Configuring an ERP System: Introducing Best Practices or Hampering Flexibility?

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ABSTRACT

The purpose of this teaching case is to help students gain an appreciation of some of the challenges inherent in implementing large software packages such as ERP systems. First it attempts to give a concrete sense of what it means to "configure" software. It then introduces the student to some of the standard dilemmas a company faces trying to make packaged software fit specific business needs. In looking at the gaps between a specific business process and the ERP application's functionality, the case introduces the student to the way in which ERP systems demand structure in the business processes they support, and the resulting tension between managerial control and organizational flexibility. The case also illustrates some of the ways companies try to address the gaps between what they want and what the software offers.

Keywords: ERP systems, packaged software implementation, configuration, gap analysis

1. CASE SUMMARY

The Photographic Supplies Distribution Company (a pseudonym for a real company that prefers to remain anonymous) is trying to implement a J.D. Edwards (JDE) ERP system. At the time of the case the implementation of the finance, business planning, and operations management modules is complete, and the team is working on the order management module. Setting up the company's complex pricing process, with its ever-changing series of promotional programs, has turned out to be particularly challenging.

The key participants are Tom Brown, Director of Finance and Accounting, who is the project team co-lead along with Allan Reilly, Director of IT, Helen Fielding, a manager in Finance who has taken primary responsibility for configuring the pricing module, and David Lee, the consultant. Helen has been unable to find a way to structure the pricing process in a way that fits with the JDE software. The people in Marketing are resisting the idea that promotional programs can be structured. In order to bridge the gaps between the business needs and the software, the team is trying to decide whether to force a structure on the business processes or whether to set up all the current pricing variants, which will not only be difficult to configure, but will also unleash a maintenance nightmare.

2. INTRODUCTION

Tom Brown left the meeting he had called with the Marketing group feeling quite discouraged. He had always known that setting up or "configuring" the new ERP system from J.D. Edwards to accommodate the various pricing practices for the company's many different products would be complex, but from what the group had told him it was going to be worse than he'd expected. "I swear, those guys offer a different price to every customer for each product, every day." And pricing was only one of the headaches. The project team also had to figure out a way to set up the system to follow a large number of company specific business practices, from the way they selected which inventory lots to use when they filled orders to the rules for allocating scarce product to different customers.

3. COMPANY BACKGROUND

The Photographic Supplies Distribution Company (PSDC)[7] was a wholly owned subsidiary of a major manufacturer of photographic equipment and supplies, selling everything from rolls of film to film processing machines, chemicals and paper. PSDC was responsible for taking the various types of photography-related products produced by its parent company and repackaging them for sale and distribution to wholesalers and retailers, large and small.

For example, individual rolls of film might be boxed together into "multi-packs", or disposable cameras might be encased in special promotional packaging with seasonally appropriate artwork. With the different

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[1] All corporate and individual names have been disguised.

configurations, the 1000 different "raw" items could be repackaged into over 12,000 different end products.

The company sold goods worth approximately $300 million per year to 8500 customers. Customers included photographic specialty stores (both independents and chains), large consumer goods retailers such as Walmart, and corner variety stores. Three to five hundred sales orders came into the order desk each day, and most of these were shipped within twenty-four hours of being placed. Maintaining timely delivery was a key strategic requirement. While most of the company's 250 employees were located at head office and its associated warehouse, a portion worked out of the two regional warehouses that served other parts of the country.

The company was divided into six business units. Two of these focused on marketing of different product lines, and were responsible for developing and executing a variety of pricing and promotion programs such as seasonal specials, pricing discounts, and special deals for preferred customers. The sales and service division responded to incoming phone orders, queries, complaints, and requests for service. The operations division was responsible for getting the products from the parent company, packaging them according to customer requirements, and shipping out orders as fast as possible. They also oversaw the warehouse and the IT group. The final two groups were finance and administration, and a small group responsible for environmental and technical services.

The IT infrastructure was typical for a company of this size. Most applications were centralized on an IBM AS/400, with a basic PC/LAN for standard communication tasks. An older ERP system known as BPCS had been installed about ten years earlier, and had been highly customized over time. At this point it was no longer supported by the vendor, and was not meeting business requirements. There was general agreement that the time had come to replace it.

4. THE PROJECT

A project team composed of eight members representing the different divisions, and jointly led by Tom Brown, Director of Finance and Accounting, and Allan Reilly, Director of IS, took on the job of selecting and implementing a new ERP system. After ten months spent analyzing business processes, specifying all functional requirements, and researching appropriate ERP packages, the team recommended WorldSoftware from J.D. Edwards (JDE), a company that specialized in ERP systems for mid-sized companies. PSDC decided to purchase and implement four JDE modules to support finance and accounting, business planning, order management, and assembly and shipping operations.

The intention was simply to replace the existing system, and keep most business processes the same to the extent possible. While the company expected that the new software would improve efficiency, they were not interested in re-engineering processes any more than necessary to accommodate the new software. That said, they had learned their lesson about the long term costs of excessive customization – the existing system had been heavily customized and was no longer supported, which was a major motivation for seeking out a new software package. The team was committed to changing the software as little as possible.

The individuals selected for the team were both knowledgeable about the company's business practices and very comfortable working with new technology. Because of this, and because the JDE software was relatively straightforward, the company decided that the team would do its own implementation. While a consulting firm was hired to organize and oversee the process, their role was strictly to provide advice and assistance, not to do configuration. Fortuitously, IS Director Allan Reilly, who had only been at PSDC for a year, had considerable experience with the JDE software, which he had implemented at his previous company. Team members did not relinquish their existing responsibilities, but simply added the implementation to their regular tasks. As most of the team members had been at the company for many years and were fairly senior in their departments, they not only understood existing business processes very well, but were also in a position to recommend changes as required to match the constraints introduced by the new software.

In order to keep the task manageable, the team worked on one module at a time (with a certain degree of overlap, so that planning of each successive phase started before the previous one went live.) The Finance module was implemented first, followed in turn by the Operations module, the Business Planning module, and the Order Management module. The first three modules took fourteen months to complete. The major challenge, however, was in Order Management. Recognizing that this was the core activity for a distribution company, and would need to be handled carefully, six months were allotted for configuring the software and cleaning up and migrating the old data.

5. IMPLEMENTING ORDER MANAGEMENT

Processing an order involved much more than simply recording a customer's request, filling it, and sending an invoice. First, when customers called, they generally had a list of items to order. Some of these items would be in stock, some of them needed to be assembled from component parts, and some would be out of stock. Some component parts, and some would be out of stock. Some products were always made to order, while others were supposed to be in inventory. Some customers preferred to drop backordered items – or even cancel any order with backordered items. In addition some customers wanted to receive all items in a single shipment, while others accepted partial shipments. When an item was confirmed as being available, a reservation had to be made against the

inventory in stock so that it was not subsequently promised to another customer. For those items that were made to order, appropriate components and packaging needed to be in stock. When items were in short supply, major customers received preferential treatment.

Once availability was established and the customer's credit was checked, an order needed to be priced. A customer might be eligible for a variety of marketing programs. For example, certain customer classes always received special discounts. In addition, the size of the order might qualify for a volume discount, there could be a special promotion going on for a particular product or combination of products, the customer might qualify for a "business development" discount, or they might be redeeming points from the "frequent buyer" program. One of the expected benefits from the new ERP system was that the price for an order would be calculated automatically, and customers would always get all the discounts they qualified for. In the old system, only list prices and some standard discounts were built in. The order desk used price overrides to apply many promotional discounts. Not only was there a loss of control over pricing, but with the complexity inherent in the pricing system, many errors were made. Customers frequently complained once they received their invoice that not all discounts had been applied, leading to many billing adjustments. Also, with the existing system, it was hard to analyze the differential impacts of different promotions. The finance and accounting group was looking forward to establishing better control over this process, and considered this a key benefit of implementing the JDE software.

When an order was finally placed, either a pick slip had to be issued for available stock, or an assembly order generated so that the appropriate items were put together from components. Sometimes, when a specific item was missing, products previously assembled for inventory were disassembled to free up the missing components. Needless to say, this was avoided when possible, but it did mean that checking for availability of an item could involve looking at the availability of components in various forms.

Pick slips themselves needed to indicate not only the item and quantity, but also the specific location (bin) that stock was to be picked from. Some items had shelf life constraints, and the intention was to fill orders from the older stock first. The additional wrinkle was that customers preferred an order to be all from the same lot, which might constrain the lots that could be used. The expectation was that the new system would help with inventory management by ensuring that older stock was used first, reducing the likelihood of small odd lots being left over, and reducing the total amount of inventory being carried.

The software needed to be configured to accommodate all of these business process rules. As with any ERP package, the JD Edwards software offered a fair degree of flexibility in how business processes were defined, but in order for the software to work it was necessary to define an underlying structure – the rules the software would follow. The need for clearly defined structure is particularly acute in an ERP system because of the integrated nature of the software. For example, a pricing policy defined by Marketing will automatically be applied at Sales and reflected in the invoice sent out by Finance and Accounting. An error made by one department will immediately ripple through to other parts of the company. The advantage of an integrated system is that it reduces the need to input information into separate systems. Invoices do not need to be built up after the fact from information contained in the order system, and then entered into the accounting system to be reflected in the financial statements. Instead, all the invoice information is automatically generated at the same time that the order is placed, and the general ledger accounts are automatically adjusted. That said, for these activities to occur in an integrated way, the business process rules must be carefully specified, and data must be defined in ways that simultaneously make sense for different types of users.

In the WorldSoftware from J.D.Edwards, configuration involved identifying "order activity rules" – a sequenced set of instructions. Different sequences could be identified for different circumstances. The first task was to identify "categories" of objects (e.g. orders or customers) that were handled in the same way under different conditions, and then to define the sequence of order activity rules that applied to each category. For example, when an order came in from a customer who wanted backorders dropped, the order activity rules would include checking for out-of-stock items and dropping them. The problem that arose was that any item that was always assembled to order would appear to the system to be "out of stock" and dropped from the order. One alternative the team came up with for managing this condition was to split such orders into two parts, each with its own sequence of order activity rules. If, however, the customer was also one who wanted all items to be shipped together, then a way had to be found to reunite the separate parts of the order before shipping. The eventual solution to this problem was to place all such orders on hold, and to have them handled manually by the order desk. Since this condition only applied to a small number of major customers, the extra work involved was judged to be reasonable.

The team eventually worked out how to structure the business process rules for handling different types of orders for most aspects of order management. They wanted to avoid making any changes to the software, but they also knew that in some cases changing the business processes was not a viable option, either because customers had specific requirements, or senior managers were unwilling to change their way of working. In some cases the solution, as in the example above, was to retreat to a manual process. In other situations Allan Reilly, director of IT, wrote little satellite programs that would take data from the system, perform a specific function, and then return the data. While technically not a change to the

software, such satellite programs do add to the problems of ongoing maintenance and future software upgrades. The one area of order management that remained a thorny problem was to configure the software to handle pricing.

6. SETTING UP THE PRICING MODULE

By the time the team started working on the order management module, only a few of the original members were still actively involved. Three of the team members had become extraordinarily adept at configuration, while other team members had drifted away, either because they were uncomfortable with the technology, or their other responsibilities had crowded out their commitment to the team. In particular, no-one from Marketing was in a position to configure the pricing module, so Helen Fielding, from the accounting and finance department, took responsibility for it. Several of the clerks who reported to her were given the job of setting up all the tables once the group had worked out what needed to be done.

Over a four month period Helen sat down for half a day each week with the consultant (David Lee) to work out how to configure the software. On the days between meetings she tried to implement what they had discussed. The challenge in this case was to specify a conceptual structure that could be set up using the software's built in options, and at the same time provide enough flexibility to accommodate all the different promotional programs (which varied by customer group and product type) without creating a maintenance nightmare.

In the early sessions, as Helen tried to understand the underlying assumptions built into the software, she tried to identify appropriate ways to group information. For example, certain customers were entitled to special discounts, such as the 5% discount offered to professional photographers – but this only applied to specific items, such as film, not the whole order. Helen struggled with trying to decide if promotions should be set up primarily by customer group, by item group, or by promotional program. The software expects the user to start by defining a series of pricing adjustments, then setting up a hierarchy of these adjustments (the order in which they will be applied) and finally attaching them to the customers/items/programs where they belong. Defining groups of customers or items that were handled in the same way and creating one adjustment definition to cover each group would make the definition process manageable (and the definitions themselves maintainable.) Without a well defined structure it would be necessary to define an adjustment for every customer/item/product combination individually, an impossible task.

With each potential structure Helen tried, she also had to worry about how it would fit with other business rules. For example, on minimum orders a $15 freight charge had to be applied – but this could not be built into the pricing structure, as it did not apply to all orders. Similarly the frequent buyer program allowed customers to collect points towards future purchases on the basis of the amount spent on certain products – but in calculating the number of points to be awarded for an order it was important that the customer got credit for the actual discounted prices, not full prices of these products. Since some discounts applied to the whole order and were applied at the end, not to individual products, extracting this information could be complex.

In general, the way in which the company had traditionally structured their prices did not fit well with the pricing assumptions embedded in the software. While the current approach could, in theory, be set up, it would lead to a large ongoing maintenance task, as the number of potential combinations and permutations of customers, items and programs was quite large. Without some way to group pricing adjustments it was considered unmanageable.

David Lee, the consultant for the order management module, recommended that the way to start analyzing the problem was to set up a matrix that listed all the promotional programs and all the customer types. For each program/customer combination, the products affected and the treatment to be applied would be set up as a pricing adjustment.

The first challenge was that customers were grouped differently for different promotions. For example, some promotional programs were based on membership in a buying group, others on the basis of customer size, and others on the geographic region. In addition there were "exceptions" negotiated between Marketing and specific customers. Even if the customer groups were subdivided into subgroups that were handled consistently across programs, the programs themselves might handle different items differently. For example a professional photographer eligible for a discount on all film products might receive a 5% discount on one type of film, but a 10% discount on another type. Furthermore, the set of items that were eligible for the frequent buyer program was different from the set of items eligible for certain discounts. See Exhibit 1 for an example.

When the number of possibilities started to balloon out of control, Helen brought her concerns to the weekly project team meeting. At that point she had only worked through a handful of customers, specifically those who had well-defined contracts with PSDC. Already she had pages of potential pricing adjustments, and she could see that she would be pushing the limits of what the software was built to handle. Arrangements with other customers were often somewhat fluid, and she was concerned that they would require even more categories.

Tom Brown, the project manager, felt frustrated that the whole issue was being handled by Helen instead of someone in marketing. "Is Finance doing Marketing's job, trying to figure out the pricing strategies being used to do the set-up? Also, if Marketing doesn't understand the thinking implicit in the set-up, then they will keep bringing

in new stuff that doesn't fit. The way we're going about it now, it's a huge task, and it is likely to become even more unwieldy. We should take it back to them."

Allan Reilly, director of IT, agreed. "They need to look at the JDE technical framework and try to think about their pricing from the perspective of customer groups and product groups."

Tom: "We need to get a conceptual model out of them as to how they generate prices now. Then we'll try to see how to fit their process to the JDE technical framework – Helen's matrix. If we can move to a less exception-oriented system, where we don't have a different price for each customer/item combination, then we will be able to have a manageable system."

Allan, laughing: "Punish them with paper work. If they have to maintain too much variability, they'll find a way to group customers and prices. Also, we can't just go to them and show them our suggestions. They'll nod their heads, but they won't actually think about it or understand it. Then the new promotions they create won't fit into the structure we've created."

David: "Show them the category codes to get them thinking out of the box. JDE designed the software to follow best practices, and according to the built-in structure you should be able to set it all up with just a few categories of customers. Does Marketing really have a pricing strategy? It really doesn't look like they do, and if there isn't one, they won't be able to come up with anything."

Helen: "The worst of what they do right now is that pricing is always over-ridden at sales – there is no control that way."

Tom: "We want there to be some consistency in pricing. If there isn't a strategy, this exercise may help Marketing to realize that. So the goal right now should be to get Marketing to articulate how they want to price. I want to understand how they think they are managing their business – what logic is going into it? This could be a huge project, way beyond what we can get into right now, but it would probably be worth it. Right now let's make a start at least. We can't really do pricing otherwise. I'm going to call a meeting with Marketing. Helen can explain to them how JDE pricing works, and then they will have to tell us what the best structure is for pricing."

7. THE MEETING WITH MARKETING

Tom was pleased to see that eleven of the sixteen people in Marketing had made it to the meeting. He started the session off by warning them that with a September 1 go-live date, all Fall promotions would be in JDE only, and that if possible they should avoid promotions that spanned the cutover date. Speaking as the Director of Finance he also warned them that once JDE was live, his division

would no longer accept price overrides from Sales. At first there were a few comments that this wasn't all that common and could be dealt with manually. After a brief discussion there was a general realization that in fact a lot of pricing was handled by Sales. The order desk was supposed to get overrides approved by Marketing, particularly since price discounts affected the numbers on which Marketing was evaluated. In practice, however, since Marketing did a poor job of updating the system when new promotions were introduced, the operators on the order desk made many pricing adjustments while customers were on the phone.

Having established that in the future, Marketing would have to take much more responsibility for pricing, Tom then explained that in JDE there was a lot more functionality, but that meant lots of added complexity. To make the whole system work properly there needed to be much more logic and consistency up front, and fewer "one shot" pricing deals. "The system is flexible enough to handle high variability to the point where it will let us get out of control. We need to do pricing by establishing item classes."

Ann stepped in at this point to explain how JDE works. "There is a customer master file for each customer. To this is attached an adjustment schedule. To each of these schedules we attach adjustment definitions which are based on programs and items. Since in the past we set up pricing for each account, depending on what the contract said, JDE represents a real change. We won't be able to just transfer information from the old system to JDE. We're going to have to step back and think about what it is we do. The only way we're going to get things to work in the system is to fix up our pricing strategy. If there's no rhyme or reason to it, we can't look after it."

At this point she was interrupted by one of the Marketing reps. "We have a strategy, but it isn't based on customer groups and item groups. We aim to hit the price point. The market – our customers and our competitors – influence what the price is. It isn't something you plan in isolation and implement." Another rep chimed in with "well we do have an underlying strategy, but it isn't that highly tuned."

Tom broke in at this point. "We have to come up with something. Everyone identify their top twenty accounts, and figure out how you deal with them. Fit this information onto a matrix like this (he handed out blank forms showing the type of matrix that Helen had been trying to construct.) I want you to think beyond what you can do now. Just remember, the more categories you come up with, the more complex you make it for yourself, because you are going to have to maintain these adjustments. If they aren't accurate, then your customers are going to get inaccurate invoices, because neither the order desk nor Finance and Accounting are going to clean up after you anymore." Even as he said that he wasn't sure he could stick with it, because if Finance stopped fixing

problems like obviously inaccurate invoices, then customer service would deteriorate to unacceptable levels.

As they left the meeting, everyone nodded and agreed to try to come up with a pricing structure, but Tom had real doubts. "How do you get a system like JDE to work in an environment where there is no control, no discipline, and no desire to change?"

AUTHOR BIOGRAPHY

Olga Volkoff is an assistant professor in the Department of Management at Worcester Polytechnic Institute. She conducts research into ERP implementation by means of longitudinal case studies, and made weekly visits to PSDC over a 16 month period during their 20 month ERP implementation. This was the first of a series of such studies.

EXHIBIT 1 – PRICING MATRIX

Programs / Customers	Off invoice discounts	Volume Rebate	Business Development Fund (new customers)	Warehouse Allowance	Points Program Member
Cust. A	7% all products of type A	Yes	No		Yes
Cust. B	7% some products of type A, some of type B	No	Yes	Some items	Yes
Cust. C	7% some products of type A, some of type B	Yes	Yes		No
Cust. D	5%	No	Yes	Some items	No
Cust. E	5%	Yes	No		Yes
Cust. F	none	No	No		Yes

This table provides an example of different types of programs, and how they apply to six of the 8500 customers. In addition to on-going programs such as these, there are regular "promotions" that apply to specific items and last for a limited period of time. In the example, Customers B and C are members of the same buying group for the purposes of off invoice discounts, but they do different levels of business with PSDC. They have also made different choices with respect to being members of the points program. In addition, Customer C will come off the Business Development Program before Customer B. The warehouse allowance is a special program devised for customers who pick up their own shipments, and does not apply uniformly to any particular buying group. As a further complication, discounts may apply to only some items within a product line, and different promotions target different sets of items.

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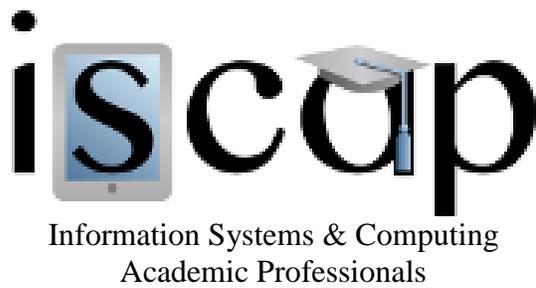
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