Distribution scenario analysis at Philips Lighting B.V.

exploring supply chain costs effects of distribution scenarios to a retailer

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I Abstract

This thesis contains the findings of a graduation project in which the supply chain between Philips Lighting B.V. and one of its Do-It-Yourself retail customers, named OBI, is examined. The purpose of this graduation project was to examine whether the current way of distributing OBI outlets directly by the Philips' regional distribution centre could be done more efficiently. An analysis of the processes, performance and costs of the supply chain lead to the design and exploration of alternative distribution scenarios whereby the effects on the logistics costs of both Philips as well as OBI are examined. In addition, the implementation guidelines and barriers to be confronted of the most favorable scenario are presented.

II Foreword

This thesis contains the findings of a graduation project conducted at Philips Lighting B.V. in the period from March 2005 till December 2005. This graduation project formed my final stage of the study Industrial Engineering and Management Science at the Technological University of Eindhoven (the Netherlands).

The project was conducted within the Business Unit Consumer Lamps Europe which develops, produces and sell lamps meant for the consumer market. The recent introduction of its German Do-It-Yourself retailer, OBI, gave the opportunity to conduct this challenging project. Namely, the unusual way of distributing this customer gave cause to examine the implications and to look into ways to optimize this setup. It had been a great challenge and a good learning experience for me to deal with this real-life problem.

The establishment of the findings of this research project had not been possible without the crucial help of a number of persons which I am very grateful to. First, I would like to thank my university supervisors, Tom van Woensel and Jan Fransoo, for their constructive advice, contribution, and criticism during this project. Further, I would like to thank my company supervisors Axel Vonhausen and Antoon Martens for their fruitful cooperation and contribution. I also would like thank to all the interviewees within the company for their hospitality and contribution to the findings of this project. Last but not least, I would like to express my gratitude my family and friends for their contribution, belief and support during all stages of my project.

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III Management Summary

This thesis describes a graduation project conducted at the Business Unit Consumer Lamps Europe of Philips Lighting B.V. This Business Unit develops, produces, and sells lamps for the consumer market. As of August 2004 Consumer Lamps has acquired its new German customer OBI, which is one of the world's largest DIY retailers. OBI has 498 outlets throughout 11 countries, of which 341 of them are located in Germany. Due to time restrictions on the introduction phase of this account and the unavailability of a customer's distribution centre, Philips decided to supply the large number of outlets in Germany via its regional distribution centre in Acht. However, as the regional distribution centre is not primarily designed for outlet delivery a project has been set up whereby the following research questions were to be answered:

1. *How efficient is current way of distributing OBI outlets in Germany directly by the RDC from a process, costs perspective, and how effective is it from a performance perspective?*
2. *Are there alternative distribution scenarios that result in a more efficient way of working from a total chain perspective?*
3 *How should the most favorable alternative distribution scenario be implemented and what barriers should be confronted?*

In order to increase the feasibility of the project, the following scope was defined. Namely, returns, promotional & campaign planning, products bought by OBI outlets were not considered in this study. In addition, the project regarded the functionalities of the current information systems in the supply chain as fixed in order to increase the feasibility of implementing a possible new scenario

In order to answer the first research question the processes, performance and costs of the current supply chain were examined. It is observed that a number of dedicated processes had to be set up for OBI at the regional distribution centre, as it is not primarily designed for retail distribution. Based on the performance analysis it could be concluded that these processes for OBI achieve the target performance. However, it is observed that the actual logistics costs as a percentage of the sales are substantially higher than is accounted for in the prices charged to OBI. Namely, the actual logistics costs rise up to 30% of the sales while the prices charged to OBI take only an 8% margin for logistics costs into account. This is because the 8% margin is based on a warehouse distribution structure while Philips is faced with an outlet delivery structure that results in substantially higher logistics costs. In addition, the RDC proves to use an ABC rate structure that is influenced in such a way that it charges higher logistics handling out costs than actually incurred by them. Therefore the following problem statement was formulated:

'Philips incurs too high logistics costs as the prices charged to OBI are based on a central warehouse delivery structure while Philips is faced with an outlet delivery structure. '

This problem statement raised the need to explore alternative distribution scenarios in order to reduce the logistics costs. Therefore the following design assignment for the second research question was formulated: *'Design alternative distribution scenarios from Philips to OBI and analyze the supply chain costs effects of these scenarios on both parties.'*

In order to benchmark the current way of working two alternative scenarios are designed, respectively the Central Warehouse (CW) scenario and Grouping Degrouping (GD) scenario. In the CW scenario the OBI outlets will be supplied via central warehouse that acts as a storage facility between the RDC and the outlets. In this scenario the lead-time to the outlets will decrease because of the proximity of the central warehouse to the outlets. In the GD scenario the outlets will be supplied via a hub, which acts as a 'break-bulk' facility by ordering goods in bulk from the RDC, and upon receipt breaking those quantities into smaller amounts for immediate shipment to the outlets In this scenario the lead-time to the outlets will increase as it is composed of the lead-time from RDC to hub, review period of the hub, and the lead-time from hub to outlet. The central questions that were to be examined at both scenarios were:

1. *Does the reduction in transport and RDC handling out costs outweigh the extra costs incurred by the additional facility in the supply chain?*
2. *How much does an alternative scenario affect the outlets in terms of logistics costs?*

The two alternative scenarios were modeled analytically together with the baseline supply chain. A validation process of the baseline supply chain costs showed that the model is valid for representing the logistics costs of the current situation. Based on the comparison analysis of the model the following statements can be made with regards the central questions:

- ***The CW scenario results in about 10% savings for Philips as the decrease of the RDC handling out and transport costs outweighs the additional handling and storage costs of the CW.***
- ***The GD scenario results in about 2% logistics costs increase for Philips as the decrease of the RDC handling out and transport costs does <u>not</u> outweigh the additional handling costs of the hub.***
- ***Both alternative scenarios have marginal effects on the logistics costs of the outlets in terms of storage and handling.***

According to the model, the future developments with respect to gaining more outlets make the CW scenario even more attractive as the savings of Philips could be increased by economies of scale. In addition, it was found out that an outlet number increase is needed in order to make the GD scenario profitable. In this study the break even point is found to be 237 outlets. Furthermore, based on a sensitivity analysis on the logistics parameters, cost drivers, and the demand parameters chosen in the model the following additional statements could be made:

- The findings with respect to the profitability of the CW scenario are robust with regards the parameters chosen. However, the savings could deviate between 4% and 16% as the pick cases rate has a considerable impact on the logistics costs of this scenario.
- The GD scenario has the potential of being profitable under the following circumstances: (1) a 1 day increase of the hub review period (2) a 61% increase of in the demand level of the outlet (3) a 14% decrease of the pick cases rate.
- Neither big nor small outlets will be affected by the alternative scenarios.

Based on the following two arguments the CW scenario is regarded as the most favorable scenario and therefore recommended for implementation:

- The savings of the CW scenario are higher than the GD scenario under all circumstance changes examined in this study
- The CW scenario results in a lead-time decrease and is therefore more likely to be accepted by OBI.

A public warehouse is advised for the setup of the CW based on the following advantages: (1) no fixed investments, (2) lower costs, (3) flexibility. This practically means that a third party logistics provider (3PL) has to be hired for the warehousing and distribution activities related to the setup of the central warehouse. Based on the commitment needed of the various parties within Philips and possibly OBI a phased implementation process is recommended consisting of the following phases: (1) bringing a tender out to 3PL's in Germany and estimating the savings that could be achieved with the model constructed in this project (2) entering the commercial discussion with OBI, and finally (3) setting up an implementation project. The goal of the commercial discussion is to pursue additional savings in the supply chain with the help of OBI. However, with respect the implementation process the following statement could be made:

'The implementation of the CW scenario is not trivial as internal and external barriers have to be confronted by Philips'

There are three types of organizational barriers that are to be confronted in the implementation project, namely: (1) Philips internal barriers (2) barriers between the 3PL and Philips (3) barriers between Philips and OBI. The first type of barrier imposes clear communication with respect to the savings and the purpose of the new scenario to various parties within Philips as processes will have to be changed. The second type of barrier imposes clear agreements between Philips and the 3PL with respect to the services procured, as quality & service responsibilities will be transferred to an outside party. In addition, a trade-off has to be made between the estimated savings that could be achieved and the investments and risks with respect to hiring a 3PL as the savings depend on the period of time that OBI remains a customer of Philips. Finally, the third type of barrier impose a requirement to win the trust of OBI and a good negotiation strategy to persuade OBI to share the additional savings that could be achieved by it as it has a considerable negotiation power in the supply chain.

IV Table of Contents

Abbreviations

ABC	Activity Based Costing
ATP	Available To Promise
BG	Business Group
BU	Business Unit
BUCLE	Business Unit Consumer Lamps Europe
CMSU	Country Marketing Sales Unit
CRDD	Customer Requirements Delivery Date
CU	Consumer Units
CW	central warehouse
DC	Distribution Centre
DIY	Do It Yourself
FTL	Full Truck Load
IPLC	International Production and Logistics Center
MAT	Moving Annual Total
MRO	Maintenance Repair and Overhaul
MG	Market Group
MTP	Medium Term Planning
MTS	Make To Stock
ODS	OBI Disposition System
PLD	Philips Lighting Distribution
3PL	Third Party Logistics provider
SG	Supply Group
SKU	Stock Keeping Unit
VMI	Vendor Managed Inventory