Section 4
Production Management
Transfer of production to strategic suppliers: A case study

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Abstract

To remain competitive, Norwegian suppliers to the maritime industry need to improve the efficiency of their supply chains and production systems without compromising their products’ high performance. To free capacity for product innovation and reduce their cost of production, companies may transfer parts of their production to strategic suppliers in their supply chains. However, many businesses do not carry out such transfer processes in a systematic manner owing to a lack of models and tools supporting them in the process. In this paper, insights into a case study are presented for two production transfer processes between a Norwegian supplier of advanced maritime monitoring systems and one of its strategic suppliers. A set of preliminary guidelines for carrying out production transfer processes is proposed on the basis of the case study. The paper is the first step toward developing a model for systematic production transfer processes.

Keywords: transfer of production, ramp-up, operations strategy, supply chain collaboration, guidelines, case study.

1 Introduction

Manufacturing of innovative and technologically advanced products is an area where, traditionally, Norway has been competitive, with a potential for growth. Through access to knowledge and focus on research, development, quality, and performance, Norwegian suppliers to the maritime industry have positioned themselves as leaders within the premium segments of their markets. Here, customers
have been willing to pay a higher price than in the volume segments, where competitors in low-cost countries, traditionally, have dominated with less expensive products that have a lower performance. However, in recent years, competitors in low-cost countries have increased their product performance while keeping their costs lower. Consequently, Norwegian suppliers have been forced to lower their margins to remain attractive to their customers. This is not a sustainable solution. To secure the competitiveness of Norwegian suppliers of high-tech, knowledge-intensive products to the maritime industry, there is a need to improve the efficiency of their supply chains and production systems without sacrificing their high product performance.

Many Western companies choose to transfer parts of their production to suppliers to increase their competitiveness. This approach has many stated benefits, such as lower factor costs and access to new materials, distribution channels, and technologies; however, it is associated with substantial risk, and may lead to increased costs and loss of business if it is not carried out carefully and in a systematic manner [1]. Yet, there is a lack of established frameworks focusing on rapid and reliable production transfers.

In this paper, insights into a case study are presented for two production transfer processes between a Norwegian supplier of advanced maritime monitoring systems and one of its strategic suppliers within electronic manufacturing service (EMS). A set of preliminary guidelines for carrying out such transfer processes is proposed on the basis of the case study. The purpose of the research is to help better understand production transfer processes, and the paper is a first step toward developing a model for systematic transfer processes.

2 Research method

When research is of an exploratory nature, and contemporary events are investigated without being able to manipulate behavioral events, case studies are a preferred research method [2]. For this particular activity, where production transfer processes of a Norwegian supplier to the maritime industry are explored, the researchers were not able to manipulate any behavior – at least in the short term. Therefore, an instrumental case study approach is adopted. This approach provides insight into a particular issue and can be used to redraw generalizations or build theory [3]. The case study has been designed as a single case study as access to adequate empirical data was limited to production transfers within one supplier-buyer relation. However, two transfer processes were followed as this gave multiple sources of evidence and enabled pattern matching, and thereby increased both construct and internal validity [2]. The empirical data has been collected through workshops, semistructured interviews, and meetings with key representatives of the case companies, e.g. quality managers, product developers, key account managers, and process engineers.
3 Theoretical background

In this section, key concepts for the topic are defined and a brief overview of earlier studies is provided. Typical challenges for a production transfer process are highlighted.

Production transfer is hereby understood as the preparation, transfer, and start of relocated production, i.e. the relocation of the production of products and components from a sender (the buying company) to a receiver (a supplier). It comprises several types of transfer: transfer of knowledge, physical equipment, administrative systems, and transfer of relationships to different supply chain actors [4]. The start-up phase, also known as ramp-up phase, lasts until a full-scale production is reached – at targeted levels of cost and quality. It succeeds the process engineering and pilot production phases [5]. Moreover, the production may be transferred to domestic (nearshore) or offshore suppliers, internally or externally owned [6, 7].

Sourcing processes are not exempt from challenges, and to benefit from production transfers, one needs to reduce or cope with various types of risks, such as the inability to meet demand on time, the loss of intellectual property, or an increase in transaction costs. Thus, it is important to identify and implement measures to reduce risk level as much as possible [8]. Two challenges emphasized by the literature and specific for the ramp-up phase are unforeseeable capacity and quality losses, which are likely to lead to delays and increased costs [9]. Their occurrence and frequency depend on factors like the sourcing experience of the supplier and the buyer; the size and pace of the transfer process; the amount of tacit knowledge to be transferred; the degree of adaptation of the production process or the product to the new context; the degree of technological complexity and maturity; and second-tier suppliers [10].

Several studies about supplier relationships for the manufacturing of high-tech and core products highlight the advantages of a partnership model with strategic suppliers characterized by effective information sharing, close collaboration, and long-term commitments [11, 12]. Moreover, the early involvement of suppliers in the product development process is an increasing trend owing to several benefits seen with such a collaboration, i.e. improved product quality, improved manufacturability and logistics, shorter time-to-market and ramp-ups, reduced costs, and experience transfer [8]. However, in spite of a diverse literature about the advantages of early supplier involvement and close collaboration with strategic suppliers, there is a lack of established frameworks focusing on rapid and reliable production transfers and ramp-ups through effective cooperation and information exchange in high-tech supply chains.

4 Case study

The case study describes key takeaways from two production transfer processes between a Norwegian supplier of advanced maritime monitoring systems (Buyer) and one of its strategic EMS suppliers (Supplier). First, the two products under
consideration are introduced. Here, products A and B represent a mature and an ongoing transfer, respectively. Thereafter, insights into the transfer processes are condensed into a set of preliminary guidelines for carrying out such transfer processes.

4.1 Introduction of products

4.1.1 Product A
The production of product A was the first to be transferred from the Buyer to the Supplier. The product somewhat differs from the Buyer’s other products in that it is cheaper, less complex, and produced in higher volumes (tens of thousands). All products are sold to a sole customer, which uses product A to offer a monitoring service to which other companies can subscribe. The products operate in exposed areas, and often need to be replaced. This creates a yearly demand for product A.

The product consists of a sensor, casing, and electronics. The assembly process consists of soldering the sensor and electronics together and molding it into the casing. Subsequently, the product is tested. For several years, the Buyer purchased the casing and electronics from two suppliers and assembled the products. However, two years ago, the Buyer approached the Supplier with an invitation to tender for the assembly of product A. Currently, the Supplier receives sensors from the Buyer and casing and electronics from two other suppliers, and carries out the assembly and testing of product A. All products are delivered to the Buyer, which still maintains communication with the customer of the product.

4.1.2 Product B
The production of product B is currently being transferred from the Buyer to the Supplier. Product B, a signal converter used in combination with a range of the Buyer’s other sensor products, replaces a previous product version with similar characteristics. It consists of a cabinet with different electronics, such as power supply, wiring, and circuit boards. For the previous version of the product, cabinets were produced by one supplier, shipped to another for installation of power supply and wiring, and then shipped to the Buyer, which installed circuit boards from the Supplier and tested the product. However, for product B, the Supplier will become more integrated in the supply chain. It will receive cabinets from the cabinet producer (and eventually a subsidiary of the Buyer located in a low-cost country) and install all electronics including self-produced circuit boards before shipping the product to the Buyer. For the time being, testing will still be carried out by the Buyer.

4.2 Transfer process

In this section, insights into the transfer processes are presented in the form of general requirements pertinent to the production transfer process.

First, there is a need to involve relevant actors from both companies early in the process. For the transfer of product A, the purpose of the transfer was unclear
to key personnel in the department that owned the product. It was rumored that it was a cost-saving measure, when the main driver was, in fact, the high volume and low complexity of the production not being consistent with the Buyer’s core competence. Further, key personnel did not feel involved in the decision to transfer production. In fact, they saw the need to intervene in the transfer process two times to secure deliveries to the customer. Both the Buyer and the Supplier agreed that the transfer process should be marked by a formal kick-off.

Second, a *communications structure* needs to be established. This includes defining contact points at both the buyer’s and the supplier’s ends, and agreeing on how relevant matters should be communicated. During the transfer of product B, the Supplier had appreciated the fact that the contact person at the Buyer’s end was same throughout the process. At the same time, the contact person at the Buyer’s end felt that it had been challenging to know who to contact at the Supplier’s end. She had also experienced that two contacts at the Supplier’s end had different revisions of the bill-of-materials (BOM). According to the Buyer, their personnel quickly embarked on other projects after a transfer. Generally, it is important that a supplier has a contact point at the buyer’s end even after the transfer, and vice versa.

Further, the parties should be conscious of *risk handling*. Early in the process of transferring product B, the Supplier was asked to secure necessary material from second-tier suppliers without any formal agreements being put in place. Due to changes in the BOM, some of this material had become obsolete. The economic consequences for the parties were still not settled. Further, beyond what was indicated in the invitation to tender, no formal agreements regarding, e.g., future volumes existed. This posed a risk to the Supplier, which had invested in its processes on the basis of the transfer.

The case study identified *transfer of equipment* from the Buyer to the Supplier as another area that should be taken into careful consideration. For the transfer of product A, it was initially decided that all test equipment would be moved from the Buyer to the Supplier instead of duplicating the equipment. This was one of the decisions that the department that owned the product challenged. It envisaged that the Buyer would be unable to run spot checks, thereby losing control over the quality of its outgoing deliveries. Some of the Supplier’s current test equipment had been duplicated and borrowed from the Buyer, whereas some were owned by the Supplier. This equipment was identical to the Buyer’s other test equipment.

Further, the *ramp-up* needs further attention. For the transfer of product A, the original plan was that the Buyer would produce the product up until Easter and the Supplier would produce everything subsequently. Both the Buyer and Supplier currently agree that this is not realistic; it is impossible to transfer years of competence “overnight.” For product B, some issues regarding product design that should have been sorted out during the pilot production phase were identified in the production phase. As such, some type of stage gate should be put in place between the pilot production and the production phase. Further, the buyer should maintain some production capacity to secure the supply chain’s ability to deliver during a ramp-up.
Throughout the transfer process, many alterations take place that necessitate a consciousness toward change handling. This applies both between the buyer and the supplier and internally in the two companies. For the transfer of product A, the Supplier came up with many suggestions for improvements in the production process, some of which were accepted, whereas some were dismissed by the Buyer. In the latter case, the Supplier felt that it had often been short of an explanation. For product B, the Buyer experienced challenges with its own product life-cycle management system with respect to how changes should be registered. In any case, the current version data should be kept in one file, which is updated and validated at all times.

As described previously, the purpose of the production transfer needs to be clearly defined and communicated to relevant actors. The buyer should follow up on the attainment of these objectives. For product A, the department owning the product still has no clear overview of the economic consequences of the transfer. If perceived benefits are not realized, the buyer should consider to either transfer the production back or transfer it to another supplier.

During the research, the Buyer revealed that it was considering updating product A to a new version. The Supplier had made a plan to further improve product A's production process. Many of these suggestions, including possible investments, will be futile if a new product version is launched. Hence, the supplier should, in some way, be kept updated about the future prospect of the product it produces. In the same way, the supplier should inform the buyer about relevant information concerning product components, such as last buy notifications from second-tier suppliers that may trigger product alterations.

A transfer of production may also trigger new business opportunities for the supplier. For product B, the Buyer included the development of an assembly procedure in the order. According to the Buyer, the Supplier also had competence within test development that it could sell in conjunction with production transfers.

5 Conclusion

In this paper, insights into a case study are presented for two production transfer processes between a Norwegian supplier of advanced maritime monitoring systems and one of its strategic EMS suppliers. A set of preliminary guidelines for carrying out such transfer processes is proposed on the basis of the case study. These are summarized in Table 1.

The purpose of the research is to help better understand production transfer processes, and the paper is a first step toward developing a model for systematic transfer processes. Such a model would help managers carry out such processes either from their own facilities to a supplier or from an existing supplier to another. A systematic approach is likely to reduce costs associated with such transfers.
Table 1: Guidelines for production transfer processes.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
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<tbody>
<tr>
<td>Involvement</td>
<td>Early in the transfer process, relevant actors need to be informed about its purpose and be involved in making decisions, which strongly influences the company’s ability to deliver. The transfer process should be marked by a formal kick-off.</td>
</tr>
<tr>
<td>Communications structure</td>
<td>Contact points and modes of information sharing should be defined for the entire transfer process and the subsequent period to follow.</td>
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<tr>
<td>Risk handling</td>
<td>Both the buyer and the supplier should carry out risk assessments prior to the transfer process. Formal agreements need to be put in place where appropriate, e.g. for securing material and future deliveries.</td>
</tr>
<tr>
<td>Transfer of equipment</td>
<td>The timing and nature of the transfer (e.g., copy exactly) of equipment need to be decided.</td>
</tr>
<tr>
<td>Ramp-up</td>
<td>The transition from the pilot production phase to the maximum capacity production phase needs to be carefully planned with respect to, e.g., whether the product is ready for ramp-up and how any overlap in capacity should be organized.</td>
</tr>
<tr>
<td>Change handling</td>
<td>Suggestions for a change should be treated in a systematic manner, with decisions being supported by factual explanations and systems keeping track of valid documentation at all times.</td>
</tr>
<tr>
<td>Goal attainment</td>
<td>Effects of the transfer need to be measured and followed up. If perceived effects are not realized, this could trigger a transfer of production back to the buyer or to another supplier.</td>
</tr>
<tr>
<td>Future prospect</td>
<td>A supplier should be kept informed about the future prospect of the product it produces so that unnecessary investments and improvements are not made. At the same time, the supplier should keep the buyer informed about information that may trigger product alterations, such as last buy on key components.</td>
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<tr>
<td>New business opportunities</td>
<td>A transfer of production may trigger new business opportunities. The parties should consider what tasks are to be performed in connection with the production transfer.</td>
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References


