

PENN STATE UNIVERSITY
Department of Industrial & Manufacturing Engineering

IE466: CONCURRENT ENGINEERING
Fall 1999

RESOTECH, INC., ASSIGNMENT #1
Due: 9/22/99

Resotech, Inc. Case Overview

This case examines the experiences of a small, technically advanced company in the magnetic resonance (MRI) imaging industry. After successfully launching its first product in the high performance segment of the MRI market, the company must evaluate attractive opportunities for its next generation of products. In particular, it must decide whether to develop a product for a higher volume, lower cost segment of the MRI market.

The case raises issues of technology strategy, the management of multiple projects over generations of products, the organization of product and process development, and the interaction among these elements. After reading the case, answer the following questions.

Questions for Resotech, Inc. Case Study

1. Evaluate Resotech's approach to management and technology strategy. What strengths and weaknesses do you find?
2. Should Resotech accept the CHC contract? Defend your decision with evidence on the financial, technical, commercial, and operational implications of the contract.

Since case study discussion may be foreign to you, I will give you the option of pairing up with one other person to complete this assignment. There is a catch, however. If you do decide to work as a pair on this assignment, then I expect you to do the following additional work:

- i. When answering Questions 1 and 2, one of you must play the role of R&D while the other plays the role of marketing/management. You then need to answer Questions 1 and 2 using a point/counter-point argument where you each take turns presenting your perspective on the situation. In the end, you both have to come to an agreement on how to proceed.
- ii. Then, given your answer to Question 2, you must work together to develop a plan for the technical and commercial operations at Resotech for the next three years, including:
 - a) improvements to the RS-1000 (derivative projects),
 - b) development of the RS-2000 (a next generation project), and
 - c) the mobile MRI project (a breakthrough project) if you choose to pursue it.

Make sure to outline who will be doing each task in your plan of action, e.g., which group is working on which part of which project and when? testing and prototyping? full-production? marketing? will the computer software people be working on the RS-1000, RS-2000, and mobile MRI simultaneously, or separately? etc. Be as thorough as possible.

Submit: 3-4 page report addressing Questions 1 and 2; or, if you decide to work with a partner, submit 6-8 pages addressing Questions 1 and 2 and Points i and ii.

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PREPARING A CASE STUDY: SOME HELPFUL HINTS

Understanding a case and writing an “A” paper depends on two things: your English grammar and composition skills (you should already have these) and an effective way to organize your knowledge about the case. The following steps can be used to help you organize your thoughts for Resotech, Inc. and future case studies.

Five Steps for Preparing a Case Study:

1. Skim through the case once (about 20 minutes).
2. Sit down in front of the word processor with the assignment, and type in the general information categories that will be needed to answer the assignment questions. This typing is in **bold** below.
3. Read the case in front of the computer, entering information in each category as it comes up, and highlighting or underlining it in the book. Examples of relevant information for the Resotech case are given in plain (not bold) font below. If you cannot do this, you should print out your page, leaving lots of space between the entries so that you can fill in info with pencil as you read the case. Also, adding page numbers can help you go back later for more detail if you need it in Step 5.
4. After reading the case, read over your notes and write up a summary of your feelings (see the section following “Key Points”).
5. Support the statements in the summary by inserting some of the key points (you will not use them all, maybe 1/2 to 2/3) that you collected along the way. Then, with a little editing, you have your paper!

Resotech Case: Examples of Key Points

- a. Evaluate Resotech's approach to management and technology strategy - strengths and weaknesses
- b. Should it take the offer? Financial, technical, commercial, operational impacts?

a.

technology strategy:

- cutting edge, set industry standards, ultra-performance. **RS1000** (sold 15 in less than one year), next generation **RS2000**
- pro: strategy consistent with existing marketing and engineering talent, and it has a stable market
- con: limited market - prestigious teaching hospitals - as market matures, firms with manufacturing/distribution talent (GE, with 31 % of market) which support bulk of market may surpass on learning curve (current strategy is low growth, perhaps high risk over the long term - but fun for the principals)

management strategy:

- molded by founders, Lee and Kumasaka
- Lee: 'driving, innovative force' techie/designer, Ph.D. physics Princeton
- Kumasaka: patient, slow-spoken, deliberate, 'glue' radiologist/entrepreneur, handled financial backing and marketing
- Jain: EE MIT, genius
- Jackson: marketing insights

strengths:

- Management structure (strengths): component teams: magnet, radio, data processing, group leaders, loose structure, open communication, weekly group discussions, marketing person is a radiologist (Kumasaka)
- Manufacturing: contract out parts except some small items, only final assembly.

weakness:

- Voice of the customer does not appear except through Kumasaka. Jackson's memo (p 130) addresses this.
- no product development strategy except in Kumasaka's head

b.**Information that may be needed to decide what I would do and why:****financial:**

- maintenance is about 10% of product cost per year (p124)
- CHC offer - 25 machines over 2 years, 1.6 million per unit (p 128), 250,000 up-front R&D money
- service for mobile units should be more, but proposed contract says 8.5% instead of customary 10%
- hard to address the actual potential profit, but remember the customers for mobile units are many small poor hospitals so there will be a lot of price pressure. Don't count on technical advancement paying big dividends.
- Emphasis will be on **EFFICIENT** production and service. Therefore **SERIOUS** risk of loss on maintenance contracts.
- not enough data for estimating long term financial impact - need an estimate of profit margins for each product type, potential market size, but Resotech's investment requirements can be estimated pretty well: about \$1.5 million for materials and equipment (p 132) and 25 people x \$70,000 each in salary and benefits x 2 years \$3.5 million for a total of \$5 million - and CHC wants to give \$250,000 for R&D!

technical:

- RS1000 experience says technical innovation in this area means unexpected delays while technical problems are solved (e.g. magnet insulation - novel shielding approach).
- options include upgrading RS1000 (p125), RS2000 (there has been rapid progress - 3 Tesla magnet is goal
- p 125), mobile for CHC and others.
- mobile unit is not a piece of cake: Lee (p 13 1) magnet again - 20 people, 20-25 months

- mobile issues need same skills (a compact magnet/shield design) and different skills (rugged, mobile frame, compensation for fields in different locations/orientations, trailer 'room' design. Different skills are largely mechanical engineering, not a forte of Resotech.

commercial:

- CHC not only mobile client - its a big market, 20-25% of whole mkt.
- is the CHC order believable? They only have 7 fixed +3 mobile now, and in light of Medicare constraints, this order might be renegotiated.
- CHC will go to competitor (Picker - worse because of Picker-Philips merger - Philips is bigger than GE, or Dasonics - expected to sell 30 in'86) if Resotech says no. Competitor may use this manufacturing experience to crowd Resotech out of the market. -Medicare impact pressures for lower cost units and mobile units -Medicare impact small customer base for RS2000 -large hospitals: best, most recent technology - bodes well for the RS2000

operational:

- very tight time line: working prototype in about 1 yr. (get \$1 million) and commercial prototype in 1 1/2 yr. (get \$2 million) (p 128)
- Kumasaka sees risk of missing RS2000 '89' introduction if go with mobile unit don't want to lose momentum.
- Kumasaka says 'we are going to do the 2000, period.' Therefore, a critical question is can Resotech handle multiple projects at once, particularly with one of them being the mobile unit.
- Lee says can't pull together a team by first of year (p 132), but first prototype due the following fall! this unit must be kitted together with existing magnet, etc. - no time for R&D.

Summary of Thoughts (Step 4):

(This is not fully developed nor is it supported using the points above. Furthermore, it is NOT the 'right' answer—there is not one.)

To me, the current market for Resotech's products matches their skill-base: a high-tech product, sold to big hospitals and teaching hospitals that will buy the latest because people come from all over the region to be treated there. We are not talking Medicare. Resotech's skill-base consists of high-tech people who can develop cutting-edge products. The management has done a good job hiring people, staying consistent with the company's goals.

Resotech's skill-base for the mobile unit market is lacking in two ways:

1. technical skills, and
2. product/process development skills.

In terms of technical skills, they do not have the mechanical engineering skill-base, nor the time to develop such a product. In terms of product/process skills, they are not prepared for mobile unit service, nor for relatively high manufacturing volumes, nor for broad based marketing efforts required for the much larger customer base. Also, their product development process is not appropriate; concurrent engineering must be accomplished in a different way for this market. It requires a more formal process of capturing customer requirements than Kumasaka's

conversations with top hospital radiologists. It also requires a very close relationship with suppliers since these systems will be largely designed and assembled from vendor's components.

The market/skill-base mismatch is sufficient to deter Resotech from accepting the CHC offer, even if there was a potentially huge income potential—the risks of failure are too high since the company would be pursuing a product/marketing strategy that is inconsistent with its goals and skill-base. Moreover, I do not think that the market is a lucrative one anyway. Medicare is having a strong impact on the type of clients that will use such a mobile unit. This means that profit margins will be smaller, probably offsetting the extra volume. An indication of this cost pressure is the lower annual service charge in the proposed contract (8.5 %) in spite of the expected higher service costs from the hostile mobile environment. On the other hand, Resotech's current clients will be interested in the RS2000, RS3000, etc., certainly enough to keep their employees happy, secure, and financially well off. They may also be able to expand beyond their 7 % market share by producing an enhanced (and lower cost) RS 1000B, say.

If elite, cutting edge mobile units is not an oxymoron, then perhaps this is a long-term growth opportunity for Resotech. However, this will require substantially different skills, and it should be carefully thought out and executed rather than rushed.

What You Should Learn from This Case for the Course:

1. Deciding what product to develop is not just a technical issue. You need to have a product and process development strategy for your company that is consistent with its talents and long-term goals (of course, the talents and long-term goals should be consistent too).
2. Product/process development in the real world is complicated by the fact that multiple projects are going on simultaneously, and multiple product opportunities must be considered in light of this. This complicated nature of new product development (in many cases) means that having a product development strategy allows you to make choices within some kind of rational framework.
3. The philosophy of concurrent engineering can be accomplished simply when there is one product and a handful of employees. It is very complex (and requires formal methods) to accomplish, especially for larger firms that are developing multiple products simultaneously.