

Selling The Solution: A Key Skill for Engineering Managers

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Improving competitiveness is a common concern for most manufacturing operations. Competitive pressure in manufacturing increases each year, and business-as-usual approaches do not work. Innovation is the order of the day. Companies must respond to competitive challenges in new and innovative ways or find their products losing ground in the market place. Innovation takes many forms from hardware (such as robotics) to software and computers to philosophies such as JIT (Just In Time), TQM (Total Quality Management), and CIE (Computer Integrated Enterprises). Each innovation places new demands on the existing system into which they are introduced.

The engineering manager is often asked to provide the needed leadership in these innovation-based projects because of this individual's technical expertise and training. Technical expertise in (1) the specific innovation and (2) project management in general is not enough. The successful selection, planning, and implementation of innovation within an organization requires that someone in the organization sell the change. The classic marketing process of identifying the target market(s) and selecting the appropriate marketing mix (product, price, promotion, and channel) can be used to sell the solution inside an organization. Engineering managers can apply the marketing process and its elements when proposing and introducing change in their organization. They can avoid several common pitfalls with this approach. Effective use of the marketing mix model, to related different elements of the innovation with differing degrees of emphasis to the different target markets in an organization, can increase the likelihood of project success in both the approval and implementation processes.

An example of the effective uses of the marketing theory during the selecting, planning, and implementation phases of an innovation project can be seen in the differing target markets at differing stages/phases. During the selection phase of the project, the target market is often upper management. The final stage of the selection phase is a request for approval of and funds for the selected innovation. This request (in written or presentation form) is normally directed at upper management. To improve the likelihood of approval / acceptance of the innovation, the request should address (or target) this audience. Having identified the target and how the elements of the marketing mix of product, price, promotion, and channel relate to specific upper management concerns; the engineering manager can emphasize the project elements that are the greatest concern and interest - such as how it relates to the various strategic policies - and not clutter the request with matters outside the audience's interest - such as esoteric (from the audience's view) technical niceties. During the overlapping planning phase of the innovation, the engineering manager may address a different target market, such as the department managers, and in turn present the same product (the innovation) in a different manner (promotion) addressing different issues (the price) in a different presentation format (the channel). During the implementation phase, the target market may be the user requiring that the



marketing mix be adjusted once again to meet the expectations of this group. The innovation (or product) is the same, but what is important or relevant to this target market may be different and may be addressed differently.

The need for this type of training for engineering management / industrial engineering students was recently reinforced for this author, when teaching a course at the University of Minnesota Duluth on the effective introduction of change to a class of juniors and seniors in industrial engineering and management information systems. The class covered a series of case studies in automation and a model for improving the likelihood of a successful outcome developed from the case studies [3]. During class discussions of the cases and during exercises based on the cases, the business students showed a marked superiority to the engineering students in structuring their arguments (promotion) for recommending the changes to different constituents (target markets) during the selection, planning, and introduction phases. The engineering students tended to present the innovations in only two dimensions - technical improvements and reduced costs. This author attributes this difference, at least in part, to the business students being able to more readily relate marketing theory to the needs to address the appropriate issues to the people in different levels of the organization and different functions of the organization.

A second example of the need for marketing skills in engineering students can be found in the capstone team design course at UMD. In this course, small teams of students perform projects for local industries on a consulting basis. Often in these projects, especially those for small businesses, the students' design recommendation is substantially different from the sponsor's expected design. When this occurs, the student team must sell their solution to the sponsor. This is particularly difficult for the students as they lack understanding of the marketing concepts they must use to achieve customer buy-in of their solution. This customer acceptance is important to the university as it is committed to an active outreach program of which the team design projects is a significant part.

If selling the solution is not enough of a reason to add a marketing course to industrial engineering and engineering management programs, the area of production management provides a second argument. Production management courses are a common feature in industrial engineering and engineering management programs, while marketing courses are not so common. The need for the inclusion of a basic marketing course in engineering management and industrial engineering programs can be readily seen in the texts used in these production management courses. At the University of Minnesota Duluth the production management (and prerequisite production systems) course is taught by a industrial engineering faculty member using books written by business faculty (currently [4] and previously [1]). The instructors bring in material from outside these texts to add the additional depth needed by engineering students in certain areas. Both texts, but especially the current text, reflect the current emphasis in production management placed on quality. As the text is used, it becomes clear that the application of TQM (Total Quality Management) QFD (Quality Function Deployment), and ISO 9000 (to name just a few of the current overlaying production management philosophies) are customer driven. Since marketing is the normal function for developing customer information, it seems only natural to expect industrial engineering and engineering management students to be exposed to marketing concepts - especially the basics of target market and the marketing mix - and their application in a manufacturing environment.

Benefits from a marketing course in an engineering management program range from (1) providing the students with a basic understanding of the marketing function of their company and its suppliers, (2) providing students with classic marketing/sales skills, (3) exercising the students' persuasion skills, to (4) introducing students to the benefits to be derived from the abstraction of concepts in one field to fit a seemingly different



application in another. The same benefits argue for the inclusion of a marketing course in an industrial engineering program, at least as a technical elective.

A final argument for the inclusion of a marketing course in an engineering management or industrial engineering program is the standard MBA curriculum. One typical foundation course required by MBA programs is a marketing theory course. This makes two points. The first point is based on the model of the MBA as a master's degree in business for non-business majors. Marketing in this model is seen as a basic skill for managers. Thus it should be included in a comprehensive management program. The second point is that many of the graduates of industrial engineering programs pursue MBA degrees (and, based on salary survey data, have higher salaries than those with MSIE degrees) and the inclusion of the undergraduate marketing course allows more rapid attainment of the MBA. This also allows the engineering management and industrial engineering advanced degrees to start from a broader base.

The suggested marketing theory exposure can come from several sources. The obvious source is the business school's basic marketing course. A second option is to offer a tailored course through the program's home department. An example of a tailored course is Florida International University's Department of Industrial and Systems Engineering's marketing course (EIN 4122 - Industrial Marketing) taught by its faculty as a technical elective. In 1993 this course was taught by the author (using [2]) to a small class of ten students - nine industrial engineering juniors and seniors and one business student. While the course's objective was to develop competency in the fundamentals of industrial marketing, the course was easily presented in such a manner as to address the benefits listed in the previous paragraph. A third option is to present the marketing material in an abbreviated form in a project management course. While this option provides the least exposure, it is probably the most readily useable method given the credit crunch seen in most programs today. This author covers the basic marketing theory and its uses in selling the solution in four seventyfive-minute blocks which are divided equally between theory and application. A major weakness with this approach is that no notation of the subject being covered goes on the student's record for future uses such as meeting an MBA prerequisite requirement.

In conclusion, the recommendation to include a marketing theory class in engineering management and industrial engineering programs is supported by (1) the need for graduates of these programs to sell the innovations they propose to their organization and (2) the increasing use of customer (both internal and external) driven production management philosophies.

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2. Haas, Robert W.; *Business Marketing Management, An Organizational Approach*; PWS-Kent Publishing, Boston, 1992
3. Peterson, William R.; *Case Studies in Automation - A Methodology for Evaluating the Likelihood of a Successful Outcome*; PhD Dissertation, The Ohio State University, 1995
4. Russell, Roberta S., and Taylor, Bernard W. III; *Production and Operations Management, Focusing on Quality and Competitiveness*; Prentice-Hall, Inc.; Englewood Heights, New Jersey, 1995



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