MASTER

Verbetering van de logistieke prestatie bij Reynolds Architectuursystemen: een onderzoek naar de knelpunten en mogelijke verbeteringen in de logistieke prestatie van Reynolds Architectuursystemen

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Verbetering van de logistieke prestatie bij Reynolds Architectuursystemen
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Een onderzoek naar de knelpunten en mogelijke verbeteringen in de logistieke prestatie van Reynolds Architectuursystemen

Eindhoven, 16 juni 2000

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Voorwoord

Voor u ligt het eindrapport van mijn afstudeerproject. Het afstudeerproject is het afsluitend onderdeel van de studie Technische Bedrijfskunde aan de Faculteit Technologie Management van de Technische Universiteit Eindhoven (TUE). Het project betreft een bedrijfskundig probleem met een probleemeigenaar, een klant en een echte opdrachtgever. Het project vindt dus in een bedrijf plaats. De onderzochte aspecten van het afstudeerproject worden onderbouwd met theoretische kennis uit het curriculum van Technische Bedrijfskunde.

De onderzoeksopdracht en de vrijheid die ik heb genoten binnen dit project heb ik erg plezierig en leerzaam gevonden. Het feit dat de initiële opdracht niet overeenkwam met de definitieve opdracht geeft aan dat een grondige probleemanalyse de beste start is. Ik heb binnen de organisatie van Reynolds Architectuursystemen alle vrijheid en medewerking gehad die ik me kon wensen, wat zeker ten goede is gekomen aan de invulling van mijn onderzoek.

Voor het geven van die invulling aan mijn onderzoek zijn dan ook vele personen betrokken geweest in het bedrijf. Ik wil dan ook een ieder die mij geholpen heeft bij het achterhalen van gegevens, het bespreken van mijn ideeën, het meewerken aan mijn project en het geven van nuttige tips bedanken.

In het bijzonder, mijn twee directe begeleiders, namelijk Willem van der Assen en Ger Egberink en daarnaast mijn klankbord Wim van de Berg. Ik wil hen bedanken voor hun tijd, gestelde vertrouwen, medewerking en het geven van alle vrijheid tijdens mijn onderzoek. Daarnaast wil ik ze bedanken voor een kritische noot op zijn tijd.

Graag wil ik dhr. R. Broekmeulen bedanken voor al zijn enthousiasme, snelle reacties, steun en opbouwende kritiek en dhr. H. van Ooijen voor de tijd die hij voor de begeleiding heeft vrijgemaakt en zijn kijk op mijn onderzoek en rapport.

Ik kijk nu terug op een mooie en leerzame afstudeerperiode, waarin ik zelfstandig heb kunnen werken en met veel plezier terug kijk op vijf mooie studiejaren.

In dit rapport zijn een aantal cijfers verwijderd die vertrouwelijke gegevens, van Reynolds Architectuursystemen bevatten. Daarnaast zijn om dezelfde reden een aantal cijfers vervangen door fictieve cijfers.

Iwan de Leeuw
Eindhoven, 16 juni 2000
Abstract

The research described in this report, executed for the course Industrial Engineering and Management Science of the faculty of Technology Management at the Eindhoven University of Technology, deals with improvement of the logistical performance of Reynolds Architectuursystemen towards his customers. Due to improvements in the logistical organisation of Reynolds Architectuursystemen, which includes changes in the physical distribution structure, it will lead to a better logistical performance towards her customers.
Management summary

The graduation project is the final test of the subjects of Industrial Engineering and Management Science of the faculty Technology Management at the Eindhoven University of Technology. Its goal is to solve a complex organisational problem in a practical environment. This investigation has been carried out in the period September 1999 till June 2000 and has been situated at Reynolds Architectuursystemen (RAS), which is located in Harderwijk.

Problem definition

The reason for this investigation was that RAS had the opinion that:
- the logistical performance of RAS is decreasing;
- the requirements in the market, according to logistical performance increases;
- Distribution Centre (DC) of RAS plays a negative role in the logistical performance of RAS.

The initial problem definition of this project therefore was: investigate the logistical performance of RAS and improve the DC to achieve an improvement of the logistical performance of RAS.

The first phase of this investigation, the problem analysis, resulted in a final problem definition. The problem analysis had to give an answer to the questions:
- Does the logistical performance of RAS decrease?
- Do the requirements of the market, according to logistical performance increases?
- Does the DC of RAS play a negative role in the logistical performance of RAS?

According to these questions there were several steps to be taken, namely:
1. definition of logistical performance, which was used in the remaining part of the investigation;
2. investigation of the logistical performance of RAS;
3. comparison of the logistical performance of RAS with the requirements of the market;
4. investigation of the role of the DC in the logistical performance;
5. final problem definition.

The definition of the logistical performance used in this investigation is in terms of: delivery reliability (percentage which is delivered on time) and completeness of delivery.

According to this definition the logistical performance of RAS has decreased the last three years, which is shown in overview table 1.

<table>
<thead>
<tr>
<th>Year</th>
<th>1997</th>
<th>1998</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logistical performance</td>
<td>97,10 %</td>
<td>96,04 %</td>
<td>95,94 %</td>
</tr>
</tbody>
</table>

Table 1 Logistical performance RAS

The logistical performance shown in table 1 was measured with the VMRG-method. VMRG is a line organisation in which customers of RAS are joined. In this figure the method includes delivery reliability and completeness of delivery. Table 1 shows that the logistical performance of RAS has decreased in the last three years.

The requirements of the market according to the logistical performance are not quantified. They are set in qualitative requirements. Therefore RAS has set as her own goal to improve
the logistical performance to at least the level of the performance of 1997. At this point the conclusion can be made that the logistical performance of RAS did not match the requirements of the market.

The role of the DC in the logistical performance had to be fixed, first by identifying the role of the DC in the logistics of RAS. Gathering all the goods flows in a few logistical flows identifies this role. These logistical flows are designed by using the logistical characteristics of RAS. These characteristics are:

A The goods can be divided into two groups: profiles and accessories. This difference is caused by the different properties of the goods.

B Different customer decouple points (CDP), and different points at which the product has its final physical form for the customer (FPF). There are three possibilities:
   - CDP and FPF are positioned in the production process or stock of the supplier of RAS;
   - CDP and FPF are positioned in the stock of RAS;
   - CDP is positioned in the stock of RAS and the FPF is positioned after the CDP. This is called postponement.

C Orders can be combined with other orders for transportation; cross docking of customer specific shipments.

With these three characteristics and the current situation of RAS, all the goods flows can be gathered into six logistical flows:

1. pure co-ordination profiles
2. co-ordination profiles with cross docking
3. co-ordination accessories with cross docking
4. profiles delivered from stock
5. accessories delivered from stock
6. postponement profiles with cross docking

In two of these six flows the DC of RAS plays a significant role, namely: profiles and accessories delivered from stock. The logistical primitive form of these two flows is:

![Diagram](image)

*Figure 1  Logistical primitive form of flow 4 and 5*

After the role of the DC in the logistic of RAS has been identified there has been a new performance measuring to fix the role of the DC in the logistical performance of RAS. The used method for this measurement is different from the VMRG standard.
The reasons for measuring with a different method were:
- the fact that the VMRG method measures in weeks, not in days;
- the fact that the VMRG method includes delivery reliability and delivery completeness in one figure;
- the fact that the VMRG method does not show what possible problem areas are.

The results of the performance measurement of each logistical flow have shown that the logistical flows in which the DC plays the most important role have the best logistical performance (see figure 2).

![Delivery reliability chart](image)

**Figure 2** Delivery reliability for the different logistical flows

The result of this problem analysis is a final problem definition, which differs from the initial problem definition. The final problem definition is:

'Research the problem areas in the logistical performance in the different logistical flows. Search solutions for these problem areas, which results in a design of an ideal situation for the logistics of RAS. The ideal situation has to improve the logistical performance of RAS.'

The measurement showed that the completeness of delivery was on an average of 98% complete. Therefore logistical performance is defined in the remaining part of the investigation as the delivery reliability.

The following investigation can be divided into three parts:
- identifying the problem areas for each logistical flow;
- designing the ideal situation for the logistics of RAS;
- translating the ideal situation into the current situation.

**Problem areas in the logistical performance**

To identify the several problem areas there has been looked at the different processes of the logistical flows. In figure 3 the physical flow of one the logistical flows is shown.
Figure 3  Physical flow of postponement profiles with cross docking

This figure shows that there are different processes that trigger each other. The supplier has to deliver at the promised due date. The physical location depends on the agreements that has been made between RAS and her supplier. The DC has to treat the received shipments according to the standard lead times. The transporter has to deliver the shipment at the promised due date. The sales department and the planning department of RAS are responsible for the co-ordination of the whole process. In every stage of the whole logistical process there are possible problem areas.

The problem areas are identified for each logistical flow. All problem areas can be summarised in a few points:
- the sales department of RAS gives the wrong due date to the customers compared to the lead time that is needed for the different processes;
- the logistical performance of the suppliers;
- different agreements for the several stages in the logistical process causes variations in the lead times;
- shipments are released for transport to early compared to the promised due date;
- the DC does not satisfy the standard lead times

To eliminate these problem areas a redesign of the logistical process as well as a redesign of the co-ordination of the process is needed. In the ideal situation of these two redesigns have been made.

Ideal situation for the logistics of RAS

In the ideal situation for the logistics of RAS the problem areas are eliminated due to:
- redesign of the process for postponement profiles with cross docking. In the ideal situation the shipments go straight from the manufacturer to the customer. The new physical flow is shown in figure 4;
- redesign of the process for co-ordination profiles with cross docking. In the ideal situation the shipments go straight from the manufacturer to the customer;
- redesign of the process for co-ordination accessories cross docking. In the ideal situation the shipments go straight from the manufacturer to the customer;
Figure 4  New physical flow for postponement profiles

- an improvement in the inventory management;
- the sales department promises the right due date according to the lead time of the process;
- a better communication between the different departments of the RAS organisation;
- shipments will be released for transport one day before the given due date;
- new agreements will be made with the different suppliers about their logistical performance.

The improvement of the logistical performance due to eliminating the different problem areas is shown in table 2.

<table>
<thead>
<tr>
<th>Flow</th>
<th>Current situation (% on time)</th>
<th>Ideal situation (% on time)</th>
<th>Improvement caused by eliminating &quot;too early&quot; shipments</th>
<th>Improvement caused by deliveries straight from supplier to customer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>≥ 54</td>
<td>52</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>12</td>
<td>≥ 25/85(^1)</td>
<td>-</td>
<td>19/72(^2)</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>≥ 55</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>41</td>
<td>≥ 63</td>
<td>22</td>
<td>53</td>
</tr>
<tr>
<td>5</td>
<td>36</td>
<td>≥ 63</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>≥ 61</td>
<td>-</td>
<td>55</td>
</tr>
</tbody>
</table>

Table 2  Improvement logistical performance

Realistic ideal situation

The ideal situation has been tested for the current situation. This resulted in a realistic ideal situation.

The following changes result in a realistic ideal situation:

1. The first change is the co-ordination of the different processes by the people in the RAS organisation. The existing problem areas related to this issue are caused by the way of thinking, namely the organisation thinks in weeks not in days. When the organisation starts thinking in days all the processes can be co-ordinated in days. Problem areas in all logistical flows will be eliminated.
2. The second change is the redesign of the logistical flow postponement profiles with cross docking. Shipments will be delivered straight from the supplier to the customers without cross docking.

3. The third change is changing the transport agreements for the logistical flows co-ordination profiles and accessories with cross docking. This change will decrease the variation in lead times for these flows.

4. The fourth change is making new agreements with the suppliers. The agreements include logistical performance at day level. The agreements have to be monitored by RAS or the supplier.

5. The fifth change has a direct link with the first change. Shipments will be released for transport one day before the promised due date.

6. The sixth change includes all flows, communication within the RAS organisation has to improve.

Implementation

To implement the proposed changes in the realistic ideal situation a few steps have to be taken, namely:

Further investigation into straight deliveries has to be done. Which transport companies can take care of the transport. For deliveries with cross docking (logistical flows co-ordination profiles and accessories with cross docking) it has to be determined which DC will be used.

New agreements have to be made with the suppliers about logistical performance.

Several changes in the organisation are needed, such as the way of thinking in days as opposed to weeks and a better communication between the different departments of the RAS organisation.

Conclusions

The logistical performance of RAS has decreased over the last three years and does not match the requirements of the market. The DC of RAS does not play a negative role in the logistical performance of RAS.

There are several problem areas in the logistical performance of RAS, which include all the logistical flows. These problem areas can be summarised in a few points:

- co-ordination of the different processes;
- way of thinking, in weeks not in days;
- logistical performance of the suppliers;
- the current agreements about several stages in the logistical process.

A redesign of the logistical process as well as a redesign of the co-ordination of the process can eliminate these problem areas. These redesigns result in changes in:

- logistical process, straight deliveries from supplier to customer;
- new agreements about different stages of the logistical process;
- a new way of thinking in the organisation;
- new agreements with suppliers.

The improvement of the logistical performance with these changes can be quantified partially, which is shown in the ideal situation.
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