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Industrial Engineering Case Study Report

Siemens, Boers & Co, SEW NL

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1. Siemens Case Study

1.1 Introduction to the Case

A review needs to be done in the Make or Buy strategies for wiring harnesses by the company Siemens.

The reason for outsourcing in the past was to improve the cost productivity factor. But Siemens in the past has had negative experiences with external suppliers since quality was often not sufficient or the supplier went bankrupt.

This time there is a considerable increase in the production volume required in the future as per the forecast provided by the sales team. Also there has emerged during the market research two new and promising suppliers. One supplier is located in Poland, the other supplier is located in Romania.

The supplier in Romania has approximately 20% lower manufacturing cost. The material costs are comparable. But a negative factor is that the required volume is very low for these suppliers when compared to their other customers. This has led to fears at Siemens that the suppliers will increase prices in future or not deliver in time.

Taking all factors into consideration the following questions must be answered.

- What would be the recommendation to the Siemens team? To whom should Berlin factory outsource and why?
- Is there an alternative? Could you imagine to optimize the internal production substantially instead and how?

1.2 Discussion: Make-or-buy decisions

A make or buy decision is valid business decision which is being taken by organisations around the world. Some organisations are at a clear disadvantage when they try to make products which are available from other external suppliers at a much lower price.

This is the juncture at which each organisation must take a decision, whether to manufacture or outsource. The decision can only be made by following a defined process. This process involves the knowledge of four main parameters in case of production outsourcing.

- The volume
- The fixed cost of making
- Per-unit direct cost when making
- Per-unit cost when buying

Using these four values the "Cost to buy" and the "Cost to make" are calculated and compared.

The calculations are as follows:

Cost to Buy = Volume x Per. unit cost when buying

Cost to Make = Fixed costs + (Per-unit direct cost x volume).

Other than the cost of production there are a lot of other reasons to be considered which are important as well. Production is influenced by factors like direct control over the product, intellectual property criteria's, quality control regulations, supplier unreliability etc. Outsourcing on the other hand can be influenced by technical experience, insufficient capacity to produce in-house, brand preferences, strategic partnerships etc. ([3] p. 1)

Thus it is quite evident that to formulate an accurate "make or buy" decision it is essential to take into consideration all factors concerning the decision. This can be done effectively by employing a decision matrix.

A decision matrix is a table that permits for a systematic identification, analysis, and rating of the relationships between sets of information. The matrix is especially useful for looking at large numbers of decision factors and assessing each factor's relative importance.
The make or buy decision has been analysed and a solution has been formulated on the basis of the below matrix. ([1] p. 1)

1.3 Decision matrix overview

Criteria factors	Weight	Rating	Make In-house	Buy from Romania	Buy from Poland
Supplier´s profile	**40**	**10**	**9**	**8**	**8**
Financial Strength					
Market Reputation					
Flexibility					
Innovative Capacity					
Information sharing					
Collaboration					
Financial terms	**15**	**10**	**5**	**8**	**7**
Cost of transport					
Payment terms					
Quality	**15**	**10**	**9**	**6**	**8**
Product quality					
Quality control					
Process capability					
Continuous improvement programmes					
Delivery	**10**	**10**	**9**	**7**	**8**
Lead time					
On time delivery					
Quantity and packaging standards					
Documentation					
Political Factors	**5**	**10**	**7**	**8**	**6**
Geographical location					
Political and legal environment					
Social Environment					
Safety and Environment	**10**	**10**	**8**	**8**	**7**
Technological Changes	**5**	**10**	**8**	**6**	**8**
Total	**100**	**70**	**55**	**51**	**52**

Table 1.3

Operational guidelines

The above decision matrix has been formulated by using seven detrimental factors and assigning points to them.
There is a weight column which denotes the importance of a factor on a scale of up to 100. The rating column denotes the maximum amount of points that can be given to a certain factor while making the decision. The three other columns contain the options among which a decision has to be made. The user then assigns points to these options against each decision factor.
The points of each option are then summed up to total. The total of all three decision options are compared and the decision with the highest points is taken into consideration.
In case there is a tie among the totals, the totals of the highly weighted factors are compared to arrive at a decision.

Measurement methods for each factor

The decision matrix was formulated using seven main factors and their sub factors. Below it is explained why each one was considered and how they were graded.

Supplier´s profile: The suppliers profile is the main criteria as the output of our decision is heavily dependent on the reputation, past performance, collaboration strength etc. Thus it is given a weightage of 40 on 100.

Financial terms: The costs are also an influencing factor when it comes to choosing a supplier. It is assigned a weightage of 15 on 100. The in house cost of production with contractors is very high and hence it earns few points here. Romania gets a good rating here as there is 20% lower manufacturing cost.

Quality: Quality is a very important focus area for Siemens as explained by the staff and also based on the feedback of Siemens consumers. Thus it is as important as the cost of the good since outsourcing was previously stopped due to bad quality products. Hence it gets the same amount of weightage of 15 on 100 and the in house naturally wins the grades.

Delivery: As explained by the Siemens staff it is quite essential to have the raw material supplies on time to keep up the production running. They follow a lean manufacturing system and hence delivery gets a 10 on 100. The best way to reduce the delivery time is to produce by self and hence in house is graded more.

Safety and Environment: Environment safety is given a very high focus in Europe and Germany is a pioneer in the same. Thus it is given an independent weightage of 10 on 100 and

Siemens located in Germany gets the highest grades. According to market research Romania has better environmental safety rates than Poland.

Technology and Political factors: Both technology and political factors play a major role in manufacturing and hence have 5 weightage each. Romania is the most conducive when it comes to overcoming political barriers. ([2] p.1)

1.4 Solution

According to the decision matrix the clear winner is the decision to make products in house. Now going forward the questions will be answered.

1. **What would be the recommendation to the Siemens team? To whom should Berlin factory outsource and why?**

A. The recommendation to the Siemens team would be to produce the materials in house. But if they are more focussed on the cost of production they will be more inclined to outsource. If this is the case according to the decision matrix they should outsource to Poland.

2. **Is there an alternative? Could you imagine to optimize the internal production substantially instead and how?**

A. The alternative to outsourcing is to increase the production capacity. The answer to optimizing the production sustainability and capacity is to capitalize and improve on their method of "Lean Manufacturing". To state an example which I personally noted was that the process of production was lacking the lean performance as some production parts were lying idle waiting to be worked upon due to a certain dependency.

1.5 Conclusion and Personal views

The production can be increased substantially by filling up this loop hole of lean manufacturing as Siemens has all the infrastructure and resources to do so. SEW Euro drive achieved remarkable improvements in production by making their manufacturing process lean. For example all tools and raw materials were placed in an orderly manner and frequently replenished, the workshops were designed to suit the requirements of the workers (Left handed or right handed).
Overall this improves the production by a huge margin and Siemens should according to me adopt or actually implement something similar.

2. Case study on Boers & Co.

2.1 Introduction to the Case

Boers& Co is a fine mechanical parts manufacturing organisation. It is a 118 year old company and composed currently of a mother organisation Boers & Co Fijn Metaal Group (FMI).

There FMI comprises of 2 daughter companies:

- Boers & Co FijnMechanische Industrie (FMI), producer of fine mechanical components
- Boers & Co PlaatWerkIndustrie (PWI), producer of precision metal sheets

Presently within the different market sectors in which Boers & Co is part of, there is a huge increase in competition. According to Boers & Co., although the effects of the euro economic crisis are behind them, the companies in Europe are not able to unite completely and work in a co-ordinated manner. The sharing of knowledge and a critical look to the Total Cost of Ownership within the supply chain are two main focus areas for Boers & Co.

Recently an alliance was formed among the businesses, universities and institutes in the Techno Park are of Eindhoven. This led to strong co operations and technical innovations in this area. Boers & Co wants to do something similar with its surrounding organisations and universities.

To sum it up, the case is to formulate ideas on how regional companies can work more closely together to improve their technology resulting in a better market position for Boers & Co. Boers & Co must take care that this should not lead to competition among the companies.

2.2 Discussion on the case

From the case it is understood that Boers & Co is primarily focussing on gaining technical knowledge to improve their existing products and carry out their innovation. This knowledge is possessed by their suppliers and regional organisations surrounding them. If possible they intend to increase their network to countries abroad for e.g. Asia. It is quite natural that organisations will be unwilling to share certain technical knowledge about their products as they probably consider them trade secrets.

Knowledge transfer is essentially a two way process. If an organisation wants to gain knowledge from another one it must be in a position to offer something in return for it. It can either be capital, resources, suppliers or even knowhow for that matter. ([4] p. 5)

Boers & Co also implies that the Total Cost of Ownership factor is taken into account when collaborating with companies especially with ones abroad. Total Cost of Ownership (TCO) is an estimate of the total costs of goods, services or construction works over the whole of their life . This factor is detrimental when you exchange knowledge or invest in knowledge sharing as it is very helpful in analysing the value of the investments. It can denote whether the particular collaboration is indeed profitable for the organisation or not. ([5] p. 1)

2.3 Solution

As part of the solution 3 suggestions were proposed by our team to Boers & Co. They were namely participating in or organising a global technology exhibition, Product based Collaboration and the introduction of a public platform.

A. Participating in or organising a global technology exhibition

"Techtrans" a name for the global technology exhibition idea was warmly welcomed and adopted by the Boers & co team. The idea involves Boers organising or being part of a technical fair among the companies with whom Boers& co. wants to collaborate. This will act as an opportunity to work together and to showcase each other's knowhow. It can pave the way for better collaborations in future and can make knowledge sharing much easier.

B. Product based Collaboration

Boers & Co had showcased a knee assist which helps the physically challenged athletes to ski. Boers & Co also works actively in the medical sector. Such products in these sectors can be highlighted as social products and their improvement and innovation becomes the need for the society. By highlighting such factors, other companies and organisations would be encouraged to contribute and be a part. Thus resulting in collaboration and eventually in targeted innovations for Boers & Co.

C. Public platform

It was also suggested to Boers & Co that in addition to knowledge from organisations there is a huge amount of knowledge lying with individuals around the globe. This knowledge can be tapped using an online open source idea sharing platform. Something similar to Wikipedia, Android OS, etc. This will generate free knowledge and can prove as a huge profit generator as these ideas are cost free and the setup costs for such an online platform is comparatively less.

2.4 Conclusion and suggestions

A main suggestion that was given to Boers & Co was to make their company website available also in the English language. This especially as they were looking to collaborate with companies outside Netherlands. It is very important to create an impact on potential partners abroad as the first thing that is checked is the website. It will also pave the way for additional advantages and future company endeavours.

2.5 Answers to sub questions

What have you seen at Boers & Co that fits the strategy we would like to apply to improve our market position on the global market?
Market Pull situation, corporate leadership, employee motivation, transparency in the process and supply chain.

What can Boers & Co offer other companies in the region?
Technical knowledge, Bulk purchasing in case of supplier knowledge sharing, sharing of networks, facilitating a Centralized R&D Centre for companies which use the same technology.

What is the difference between the vision of Boers & Co and foreign companies?
Total Cost of Ownership focus and the transparency in the supply chain and production process.

3. Case on SEW Eurodrive

3.1 Introduction to the case

SEW Eurodrive, Netherlands (SEW NL) is a daughter company of SEW Eurodrive GmbH in Germany (SEW DE).

SEW Eurodrive assembles geared motors on customer order. They basically use the make to order strategy. All parts needed for the assembly come from SEW DE. SEW NL is not capable to assemble the complete range of products due to volume, tools, weight and other aspects related to the product. SEW has an international network of assembly facilities (and sales facilities, etc.) over the world.

The case is to help SEW NL identify for themselves which of their products can be assembled in the Netherlands. The goal of the case is to find factors which are important and influence in determining the area of assembly for a product. Further the effects of such decisions on efficiency, flexibility and the SEW group as a whole must be highlighted.

3.2 Discussion on the case

The location of an industry is based mainly on six detrimental factors they are:

Raw Materials
Materials that are important to the assembly business must be located near the source. For example the availability of tools, resources etc. These are materials that are essentially required for the assembly process.

Markets
An organisation that is located closer to its target customers reduces its delivery costs. It ensures better chances of on time delivery and customer satisfaction.

Availability Of Fresh Water And Power

A good supply of power and water is essential for an assembly factory. Steel products need a lot of water for cooling and other similar processes. In the same manner aluminium requires a lot of power to be fabricated.

Labour Supply
It is essential for the success of an industry that it has an experienced and skilled work force. For example, if the industry is located near engineering universities etc. Low cost labours are also available in developing countries.

Transportation
To deliver the products to the end customer or industry it is quite essential that the transportation system near the location is favourable. This can involve rails, roads, sea and air transport systems.

Government
If properly involved, the local government can help influence investments in the organisation. It can lead to low taxes, cheap land etc. So if a location with a conducive government is chosen, it can prove very helpful to the organisation. ([6] p. 1)

3.3 Solution

The solution is provided below in a tabular format. Two scenarios were taken according to the case

- Assembly in Germany
- Assembly in the Netherlands

Criteria	Assembly in Germany	Assembly in the Netherlands
Market Demand	Demands from the German market is currently more.	Demands are less compared to Germany
Delivery Time	Time consuming due to transport requirements.	Not so time consuming.
Market Proximity	Easy interaction and involvement with the German market	Easy interaction and involvement with the market in the Netherlands.

Labor costs	Comparatively low labor cost	Comparatively higher labor cost.
Packaging costs and Delivery	Comparatively lower costs due to high capacity and equipment's.	High costs due to lack of capacity and resources.

Effects on flexibility and efficiency

Criteria	**Assemble in Germany**	**Assemble in the Netherlands**
Efficiency	Productivity index lower	Productivity index higher
Flexibility	Lower for SEW NL	Higher for SEW NL

Table 3.3.1

Table 3.3.2

3.4 Conclusion and suggestions

A thing that was peculiar about SEW NL was that they had employed the lean process very efficiently in their organisation. This led to the increase in output of the company and saved a lot on space utilisation in the shop floor.
A room for further improvement has emerged due to the same. There is a lot of vacant space which is left unused in the company. Since SEW NL wants to expand and start assembling more in the Netherlands, it can definitely utilise this space available. This according to me is very possible with the support of its mother company here in Germany.

List of Tables

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