New Product Development Teams: A Pilot Study

by

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Abstract

The analysis of the data is ongoing and is based upon responses from twenty-five firms. Preliminary findings indicate that 76% of the respondents use teams for product development. The initial analysis also indicates that larger firms have longer development cycle times. Managers reported, improved financial performance, speed to market and customer satisfaction as benefits of team-based new product development.

Introduction

The pace of change in business today is so rapid that it has been labeled a revolution (Stewart 1993). Globalization is increasing the number of competitors in any given business. It is now even more imperative that firms get to the market fast, with innovative products that keep their rivals off balance. Complicating this task is the fact that there are fewer people in the firm to get the work done. Re-engineering has taken whole layers out of corporate hierarchies. Work is increasingly being performed by cross-functional teams, rather than the succession of specialized departments that make up a functional hierarchy.

There is an abundance of anecdotal evidence about the benefits of team-based product development. The trends toward the process are readily apparent from the number of books and articles published on the subject. The purpose of this study is to explore generally how the cross-functional organization (teams) performs in getting products to the market quickly, and specifically how teams are employed in the product development process. Included in this discussion will be a review of practices in a broad range of industries, as well the results of a survey administered to members of the farm equipment manufacturing industry. Farm machinery manufacturing is a subject of interest for several reasons. It is a mature industry with a well defined customer base whose growth opportunity may lie primarily with new products. Also, there are few new market entrants with most innovation coming from established players. Development cycles are critical due to product seasonality. And finally, the segment is populated with older firms that might be slower to adopt new management processes. While the survey results will apply to one
industry, the manufacturing and marketing processes are similar to those found in a variety of other businesses. The conclusions of this study might therefore be applicable to other industries where cross-functional teams could be employed in the new product development process.

**New Products**

If the firm seeks to maximize returns to the stakeholders, what are the benefits of investing in risky new product development at all? New products have been cited as a means to: gain competitive advantage, define strategic direction, enhance corporate image, capitalize on R&D, utilize production capacity, leverage brand equity, maximize return on investment, and utilize human resources (Thomas 1993). These benefits can make new product development a vital part of a firm’s strategy.

The recent interest of American business in new product development processes has been influenced by the sobering experiences of firms such as General Motors. Consider that General Motors announced the formation of their new Saturn Division at about the same time that the Acura division was formed at Honda. The Acura automobile was introduced to the marketplace and had undergone three model changes before GM’s Saturn first hit dealer lots (Tomasko 1993).

Early introduction of new products will enhance the revenue of the innovating company, while putting their competition further behind. Indeed, a McKinsey & Co. study estimated that a new product that is six months late can lose out on up to one-third of its potential profits (Vesey 1991). Product introductions that are delayed may even bring about the financial failure of projects that started out as winners (Rosenthal 1992).

Competition is driving the movement to improve the new product development process. Companies must innovate to maintain their position in the marketplace. Wang and Polaroid are offered as recent examples of firms that have suffered due to the stagnation of their product line (Rosenthal 1992). Goodyear had suffered mightily in the marketplace until their new product development process was turned around with the arrival of Rubbermaid’s Stanley Gault. Goodyear subsequently turned out 22 product innovations in two years, raising 1993 earnings to a near record $388 million (Magnet 1994). Seeking the
improvement of new product development can go beyond the immediate project and into the issues of how the business as a whole is organized and controlled.

**Functional Hierarchy vs. Horizontal**

The top-down hierarchical organization evidences itself as far back as man has organized into groups. In business, the concept is documented as early as 1776 in Adam Smith's *The Wealth of Nations* (Hammer 1993), and as recently as Elliot Jaques' article "In Praise of Hierarchy" appearing in the January 1990 *Harvard Business Review* (Eccles 1992). The functional departments in the typical organization chart will include Manufacturing, Marketing, Finance & Accounting, Engineering, and others. This *functional hierarchy* will have some arguable advantages in the maintenance of functional expertise, as well as the ability to exercise command and control of the functional departments. The downfall of this organization method is the extra time it takes for decisions to be made, extra time that is particularly critical to the new product development process. It is argued that the functional hierarchy expends too much of its energy directing the "up and down" administration and communication, rather than focusing on the value-added tasks necessary for the firm's success (Byrne 1993).

*Functional silos* is one description of how functional departments organize and operate within the firm (Rosenthal 1992). Ideas or actions initiated near the bottom of a particular department must rise all the way to the top of the department "silo" before they can be communicated to any other part of the organization. The separations between departments are also viewed as walls that prohibit useful feedback from other parts of the organization. Tasks that involve the whole organization must be done sequentially. When a particular department finishes their portion of the project they "throw it over the wall" to the next department in the sequence (Rosenthal 1992). Product development conducted in such an environment frequently results in new products that are hard to design, manufacture and distribute, ultimately reaching a customer that wanted something entirely different.

Fostering communication and interaction at all levels of the organization would seem to be a way to improve any process such as product development. In the 1970's the
Matrix Theory of Management was popularized as a way to gain freedom within the organization while maintaining the order of hierarchy and reporting relationships. The matrix was still based on formal lines of authority, and therefore still relatively slow (Eccles 1992). To break down the barriers built into organizations, many firms are moving to the *horizontal corporation* (Byrne 1993).

**Benefits of Horizontal Development**

In an organization structured horizontally, the business is organized around the processes that actually get work done in the firm. Using the example of departmental silos, a process such as product development would cut horizontally across the organization to simultaneously involve all of the functional specialties in the product development process. The process may be lead by a *team* of individuals drawn from the different functional specialties. This team becomes a microcosm of the organization, allowing the particular problem at hand to be solved as a whole, rather than by gathering a collection of partial solutions put forth by the functional departments (Rosenthal 1992).

M.A. Hanna Inc., a polymer manufacturer, has found that the cross-functional organization speeds production and saves so much on energy and waste expense that their firm now requires one-third less operating capital than it needed four years ago (Stewart 1993). Frederick Kovac of Goodyear points out that you no longer have to go “up” the organization to access information anymore. Now you can just “tap in” at any level (Stewart 1993). The benefits of the horizontal organization are such that firms like Motorola, GE, AT&T, DuPont, Eastman Chemical and Xerox have now organized cross-functionally (Byrne 1993). The transition toward less hierarchy is not easy however, and researchers and practitioners admit that the new organization is usually a hybrid of the functional and horizontal management methods (Byrne 1993).

**Teams and Product Development**

Multi-disciplined teams are well suited to the product development process. Chrysler’s use of teams lead to the developed the LH Series sedan one year faster than past new products (Smith 1992). The shift away from functional orientation allows holistic development. In the environment of functional specialties, R&D and marketing may want
to develop new products, however manufacturing may be happier to stay with the current models so as to achieve optimal production. The team-based organization overcomes some of these natural conflicts between functional goals (Rosenthal 1992). The speed of cross-functional teams is apparent to Geers, a maker of miniature hearing aides. The firm has cut its new product development cycle down to nine months, while competitor Siemens might take as long as three years. This organization now uses time compression in lieu patents to compete (Tomasko 1993).

The size and makeup of new product development teams varies widely. Eastman Chemical employs over 1000 teams within the company (Byrne 1993), while Chrysler's LH team consisted of over 850 people (Smith 1992). While organizing across functions within the firm is a big step for some, others are going outside the firm to bring in customers and vendors as full team members. At Boeing, some vendors are hooked directly into the firm's CAD/CAM system (Galbraith 1993).

Not all firms are completely suited to the team-based development organization. Rosenthal (1992) cites impediments such as emphasis on manufacturing the current product, lack of top management commitment, part time design engineers, and fear of losing control as things that prevent adoption. Organizational and personnel policies may also require attention due to the move to a team-based development process. Traditional performance measurement systems can sometimes make conflict between teams and functional departments worse (Meyer 1994). Teams need measurement and evaluation systems to inform the team when corrective action needs to be taken, and also to let top management know when assistance is needed with problems the team cannot solve by itself (Meyer 1994).

**Methodology of the Study**

A survey was mailed to 149 U.S. manufacturers of farm machinery and equipment. The survey instrument went to the attention of the Product Development Department at the address listed for the firm in the *Implement & Tractor Product File* issue of October 31, 1993. In addition to team and new product information, the survey gathered background data which can be used to make some generalizations about conditions and trends in the
farm equipment manufacturing industry as a whole. The survey consisted of two parts: the first section to be completed by all firms, and the second section only for those who indicated the use of teams in the new product development process. Responses were anonymous, and return postage was provided.

**Survey Results and Analysis**

The firms responding in the study averaged 49 years in business. While the largest respondent listed worldwide employment at 18,000 people, *almost 80% of respondents had fewer than 200 employees*. Firms listed their sales force as the overwhelming source of new product ideas, accounting for an average 27% of product initiatives. Top management was second with 14%, followed by retail customers, Engineering and R&D departments, accounting for about 10% of new product ideas each. Surprisingly, manufacturers credited farm equipment dealers with an average of only 6% of new product initiatives.

In describing the trends in customer expectations over five years, 80% of the participants indicated that faster service was a customer priority. A solid majority also said that customers are demanding low price **and** high quality. Of note, 50% of firms reported that customers were looking for a more customized product. And despite what may sometimes be heard, only one respondent really felt that customers were looking for low prices even if it meant inadequate quality.

On the subject of new products, the study participants reported an average of three new products introduced per year, with new product cycle time (i.e. the time elapsed from concept to completion of the finished product) of 18 months. Twenty-eight percent of respondents indicated that “Product Manager” was a formal position in their firm. As to organization, only 32% claim that their enterprise is *process* oriented, as opposed to being *functionally* directed. The vast majority do, however, describe their product development function as oriented to *simultaneous* action rather than *sequential* steps.

In the second portion of the questionnaire, those firms that used cross-functional teams in their new product development processes were invited to comment further. Seventy-six percent of all study participants reported using teams in their product
development. The average length of time that firms had been using cross-functional teams was 32 months, with companies averaging between two and three new product teams active in the firm at any one time. In describing their product development teams, 89% of participants indicated that team membership was assigned as an additional duty, while three-quarters of respondents said that team results and performance did not affect compensation of the team member.

Team leadership was permanently assigned in almost all cases, with the Engineering department and R&D being the sources for leadership over 70% of the time. Most of these teams report to top management, and 63% are empowered to take independent (rather than advisory) action.

Performance of new product development teams was quantified in responses to question 29. Almost 70% of firms that used teams responded that the financial performance of their new products were better as a result of teams, with the balance of respondents indicating that their financial returns were about the same. A solid majority indicated that their product development process was faster as a result of using teams. (Four participants stated that their product development was now actually slower than before.)

The question regarding drawbacks to the team-based development process was purposely open ended, however the narrative responses focused primarily on difficulty of coordination within the firm, and the large time commitments required of team members and leaders. In comments on the advantages of teamwork in product development, the top benefits were consistently reported to be better communication, faster product development, better manufacturability, and better response to customer requirements.

Conclusions

In answer to the first of the larger questions cited on page six, the use of team-based product development was quite prevalent among survey participants. Care was taken in the survey structure to ensure that non-team environment firms would not be dissuaded from participation in the study. We might therefore assume that these results were representative of the industry's adoption of team concepts. With 76% using teams in
product development, it is safe to conclude that the farm equipment manufacturing sector is embracing this progressive management technique. The fact that teams have been in place for an average of 32 months also suggests that this is a trend and not a passing fad.

General statements about the impact of teams within the sample are more difficult to make. There was little difference in the product development cycle time and annual number of new product introductions between those survey respondents who *did* and *did not* use teams. Some correlation was indicated, however, between size of the firm and the likelihood of employing product development teams. Those without teams averaged 85 employees, while firms that used teams averaged over 2300 employees. Size of the firm was not a particularly good predictor of product development success for those companies where teams were used, however. The survey results show the correlation between number of employees and the number of new products introduced per year is not statistically significant (at alpha = .05). Indeed, the race may go to the small and agile, as there was a relatively high, and statistically significant correlation ($r = .7$) between the larger firm and longer development cycle time.

Finally, the question of the impact of team-based product development on the firm is addressed in answers the respondents gave regarding the benefits and drawbacks of the method. Managers are frustrated over the investment of time and the amount of coordination that cross-functional product development requires. Their misgivings were more than offset, however by the benefits they listed such as speed to market, improved financial performance, and customer satisfaction that team-based new product development delivers. This study concludes that product development in a team-based environment is widely used in the farm equipment manufacturing sector, and that those firms that do not yet employ the method would benefit from its adoption.
References


