A surrounding framework of generic sub-systems like safety bars, platforms, etc. made out of steel.

These latter components are rather generic and can be manufactured by a very high number of different suppliers around the world. Since these parts also represent either large volumes or high weight, they result in high transportation costs if manufactured by the company itself and then transported to the installation site. To lower these costs, the company searches for suppliers of such components near the customer's facilities. For parts bought from suppliers that are complex and require a rather lengthy manufacturing process, it can sometimes to be very difficult to know at what stage in the process components are. This makes it difficult to assess whether there is a chance for delays of parts being supplied from external suppliers and what the consequences might be regarding the company's delivery time to, in turn, its

customers, see the figure below. To overcome this uncertainty, one of companies visited has implemented procedures where by it requests weekly progress reports on such parts from their suppliers. The reports gives a brief status overview that can be used to make schedule adjustments if progress is less than anticipated or even speed up operations if parts can be acquired earlier than first estimated. This gives flexibility in the production planning and eliminates some of the problems related to critical parts and scheduling of connected operations.



5.4 Supplier-Customer Relationship

Under this heading, a number of different observed practices related to how the relationships between the benchmarking partners and their suppliers have been organized are described. Some of these truly represent innovative ways of doing things and could be examples well worth following. One issue in this respect is the use of so-called frame agreements, which are defined as long-term contracts under which one or very few suppliers are defined as preferred suppliers for certain components. This was seen in quite a few of the benchmarking partners and does in many situations provide several advantages. Often, frame agreements offer simpler purchasing procedures, eliminates the need for supplier searches, and also guarantees a fixed, or even decreasing, price for defined parts. Furthermore, it is often seen that suppliers that are awarded the status as preferred supplier under a frame agreement

strive to truly satisfy the customer in a different way than in the case of spot purchasing. Many of the frame agreements observed are renegotiated once every year, while in the most extreme cases, the frame agreements lasted for five years, but with the option to adjust them if promises of performance were not adhered to. Such promises of performance usually focus on delivery precision, lead times, quality, and prices. As mentioned briefly above, some of the benchmarking partners in fact had agreements with suppliers under which the supplier promises to decrease their prices every year, in return for being a preferred supplier to the company. This is a variation of the frame agreements where the customer can use his power to elect preferred suppliers as a means to achieving lower prices.

Another aspect of frame agreements, and also other types of closer supplier-customer relationships, is the elimination of quality control of arriving parts. This can be solved differently in each case. One company signs what is termed Concentrated Quality contracts with their suppliers. Under these contracts, the company expects to be able to eliminate any quality control checks for parts received from the suppliers during the next two years. The supplier can either conform to this by performing outgoing quality control or by implementing a quality system the guarantees a certain level of quality. Another of the benchmarking partners specifically requires their suppliers to perform outgoing inspection of parts delivered to the company. In both cases, these are examples of transferring the responsibility for this type of non-vale adding operations to the suppliers and seeing it as the suppliers' responsibility to deliver guaranteed parts. This results in a higher average quality of the delivered parts, reduces costs related to quality problems, rework, reordering, etc., and reduces the needs for resources spent on incoming inspections.

Slightly related to outgoing inspection performed by the suppliers, is a practice that was observed in one of the benchmarking partners. When placing orders with a supplier, a card is transferred along with the order to be attached to the physical parts when they are shipped. This card contains information about which customer order of the benchmarking partner it belongs to and where it is to be transported upon arrival, either to an inventory spot or a manufacturing operation. This makes goods receipt much more efficient and ensures that parts arriving are transported directly to the correct location.

When developing new parts or products, one company makes a clear effort to ensure that the parts that will have to be obtained from suppliers are designed for optimum manufacturing. One innovative way of doing so is by consistently involving the suppliers in the research and development processes for new products. This allows the suppliers to impact the design and often suggest only minor changes that cost practically nothing for the company to implement, but which could lead to radical changes in the manufacturing at the suppliers' that lower costs and delivery times. Thus, by engaging in a closer relationship with the supplier, such advantages can be gained.

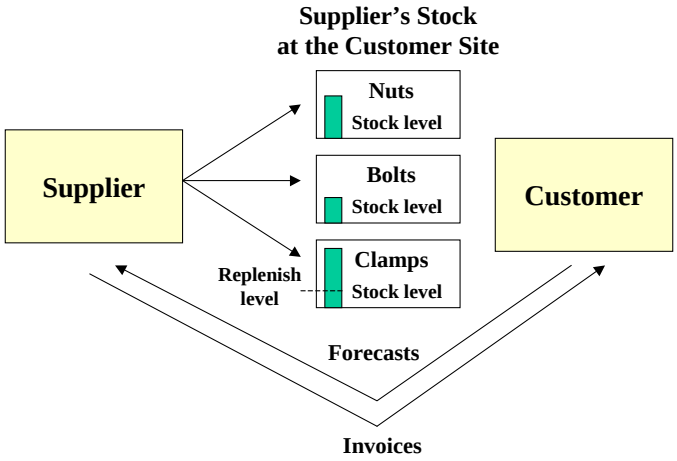
In two cases, we saw examples of the customer helping its supplier to better performance, obviously motivated by the fact that a better performing supplier will be good for the customer. However, these were also examples of what seems to be a trend toward closer customer-supplier relationships also in this industry. The two cases are:

- For truly critical parts that are either vital for the functionality of the project or that could cause major delays for the entire delivery, one company attempts to minimize the risk of delays or quality problems related to the supplier. This is done by having a technician from the company travel to the supplier's manufacturing site to assist in the production of such parts. This of course costs some money, but pays off in terms of more secure deliveries with a consistently higher level of quality.
- Another company has such tight relationships to their suppliers, and is therefore highly reluctant to simply replace a supplier when there is a lack of quality, late deliveries, or non-competitive prices on the part of a supplier. Instead, it puts efforts into trying to work out a solution with the supplier before replacing it. If the issue is a quality problem with supplied parts, it sends one of its own technicians to the supplier to review the process and advise the supplier on how to correct the problems.

The last best practice we will present pertains to two instances of a rather innovative division of responsibilities between the supplier and the customer:

1. The supplier of different small parts like bolts, nuts, sleeves, clamps, etc. keeps a stock at the customer's factory at the supplier's own expense. The supplier refills this stock at regular visits and works with forecasts for demand only. The invoicing of the usage from this stock is done once a month. The system is illustrated below. The customer is very pleased with this system, where practically no labor input is needed to ensure the full availability of parts. Furthermore, this system costs less to run than if the customer would have to monitor the stock levels and place orders itself.

2. In a similar manner, a wholesaler of steel keeps a stock of plates ready for the customer when the need arises. The steel supplier works with historical data for previous year's demand as well as with forecasts for the future. A partner to the steel supplier performs the production planning based on this input. This ensures that the steel needed for a production batch is placed on stock 5 weeks prior to the finish date for the production batch/order. Invoicing is done once a month based on assessments of the inventory done by the supplier.



6 Challenges and Successes of Benchmarking

Very briefly summarized, the main conclusion is that the benchmarking studies took longer than expected and presented some unexpected challenges. However, in the end they produced many useful findings and helped gain a better understanding of the best practices in this area. The challenges, possible remedies, and success factors are listed below. In terms of challenges and pitfalls, the main elements were:

- Finding benchmarking partners willing to participate in the benchmarking studies. This was by far the single most difficult of all tasks, which is quite usual in benchmarking. Identifying companies that seem to be comparable in terms of size, market conditions, industry, etc., that is believed to be sufficiently better to have

something to teach others, and at the same time are willing to share their best practice information, is difficult. The normal way to overcome this obstacle is to run company searches through many different channels, e.g., the company's own network, industry associations, area experts, etc.

- Getting acceptance for the use of both quantitative and qualitative benchmarking information. The information sought in benchmarking normally consists of two parts; quantitative performance data used to determine the differences in performance levels among companies comparing and qualitative business process descriptions used to create learning among them. Since the numerical performance data often involves financial information, the willingness among the consortium and benchmarking partners to surrender this type of information was rather low.
- Lack of business process understanding. Although the term business process has been known in academic circles for a few years, it is not as widespread in industry. While some of the benchmarking partners had modeled their business processes and could give us flow charts depicting these, many of them did not. Thus, it required much more work to establish the flow of goods and information and model the processes.
- Limited duration of each interview. During interviews, we were limited by time. In order to go in depth of each individual process it would have required more time, both during the interview and for the preparation. If we had been able to perform longer and more specific interviews we would have been able to get a deeper understanding of the processes and their performance.
- Comparability of companies and processes. The benchmarking partners were all chosen because they had a similarity to or relationship with the industrial partner. This did not, however, ensure comparability of their processes. Even though not

all information was comparable the visit could still generate new ideas for the industrial partners.

These are all pitfalls and challenges prospective future benchmarkers should be aware of and try to counteract. Some possible solutions to these challenges are:

- In general, the very difficult issue of finding relevant and willing benchmarking partners can be attempted solved through different approaches:
  - Applying a systematic procedure whereby a large number of potential benchmarking partners are scanned for relevance and high performance.
  - Seeking aid and support from sources and institutions that might be able to point to and convince potential partners, e.g., industry associations, area experts, media, etc.
  - Making sure the offer made to the companies is attractive, for instance by informing about processes the benchmarking company is particularly good at and offering return visits.
  - Requesting initial performance information about the process in question before selecting a benchmarking partner, to make sure the performance is sufficiently good to offer new insights.
- All challenges pertaining to poor data collection after actually having found willing benchmarking partners can be counteracted by a number of remedies:
  - Exchanging all possible background information beforehand, thus being able to start covering the interesting parts right away.
  - Sending the questionnaire in advance to allow time for data gathering and preparations.

- Meeting for a social gathering the night before the benchmarking visit to break the ice and build up trust before starting the meeting.
- Offering to pay for the time spent by the benchmarking partner in preparations for and during the benchmarking visit.
- Making sure to bring along someone fluent in the local language if the benchmarking partner finds it difficult to conduct the interviews in an international language.

On the other hand, parts of the benchmarking approach were successful and should be repeated later on:

- The extensive work done in the first task of the SMArTMAN project in assessing the current status of the industrial partners was of invaluable help in the preparations for the benchmarking. From this work, flow charts, key performance measures, and a general awareness of how things were done were already in place. This saved much work that truly needs to be done before starting to undertake benchmarking visits.
- The use of a generic benchmarking questionnaire. By using a questionnaire during the visits, it both guided the interviews, helped to make sure important information was not left out, and contributed in structuring the individual benchmarking reports.
- Performing the benchmarking visits in teams. Such teams ensured people that complemented each other in terms of skills and interests and contributed to creating ownership in the companies.
- Benchmarking necessitates a need for understanding own processes. In order to understand someone else's processes, the company must analyze and understand

their own processes. This process of analyzing and gaining a deeper understanding of one owns processes have led to improvement for the industrial partners in SMArTMAN.

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