Industrial Fittings as a Complete Service and Support of its Implementation in the ERP System: A Case Study

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Abstract: The case study deals with the implementation and usage of the ERP system in LDM, a leading Czech producer of industrial fittings. LDM has taken the implementation project for the purpose of reworking its traditional offer of deliveries of structural elements for the set up of fittings to provision of complete services in the field, thus managing to strengthen its competitiveness to a large extent. The study describes how this prestigious engineering enterprise has coped with the selection and implementation of the information system and what benefits and experience it has taken from using it.

Key words: IS/ICT (Information Systems/Information and Communication Technology), ERP (Enterprise Resource Planning), MRP II (Manufacturing Resource Planning), competitiveness

1. Introduction

LDM has been involved in the development, production and servicing of industrial fittings more than 20 years. The company manufactures governor and safety valves, or else structural elements vital for any kind of piping. In Česká Třebová, where the company is located, the production of fittings is a tradition of more than 100 years.

The company was incorporated by three partners in 1991. Since then, it has been through a dynamic development resulting in the current branched structure and focus on comprehensive services. LDM is comprised of the headquarters, two subsidiaries in the Czech Republic and six abroad. At the moment, safe for the Czech Republic the company is directly active in Slovakia, Poland, Germany, Bulgaria, Russia and Kazakhstan.
The company employs 205 employees and its turnover exceeds 480 Mio CZK. Nearly 70% of its production is exported outside the Czech Republic, in the form of direct export and the customers are foreign companies or the subsidiaries.

The main product line is divided into two parts depending on the application of the fitting and the market. One of the target market segments is the heating and air-conditioning business where the company primarily delivers PN 16 and PN 40 pressure stage drive governor valves. The other part of the product line is specialised in high-pressure fittings used in heating and power plants. From the geographical point of view the biggest LDM customers are located in the Czech Republic, EU, Russia and Kazakhstan.

In 1997, the company obtained the ISO 9001 certificate by LRQA. Moreover, it holds TÜV certificates, declarations of conformity and several import/export licenses for the Ukrainian, Byelorussian and other markets.

2. Research Methodology

The Center for Investigations into Information Systems makes a survey of the Czech ERP market every year, including, as an integral part thereof, processing of case studies in the form of qualitative inquiries and using the projection interview method with the employees responsible for IS/ICT investments in each organisation. In 2005 – 2012 the authors prepared 130 case studies in production, trading and servicing enterprises in the Czech and Slovak republics.

The theoretical background for the application of the research method has been taken from the following literature sources: (Gill, Johnson, 1991) and (Pavlica, 2000). The theoretical assumptions for the performance and evaluation of the implementation projects are based on the extensive practical experience of the Center for Investigations into Information Systems and on a long-term study of the following specialist sources: (Voříšek, 1997), (Davenport, 1998), (Učeň, 2001), (Molnár, 2001), (Basl, 2002), (Olson, 2003), (Smejkal, Rais, 2003), (Olson, Chae, Sheu, 2005), (Laudon, Laudon, 2006), (Schwalbe, 2007), (Pour, Gála, Šedivá, 2009).

The authors have also taken and studied theoretical knowledge about the implementation projects in studies drawn up by analyst companies focused both on global and Czech market, such as: (Deloitte Consulting, 2000), (Accenture, 2001), (Hestermann, Anderson, Pang (Gartner), 2009).

Preparing this case study the authors have also used publications dealing with enterprise applications in the area of production and purchase management, and increase of the enterprise efficiency based on the improvement potential by the authors: (Tomek, Vávrová, 2007) and (Učeň, 2008).

3. Main Aspects of Implementation of New ERP Project

3.1 Reasons for Transfer to Modern ERP System

The company originally relied on the development of an in-house information system. For that purpose it had the necessary specialists. For several years this procedure was successful, especially in the areas of manufacture control and logistics. Economy and wage accounting were covered by an external supplier. Its solution was however
insufficiently integrated into the modules of the in-house system. The users thus felt absence of control mechanisms. They had to work according to accurately preset procedures and incompliance with them might result in errors in data acquisition.

For a certain period of time these drawbacks were manageable and positive properties of the system were utilised, mainly the options offered by the functionalities, prepared down to the most detailed level to meet the needs of manufacture and servicing of the fittings. As the time passed the company’s capacity began to be insufficient for the development and maintenance of the system and the system turned to be obsolete, especially from the technological and ergonomic points of view. The functionalities were sufficient until the last moment when the decision was made to replace the outdated system with a modern ERP solution completely provided by a single supplier.

3.2 Tender and Main Evaluation Criteria

The decision about the change of the information system was made in 2006. Authorised staff began with market research for corporate solutions and collected information from surrounding companies with the aim to see how the companies organize these tenders and what their experience with individual suppliers is.

In 2007, the company management announced a tender for supply and implementation of the ERP system. There were 17 applicants in the first round from among local and international manufacturers or system integrators. The main weighed criteria for the overall bid evaluation included the level of functionality and technical advancement of the system including its demand for hardware, the strengths of the supplier including its financial stability, geographical distance, relation to the implementation partner and the price of the product and its structure. Another evaluation criterion was the price of licence for one user, the prices of implementation and service works.

On the basis of evaluation of the submitted bids prepared in line with the abovementioned criteria six applicants advanced to the second round. Their presentations were assessed by the management team together with a selected group of key future users of the system. The applicants were asked to present implementation of a particular task on the basis of pre-generated company data. Part of the presentation was to include planning of production of a selected component with a change during production. “The purpose was to show the behaviour of the system at the moment of the required change and the impact on data, deadlines and warehousing operations. This procedure, i.e. solution of a particular task for presentation, is highly recommendable,” says Vlastimil Dytrt, CEO of the company.

3.3 What Decided about Winning Bid

The winner of the tender was selected on the basis of several facts. The main fact was mutual understanding with the company consultants of ASV Náchod, chosen by LDM as its implementation partner for Helios Green. Although the product itself did not offer 100% fulfilment of all requirements, but this was not expected by the team assessing the individual solutions. The primary requirements for the ERP system was its ability to cover and interconnect all corporate processes with an emphasis on integration of the value chain in which LDM includes development and design, technological preparation of manufacture, operative production management and servicing. Another no less important requirement was operation of the system over a unified database. And last
but not least the new solution was expected to offer a modern ergonomic user interface.

The employees of LDM further expected addressing of a specific matter. They required the type number of each product to be broken down into the individual parameters of the respective product with allocation of the appropriate documentation. This matter was resolved by the consultants of ASV Náchod to the customer’s full satisfaction.

“The most important aspect of a tender is assessment of references of the implementation partner, which indeed happened in our case. Another important factor is agreement with the consultants. An important role is also performed by the ERP product itself. Even a medium-sized company should select from among robust and established solutions. An important thing to be considered is that the system is acquired for several years in the course of which the company may grow together with the demand for use and escalation of its systems,” summarised Vlastimil Dytrt the major recommendations for tender proceeding.

3.4 Basic Characteristics of Project Implementation Stage

ERP system Helios Green was acquired for 55 simultaneously working users. The implementation project was scheduled in two stages. The first stage included deployment of all functionalities with the exception of TPV and manufacture as such, with the related logistic processes and service. The second one focused on coverage of the value creating chain.

The project was commenced by execution of the contract in mid August 2007. The first stage was completed as of 1 January 2008, when part of the solution was taken over for routine operation. This part included economic and finance management, warehouse management, wage accounting and connection to the existing attendance system and asset management. This stage was followed by implementation of the functionalities for management of procurement and sales logistics, manufacture and servicing. The stage was completed on 1 August 2008 as scheduled. Transfers of the individual product groups to the new system and optimisation of certain functions then took another 12 months. The main reason was the historic setting of the kanban areas in manufacture which in many respects proved to be unsatisfactory. That is why this non-addressable pull system was removed and replaced with the Manufacturing Resource Planning II concept.
### ERP system

<table>
<thead>
<tr>
<th>Implementation partner</th>
<th>Helios Green</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation period of stage 1</td>
<td>4.5 months (August 2007 – December 2007)</td>
</tr>
<tr>
<td>Implementation period of stage 2</td>
<td>3 months (January 2008 – March 2008)</td>
</tr>
<tr>
<td>System optimisation</td>
<td>12 months (April 2008 – March 2009)</td>
</tr>
<tr>
<td>Number and type of users</td>
<td>55 simultaneously working</td>
</tr>
<tr>
<td>Server operation system</td>
<td>MS Windows Server</td>
</tr>
<tr>
<td>Database platform</td>
<td>MS SQL Server</td>
</tr>
<tr>
<td>Processes covered by ERP system</td>
<td>Economy, manufacture, logistic, human resource management, service management</td>
</tr>
<tr>
<td>Project benefits</td>
<td>Database unification, process automation and integration, operative management of value chain including service, reduction of error rates in all stages of manufacture, complex evidence of business case and its management with use of infrastructure applications of workflow type, transfer to push planning and manufacture management (MRP II), support for growth and competitiveness of the company in expansion to new markets</td>
</tr>
</tbody>
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**Tab. 1: Main project data on implementation of ERP system Helios Green in LDM**

### 4. Manufacture Planning and Management

LDM products are required to comply with the physical parameters (such as pressure, through flow, flow characteristics, temperature etc.). On the basis of these parameters the fittings need to be designed and their type number must be created to reflect the parameters. The type number bears the physical characteristics of each product and other potential customer requirements and breaks down in the system for allocation to a type or specific piece list. This activity is performed by the dealer planning the manufacture and executing contracts with customers. The order planning process is then performed on the background in the Helios Green system.
Fig. 1: Survey of changes of manufacturing orders designed by MRP II – On the basis of a requirement modification MRP II proposes its users changes of manufacturing orders (dates, quantities). After opening a survey row the production planner opens the manufacturing order form to find out detailed information about the work in progress and to decide about potential change of the production order.
Fig. 2: Survey of unfulfilled material orders
In the framework of the implementation project it was therefore necessary to maintain the high qualitative level of technological preparation of manufacture. In the course of the preparation an individual piece list is compiled for each demanded product and parts are then sought in the system from the whole range of the in-house manufactured and procured components. There are hundreds of thousand different variants of the input parts. Start up of new manufacture is now fully in the hands of the employees of LDM, who are able to plan and launch it without assistance of the implementation partner. This was also one of the objectives of the project – to achieve full independence of portfolio changes. At the same time subsidiaries have been involved in the manufacture planning process and thus the system communicates not only in Czech but also in Slovak and Polish in this area.

Manufacture planning is based on MRP II. However, the inputs to this concept are not represented by predictions but contractual requirements. Thus each product has its particular customer. Sales staff plans manufacture on the basis of the received orders. Their demand launches the algorithms of MRP II. These form the basis of material orders, part manufacture or release from warehouse if on stock. The whole concept is obviously supported by safety inventories whose levels are periodically updated on the basis of machine capacity, price and other attributes.
Fig. 3: Planning table – Survey of operations planned on site with current links between operations and related manufacturing orders. The bottom of the window shows the work in progress and relevant manufacturing orders.
5. Assessment of Main Benefits and Expectations

“A clear benefit of the new system is the unification of the database and interconnections of all functional areas of the system. If I ask, none of the users will express a desire to return to the old system. I have verified this fact in practice. There are no major objections from the staff working with the system every day or from the system administrators. I consider this a major benefit of the solution,” says Vlastimil Dytrt.

Fig. 4: Service card of equipment – Example of equipment service card with complete history of interventions. The card shows the connected tickets (repairs, adjustments), who did what and when with the equipment, in dynamic relations. “Imprints” represent changes to the equipment. The module may be used both for servicing in-house products and for technology servicing.
“The new system substantially improved management of the whole corporate value chain. This is not only the question of technological preparation and planning of the manufacture but also and above all its operative management and provision of service. Error rate has been considerably reduced in all manufacturing stages. There is a complex and unified database including complete information about what, when and to whom was supplied, including production numbers of the fittings. All complaints and other service activities can be managed more effectively with the help of evidence of the whole business case. Therefore unjustified complaints of customers replacing part of a fitting from another fitting are excluded,” adds Vlastimil Dytrt.

“We also appreciate new functionalities of the system. I especially mean the workflow,” continues Vlastimil Dytrt adding: “We manage the workflow by tools of Helios Green, especially in the order examination process. A responsible staff member prepares the documentation, selects all parties to the process and the system then distributes and monitors the progress of the workflow. This eliminates former bottlenecks of order management, making the whole process absolutely transparent and under system control.”

“Unfortunately, we have not managed to reduce stock as originally expected from the new system. The reason is the we cancelled the ineffective workshop management based on kanbans which was inconvenient for our type of production to order. Instead we introduced the push system of planning and management which required setting and maintenance of safety stock. And so the unfulfilled expectation is not the fault of Helios Green, but that of an overall change of the production planning and management concept, which was necessary, though,” adds Vlastimil Dytrt.

“If making a new decision about selection of the information system we would proceed in the same way and arrive at the same solution. Helios Green fully supports our activities which are characterised by development and manufacture at home and sales abroad. The information system must support the growth of the company and its competitiveness, even its expansion outside the Czech Republic. This is where I see the main benefit and the basis for my recommendation to other companies how to best view the acquisition of a new ERP solution,” concludes Vlastimil Dytrt.

6. Conclusions

LDM management is mainly satisfied with the active approach of the partner and its understanding of the issue of manufacture of fittings and needs of the users. The ERP product itself is considered rich in functionalities, well parametrisable and open for additions of other applications. The users appreciate its intuitive operation and the administrators praise its stability.

The information system further fully supports the principal competitive advantage of LDM, which lies in the company’s ability to cover the whole production cycle of industrial fittings from development, design and production preparation via manufacture itself to servicing of all supplied products. Important is also direct interconnection of all activities allowing for accurate addressing of all customer requirements and high production quality. The dealers communicate with the customers and transfer their input directly to design. The same applies to warranty and post-warranty service. The company can thus afford to guarantee reliable function not only of individual fittings but of the whole equipment. This also creates the company’s image as a supplier of complex systems and not only manufacturer of fittings.
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