

ERP System for Custom Tailoring: A Case Study

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Abstract: The Case Study deals with the implementation and use of a global ERP system in Bernhardt Fashion CZ, which is one of the leading custom garment manufacturers in the market. The study describes the way this prestigious company has utilized a global ERP product to standardize a part of its processes as well as the areas that needed to be modified or custom adjusted. The crucial part of the study comprises a detailed description of key processes and their automation requirements that are specific in the clothing industry. Moreover, the study includes a complex evaluation of achieved benefits and significant functional improvements the company has developed by using the new system.

Keywords: Information system, Enterprise Resource Planning (ERP), Computer Aided Design (CAD), Production Engineering (PE), Configure to Order (CTO), Multisite, Cost Management, Pricing, Total Costs of Ownership (TCO)

1. Introduction

Bernhardt Fashion CZ is one of the leading custom garment manufacturers in the market. It addresses the most demanding customers worldwide. The company is based in Prostějov where all the tailor production and completion takes place.

The history of the Bernhardt brand dates back to 1936 when it was established in Dautphetal, Germany by Mr. Wilhelm Bernhardt. In 2001 it was purchased by a traditional Czech manufacturer of formal garments and the production of this brand as a whole was moved to Prostějov, the center of the Czech clothing industry with high-quality and experienced tailoring specialists. In 2012 the brand was acquired by AMF Reece CR, a globally renowned manufacturer of industrial sewing machines. Thanks to this the Bernhardt garment production can gain from the available modern sewing technologies and innovation while maintaining traditional tailoring processes.

The principal vision of the company is continuous improvement of materials, products and related services to remain at the top of the custom clothing industry. The key competitive advantage is not only high quality materials used for manufacturing but also the delivery terms. Bernhardt Fashion CZ is the only company able to make a suit within 24 hours. For this reason, the company cannot do without a modern ERP system capable of covering all the standard needs of a global enterprise as well as facilitating the maintenance of its high competitiveness.

2. Research Methodology

The Centre for inVestigations into Information Systems engages in annual research of the Czech business information system market, which includes compilation of case studies in the form of qualitative interviewing and projection interview with workers responsible for IS/ICT investments in the particular organization. In 2005–2016 the authors performed over 130 of such case studies in manufacturing, sales and service enterprises in the Czech and Slovak Republic.

The authors based their theoretical research methodology background on literature focused on management oriented business research (Gill, Johnson, 1991) and on using both qualitative methods and methods between qualitative and quantitative research (Pavlica, 2000). The findings presented in the book *Case Study Research* (Yin, 2003) were used in execution of the case studies.

The theoretical basis for implementation project realization and evaluation reflects the extensive practical experience of the authors gained throughout several years of research as well as the

analytical and consulting activities during ERP project execution. Moreover, it reflects the long-term study of expert sources focused on the sphere of system integration (Vofíšek, 1997), business information systems and enterprise resource planning (Davenport, 1998; Basl, 2002; Olson, 2003; Olson, Chae, Sheu, 2005; Laudon, Laudon, 2006; Gála, Pour, Šedivá, 2009; Shaqrah, 2015), assessment of information system efficiency (Molnár, 2001), risk management (Smejkal, Rais, 2006), IT project management in general (Schwalbe, 2007) and ERP project management in particular (Gupta, 2000; Al-Mashari, Al-Mudimigh and Zairi, 2002; Mabert, Soni, Venkataramanan, 2003; Umble, Haft, Umble, 2003; Yilmaz, Ozcan, 2011).

The authors based and gained their theoretical knowledge on ERP systems and implementation projects also from empirical studies focused on their global and local perspectives (Hwang, Grant, 2016) and from studies of analytical companies focused on global (Deloitte Consulting, 2000; Hestermann, Anderson, Pang, 2009; Guay, Pang, Hestermann, Montgomery, 2015) as well as the Czech market (Accenture, 2001).

3. Main Characteristics of the Investigated Organization

Bespoke tailored suits are the main product of the company. Generally, there are no other limitations. The customer defines the cut, selects materials and components, all based on a consultation with a tailor who offers this service in cooperation with Bernhardt Fashion CZ. The respective samplers of fabrics and other components are innovated and sent out to all partner tailors by the company on a regular basis. At the same time the web form for the tailors to enter suit parameters for manufacturing and all other customer requirements is updated.

"We are ready to fulfil almost any wish the customer might have concerning their suit. Features as embroidery of logo or signature initials as well as laser button treatment are included in the standard offer. As for unusual requests, they just have to conform to certain technical and quality parameters," says Jindřich Koryčan, the Bernhardt Fashion CZ executive.

"Sometimes customers wish a suit to be made for them while they supply all or some of the materials or components themselves. These include lining with their own photographs or the strip of their favorite football team. The customer sends such lining that we cut precisely according to the suit measurements and sew in. However, to be able to guarantee the quality of the whole garment and the respective warranty period, it is necessary that such lining is shrink resistant and meets other characteristics," explains Jindřich Koryčan and adds: *"Dealing with non-standard requirements is a standard matter for our company, which has to be reflected by the information system."*

The company currently employs 200 workers, the majority of whom are engaged in manufacturing. The annual sales of approximately CZK 180 M (EUR 7 M) come from custom-sewn garments sold in over 40 countries on five continents. The above data also include two subsidiaries located in Germany and France focused exclusively on business activities. The major portion of sales is concentrated in the markets of Germany, UK, France, Switzerland and Russia. The company focuses mainly on its development within Europe. Of course, it is able to satisfy customers in remote locations as well. However, with regard to the high transport costs that may sometimes reach the value of the product itself, special services increasing the added value of such contracts need to be offered.

4. Implementation Project Execution and Practical ERP System Utilization

4.1 ERP System Selection and Implementation Project Characterization

Until 2012 when the company was purchased by AMF Reece CR, garment manufacturing was controlled by the SAP R/3 information system. However, the system had not been updated by the original owner for nearly 10 years. As it would have been very costly to innovate it and add other necessary functionalities, the company management decided to consolidate IS/ICT as a whole based on the IFS Applications ERP system successfully operated by AMF Reece CR at that time. The indisputable advantage of this choice was the fact that IFS Applications can fully replace SAP, both functionally and from the point of view of the applied technology level. As the system is used on a global scale, it can also be implemented in the subsidiaries in other countries as it supports the local legislation. Last but not least, it achieves a better price/quality/added value ratio compared to SAP while offering the crucial business process management global standard to the company (Guay, Pang, Hestermann, Montgomery, 2015).



Figure 1 – Magic Quadrant for Single-Instance ERP for Product-Centric Midmarket Companies
(Guay, Pang, Hestermann, Montgomery, 2015)

The implementation project was divided into two stages. In stage one all standard functionalities covered by the IFS Manufacturing, IFS Distribution and IFS Finance modules were implemented. The first stage also included the formation of the required IFS SAP interfaces. Stage two was designed as focused on programming of functionalities used in SAP for positioning data preparation (CAD). Considering these functions have been custom developed and unique, an extensive analysis had to be carried out in order to decide where to draw the line between the standard and the parts to be customized.

Table 1 – Principal data on the IFS Applications ERP system implementation project
(prepared by us)

ERP system	IFS Applications
Current version	8
Provider and implementation partner	Altec
Project stage 1 implementation period	Analysis and solution design – 9 months (April 2014 – December 2014), standard implementation in German subsidiary – 3 months (January 2015 – March 2015) and system debugging – 6 months (April 2015 – September 2015), standard implementation in Czech parent company – 9 months (April 2015 – December 2015), routine operation start from January 2016
Project stage 2 implementation period	Initiated in January 2016, completion expected in 2017
Number and type of users	90 named users
Server operating system	Microsoft Windows Server 2008 R2
Database platform	Oracle Database 11g
Architecture	Three-tier client/server using thin client technology
Processes covered by the system	Accounting, finance, purchase, sales, technical manufacturing preparation, production management, human resources management

4.2 Order Cycle, Order Configuration and Workshop Assignment

Order management is the key functionality. Orders are entered into the system by tailors through the web application as soon as they get the measurements and all other requirements from the customer. The orders are downloaded every hour to be processed in IFS Applications. Then suitable materials and components are selected for each order.

The screenshot shows the BERNHARDT web application interface. At the top, there is a navigation menu with the following items: Order (MTO Order, KS Order), Overview (MTO Overview, KS Overview), Materials (MTO Materials, KS Materials), CORPORATE (Archives, Guide), and Logout. The main content area is titled "Basic page" and contains several sections:

- User Information:** "User : [redacted] Welcome in the system" with a "Suggestions and Comments" button.
- ATTENTION [2016-09-05]:** "Guide: Casual jacket - NW, NWH" with two small images of jackets labeled NW and NWH.
- ATTENTION [2016-09-01]:** "Guide: SHIRT 113 - 1AA_, 4K_" with two small images of shirts labeled 1AA1 and 4K.
- Orders - not in production - MTM:** A summary box showing "Orders to be dispatched : [input field]" and "Orders to be deleted : 0".
- Updated completion deadlines MTM:** A table with columns: Product, Material - Bernhardt, Material order - Bernhardt, and Material - customer.

Product	Material - Bernhardt	Material order - Bernhardt	Material - customer
Jacket	30.09.2016	10.10.2016	10.10.2016
Trousers	30.09.2016	10.10.2016	10.10.2016
Shirts	03.10.2016	24.10.2016	24.10.2016
- Orders - not in production - KS:** A summary box showing "Orders to be dispatched : 87" and "Orders to be deleted : 0".
- Updated completion deadlines KS:** A table with columns: Product, Material - Bernhardt, Material order - Bernhardt, and Material - customer.

Product	Material - Bernhardt	Material order - Bernhardt	Material - customer
Jacket	10.10.2016	18.10.2016	18.10.2016
Trousers	10.10.2016	18.10.2016	18.10.2016
Shirts	24.10.2016		15.11.2016
- Orders - not in production - MTO:** A summary box at the bottom.

Figure 1 – Example of a non-standard order (prepared by us)

As far as material requirements are concerned, the company cooperates with a group of regular suppliers. Materials are ordered as soon as IFS Applications reports a decrease in safety stock below the set level. It follows the "one roll" rule. Thus it never holds more than one 50metre roll of each type of fabric that allows approximately 25 suits to be made. Specific articles are ordered by the buyers exclusively based on a particular customer request. Naturally, the final delivery date is affected by respective delivery periods. If the material is available in stock, the order is usually completed within three weeks. If the customer needs the product to be finished sooner, the whole manufacturing process can be shortened to as little as 24 hours for an additional express fee, while the agreed delivery time is only affected by the amount of time required for transport to the target location.

As soon as the order is entered in the system, the information on garment measurements is checked and data are collected for CAD and subsequent cutting of the individual parts. This key unique functionality is the subject of system modifications in the second implementation stage, therefore the original solution has to be applied to these calculations for the time being. Nevertheless, a certain portion of these functions have already been replaced by the IFS Applications standard; most importantly the configurator that enables product parametrization within technical manufacturing preparation. Based on the configuration, a unique manufacturing command adjusted for the materials is created.

Manufacturing order - 3811392 0001 1									
Č. objednávky:	Uvol.:	Sekv.:	Č. položky:	Popis:	Místo:	Číslo požadavku:	Line No.:		
3811392	0001	1	442	Sako pánské SLIM	B11	3811392	0001		
Typ VO:	Výroba	Nejdříve mož. zaháj.:	17.05.2016	Datum zahájení:	09.06.2016	Dávka:	1	Č. požadavku VKS:	
Směr plánování:	Zpětné plánování	Datum realizace:	10.06.2016	Datum ukončení:	09.06.2016	Stav:	Uzavřeno		
Detail Materiál Operace Štítky Pracovní nářadí Sledování a historie Vedlejší produkt Rozvrh nákladů na vedlejší produkty Rozdělení výroby									
+	Č. položky řádky	Č. pozice výkresu	Komponenta	Popis položky	MJ	Požad. dat.	Mn. ke kompletaci	Požadované mn.	
	1	4111	4111916	140010/150/V00169MZ//BERNHARDT-MĚTENKY	m	09.06.2016		1,5	
	2	4220	2072395	120100/140/D//PO/VA947/936A/6/W257/280	m	09.06.2016		0,2	
	3	4240	9120200	Lepení a vložkoviny - reprezentant	m	09.06.2016		0,5	
	7	4260	9120300	Kapsovina - reprezentant	m	09.06.2016		0,1	
	8	4300	9130100	Nit - reprezentant	km	09.06.2016		0,05	
	13	4340	3100943	135502/32/I08584//B1C0000/SHINY/902	ks	09.06.2016		2	
	15	4350	3100942	135502/24/I08584//B1C0000/SHINY/902	ks	09.06.2016		9	
	17	4389	9130400	Krajinky - reprezentant	m	09.06.2016		1	
	19	4420	9134300	Ramenní vycpávky - reprezentant	par	09.06.2016		1	

Figure 2 – Manufacturing order with list of materials (prepared by us)

A rule can be attached to each configurable item, such as a jacket, to control the selection of product structure option and technological process. Similarly, based on the entered options, the particular positions of structure and process may be influenced. Practically it means that the customer selects a particular shape, e.g. a single breasted suit jacket, and based on the configuration criteria, the system fills in the number of buttons required for manufacturing. The system also allows for a configuration mathematical formula to be entered and used for calculations of numerical values based on the configuration characteristics. Example: Thread consumption = 1.6 + size * 1.3. The requested result can be applied to the configuration criteria.

Request										
Požadavek	Zákazník:	Název:	Customer Po No:	Měna:	Stav:	Detail stavu:				
3811392	2751501		96	EUR	Uvolněno	Ve skladu HW				
Č. požadavku VKS:	Typ pro WEB aplikaci:	Koordinátor:	Prodejní místo:	Výrobní místo:	Kód druhu módy:	Typ výroby:	Kód druhu výrobku:			
	MTM	*	B21	B11	9	Pánská móda	3	2	Oblek	
Dodací adresa:	Název dodací adresy:	Koresp. adresa:	Název koresp. adresy:	Číslo aktivní zákaznické objednávky:						
B01079	Au 31, Paris	B00758								
Výrobek:	Popis položky v katalogu:	Množství:	Celní statistické č.:	Popis:						
DS	Oblek SLIM-sako+kalhoty	1	6203110000	Pánské,chlap. obleky z vlny						
Detail Ceny Adresa Info o dodávce Díly										
+	Číslo Řádku Požadavku	Výrobek	Popis	Id konfigurace	Množství	Č. položky zákazníka	Velikostní sortiment	Velikost	Velikost...	Vrchový mater
	0001	442	Sako pánské SLIM	31448	1	MT9	46	46		<input checked="" type="checkbox"/>
	0002	642	Kalhoty pánské SLIM	24364	1	MT9	46	46		<input checked="" type="checkbox"/>

Figure 3 – Manufacturing request detail (prepared by us)

The required material for the configured product is spread and positioned in the Lectra CAD system. It is also possible to adjust the cut and then let the parts be manufactured directly by the cutting machine or pass them on to the plotter that draws the respective cuts to be processed manually.

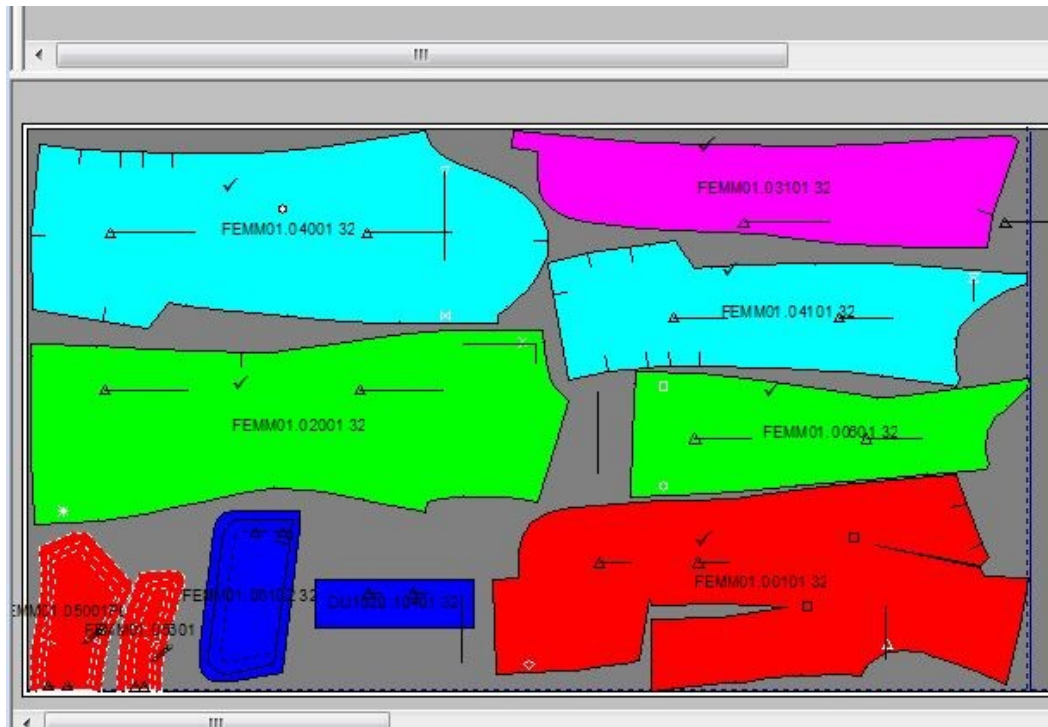


Figure 3 – CAD detail with sketched garment parts (*prepared by us*)

The cut parts are subsequently sent to the trouser, jacket or shirt workshop. Here the product is sewn together, ironed, wrapped and moved to the dispatch store. Then it is exported to the Nuremberg logistics centre for customer distribution. It is managed by Logwin, the only company in Europe able to distribute garments on coat hangers.

4.3 Dispatch and Order Documentation

Dispatch follows unique rules that have to be incorporated in the ERP system. Therefore IFS Applications is also used to design the structure of packing and placement of all distributed goods in the carrier's vehicle. At the same time, the system calculates the transport cost and includes it in the final invoice.

Each order needs to be accompanied by the respective documents and receipts. These are also produced and distributed using standard IFS Applications functionality that is a part of the Multisite module, aimed primarily at collaborative planning within the supply chain, i.e. through multiple companies. The process is as follows.

A customer order is created in IFS Applications in the German subsidiary dealing with sales, based on the order entered via the web application, which is then transformed into a purchase order for production in the Czech Republic. The purchase order from Germany is received in the parent company as a customer order. The system creates a consignment from the Czech Republic directly to the end customer.

At the customer's discretion, the goods are dispatched either through Logwin or as express with DHL or PPL. Transport labels are printed in IFS Applications as a part of dispatch and data for Logwin are exported. A notice on dispatch from the Czech Republic and an invoice for the German subsidiary are created upon delivery; the German subsidiary processes a dispatch notice and receives goods based on the respective order. The customer order administration process is completed by an invoice issued for the end customer. The invoice is sent electronically as a PDF with an electronic signature.

The majority of the operations described above are performed by a single user with standard IFS Applications functionalities. The system has been adjusted for this type of transactions to such an extent that none of the functions mentioned above aimed for passing information and documents among the companies had to be modified, except for the level of automation of the respective steps.

4.4 Cost Management and Pricing

The company sells products classified in several groups. Among them are men's and women's suit jackets, trousers and waistcoats. Others are coats, shirts, skirts, blouses and their combinations. A men's suit, for instance, consists of a jacket, trousers and waistcoat. Both direct and indirect costs can be attached to the products and the cost price can be calculated. The major items include wage costs, outer materials and production preparation. Naturally, the company also monitors other significant indicators. For example, it evaluates currency risks and transport costs and is aware of the pricing framework for the order performance to be profitable.

The selling price is determined based on the market situation as the goods have to be offered at such price levels the customers are used to and that reflect the quality of the product as well as the related services in the given market segment. For this reason the product prices are stable without any major fluctuation in the recent years. Price calculation is performed using price lists linked to the web application mentioned above. Most importantly, the final price accounts for the product classification and completion material.

5. Conclusions

5.1 Obligatory Benefits and Reduction of Total Costs of Ownership

The new ERP system has met the expectations in several different areas. The first one is indisputable the obligatory benefits that go hand in hand with the substitution of the highly customized particular solution by the standard. This applies in particular to the data basis and business process integration across the whole organization, ensuring one version of truth at all system outputs and data collection from a single spot.

The data maintenance itself by the individual users themselves has been simplified significantly as well. The original system did not include maintenance tasks and the respective interfaces for these activities. Therefore, when transferring the respective agendas to IFS Applications, attention was paid to the option of the users themselves being able to maintain the database. Another expectation related to the standard is easier updates.

Total costs of ownership are the second area of concern. These will undoubtedly decrease in the long run as a result of the new ERP system implementation as a compact All-in-One unit, although they cannot be exactly quantified and compared to the implementation and operation of the previous system. The phenomena reflected by lower TCO include lower costs of human resources required for continuous system maintenance and development as the majority of these services have now become the responsibility of the provider.

5.2 Major Functional Improvements

The third area covers major functional improvements directly or indirectly affecting work productivity of the users and organization management. Firstly, the processes and operation procedures have been standardized, which results in significantly streamlined everyday routine tasks. There are several particular examples, let us give two.

The first one is information specification, in particular in the area of cost management. Unlike the previous system using the so-called "representatives", IFS Applications work with particular materials. Thus the calculations of costs for each product have now become more accurate. The main goal of the management in further system development is to continue making the calculations and tasks related to costs more accurate so that the company may be managed based on objective economic indicators.

Streamlining distribution flow is another example of improving the management of everyday routine operation. IFS Applications are used for physical goods transportation where they facilitate the process of designing packaging and layout structure of the distributed article. The company management also considers the improvements in document administration, in particular electronic invoices, to be a great success. In the past invoices were printed, whereas today the whole process is executed electronically. Thanks to this it is also easier to keep records of customer data in IFS Applications, all contact information in particular. The savings related to the invoicing process currently reach 10% of the execution costs of 10,600 invoices issued in the last seven months.

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