
The Product Development and Commercialization Process

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Product development and commercialization is the supply chain management process that provides structure for developing and bringing to market new products jointly with customers and suppliers. Effective implementation of the process not only enables management to coordinate the efficient flow of new products across the supply chain, but also assists supply chain members with the ramp-up of manufacturing, logistics, marketing and other related activities to support the commercialization of the product. In this paper, the product development and commercialization process is described in detail to show how it can be implemented. To do this, the process is described in terms of its sub-processes and associated activities, and the interfaces with business functions, other supply chain processes and other firms. Examples of successful implementation are provided.

The product development and commercialization process requires effective planning and execution throughout the supply chain, and if managed correctly can provide a sustainable competitive advantage. Developing products rapidly and moving them into the marketplace efficiently is important for long-term corporate success [1]. In many markets, 40 percent or more of revenues come from products introduced in the prior year [2].

While the creation of successful products is a multidisciplinary process [3], product development and commercialization from a supply chain management perspective integrates both customers [4] and suppliers [5] into the process in order to reduce the time to market. The ability to reduce time to market is key to innovation success and profitability [6] as well as the most critical objective of the process [7]. As product life cycles shorten, the right products must be developed and successfully launched in ever-shorter time frames in order to remain competitive [8] and achieve differentiation in the market place.

The product development and commercialization process requires the integration of

customers and suppliers and the alignment of their activities. Successful implementation requires metrics that measure the financial impact on the firm and on other members of the supply chain.

Product development and commercialization is one of the eight supply chain management processes and it requires interface with the other seven. In this paper, we provide an overview of the eight supply chain management processes identified by The Global Supply Chain Forum. Next, we review the different types of product development and relevant definitions. Then, we describe the strategic and operational processes that comprise the product development and commercialization process. Finally, we present opportunities for future research and conclusions.

Background

Supply chain management is increasingly being recognized as the integration of key business processes across the supply chain. Efficiency and effectiveness are driven through the linking of supply chain processes. Until recently, supply chain management has been a term without a clear definition. The

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definition of supply chain management developed and used by The Global Supply Chain Forum is:

Supply Chain Management is the integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders [9].

The Forum members identified the following eight business processes that need to be implemented within and across firms in the supply chain:

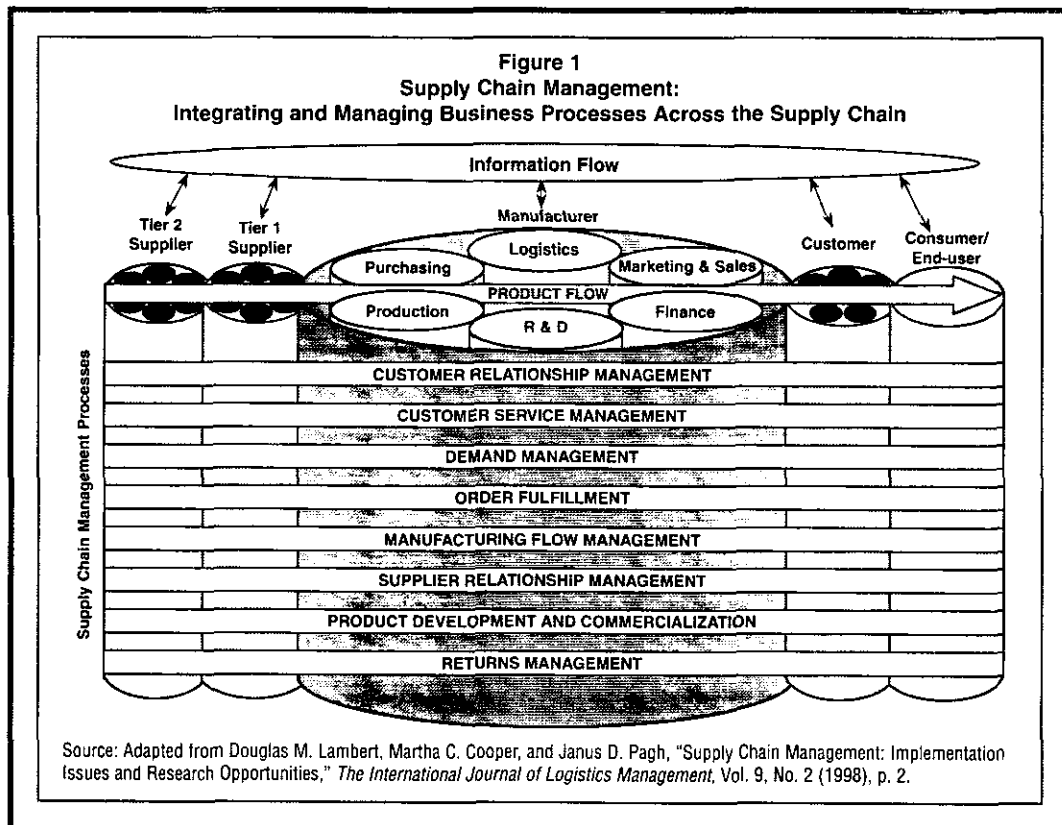
- Customer Relationship Management - provides the structure for how relationships with customers are developed and maintained, including the Product/Service Agreements (PSAs) between the firm and its customers.
- Customer Service Management - provides the firm's face to the customer, including management of the PSAs, and provides a single source of customer information.
- Demand Management - provides the structure for balancing the customers' requirements with supply chain capabilities.
- Order Fulfillment - includes all activities

necessary to define customer requirements, design the logistics network, and fill customer orders.

- Manufacturing Flow Management - includes all activities necessary to move products through the plants and to obtain, implement and manage manufacturing flexibility in the supply chain.
- Supplier Relationship Management - provides the structure for how relationships with suppliers are developed and maintained, including the PSAs between the firm and its suppliers.
- Product Development and Commercialization - provides the structure for developing and bringing to market products jointly with customers and suppliers.
- Returns Management - includes all activities related to returns, reverse logistics, gatekeeping, and avoidance.

Each process cuts across firms in the supply chain and functions within each firm, as shown in Figure 1. It is through the customer relationship management and supplier relationship management processes that most of the inter-firm activities are coordinated.

The eight processes were previously



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described in Croxton et. al. [10]. We describe the product development and commercialization process in greater detail. The framework presented is based on the literature and in-depth interviews with companies in a broad array of industries. In addition, the strategic and operational sub-processes were validated in seven working sessions with members of The Global Supply Chain Forum over a period of more than 24 months.

Types of Product Development Projects

Product development projects can be classified as one of the following four types [11]:

- **New product platforms:** This type of project involves a major development effort to create a family of products based on a new, common platform. The product family addresses familiar markets and product categories. Moen Incorporated's project involving the Revolution Massaging Showerhead is an example. This product offers several features not available with any of their other products.
- **Derivatives of existing product platforms:** These projects extend an existing product platform to better address familiar markets with one or more new products. Sony Corporation, by using common components in successive generations of the Sony Walkman, achieved higher quality throughout the platform life [12].
- **Incremental improvements to existing products:** These projects might only involve adding or modifying some features of existing products in order to keep the product line current and competitive. As an example, TaylorMade-adidas Golf, has introduced, in its Rossa putters brand, two new versions of its popular mallet-style Monza putter: the Monza Long and Monza Mid. While the new products maintain the features of the original Monza putter, the heads of both of these new putters are engineered to work best with a long and mid-length shaft respectively.
- **Fundamentally new products:** These projects involve radically different product or production technologies and might help to address new and unfamiliar markets. In late 2001, Apple Computer rolled out the iPod, a small digital music player capable of

holding about 1,000 songs [13]. This product was quite different than anything Apple had previously sold.

Product development and commercialization might include the integration of services. The combination of a physical product with services makes the product more valuable. Services such as maintenance or training might be integrated into the product development process. The product development and commercialization process at Lucent Technologies includes specific review criteria relating to customer documentation and training plans. Supply chain considerations might drive innovative customer-focused solutions which differentiate the product from competitors' offerings, particularly in saturated markets. Physical products might include intangible services which means that many solutions now include varying proportions of products or services.

Product Development and Commercialization as a Supply Chain Management Process

Each of the eight supply chain processes defined by The Global Supply Chain Forum contains strategic and operational elements. The strategic portion of the product development and commercialization process establishes a structure for developing a product and moving it to the market, providing a template for implementation within the firm. The operational portion is the realization of the process that has been established at the strategic level. Figure 2 shows the sequence of sub-processes that comprise the strategic and operational product development and commercialization processes. The lines connecting the sub-processes to the other seven supply chain management processes in the center of the diagram depict the interfaces between each sub-process and the other processes.

Both the strategic and operational processes are led by cross-functional teams. The teams are comprised of managers representing product engineering, research and development, marketing, finance, production, purchasing and logistics. The teams should include members from outside the firm such as representatives from key customers and/or suppliers. For example,

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Visteon, a supplier of automotive components, is a key player on the product development and commercialization team of the Ford Motor Company. Similarly, a user advocate is part of the product development and commercialization team at Lucent Technologies. The user advocate helps identify the customer value proposition for the product and assists with the formulation of appropriate documentation and training.

At the strategic level, a process team is responsible for developing the framework for product development and commercialization within the firm. Multiple operational teams have responsibility for managing specific development projects. While these teams have project responsibility, the strategic team maintains control of the overall process.

The Strategic Product Development and Commercialization Process

The objective of the strategic portion of the product development and commercialization management process is to construct a formalized structure through which the

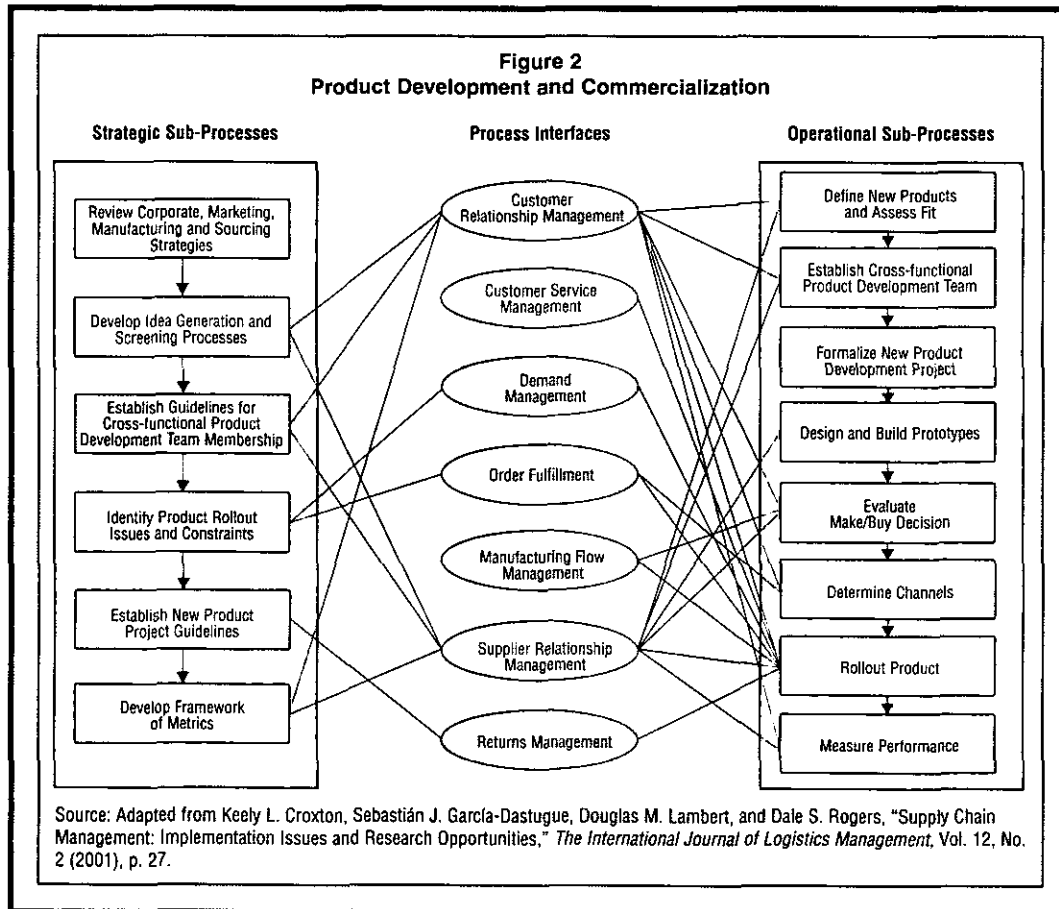
operational process is executed. The strategic process provides the blueprint for the implementation and is composed of six sub-processes, as shown in Figure 3.

Review Corporate, Marketing, Manufacturing and Sourcing Strategies

The first sub-process in the strategic portion of the product development and commercialization process is to review the corporate, marketing, manufacturing and sourcing strategies to determine how they will impact products to be developed and sold. The marketing strategy contains the key customer segment needs assessment.

Corporate and marketing strategies lead directly to idea generation for products. These strategies guide budget priorities that are examined to determine specific product development and commercialization objectives. General business strategies are honed into explicit plans that define how the firm's strategy translates into product development and commercialization requirements. The time frames of these strategies are aligned with expected product

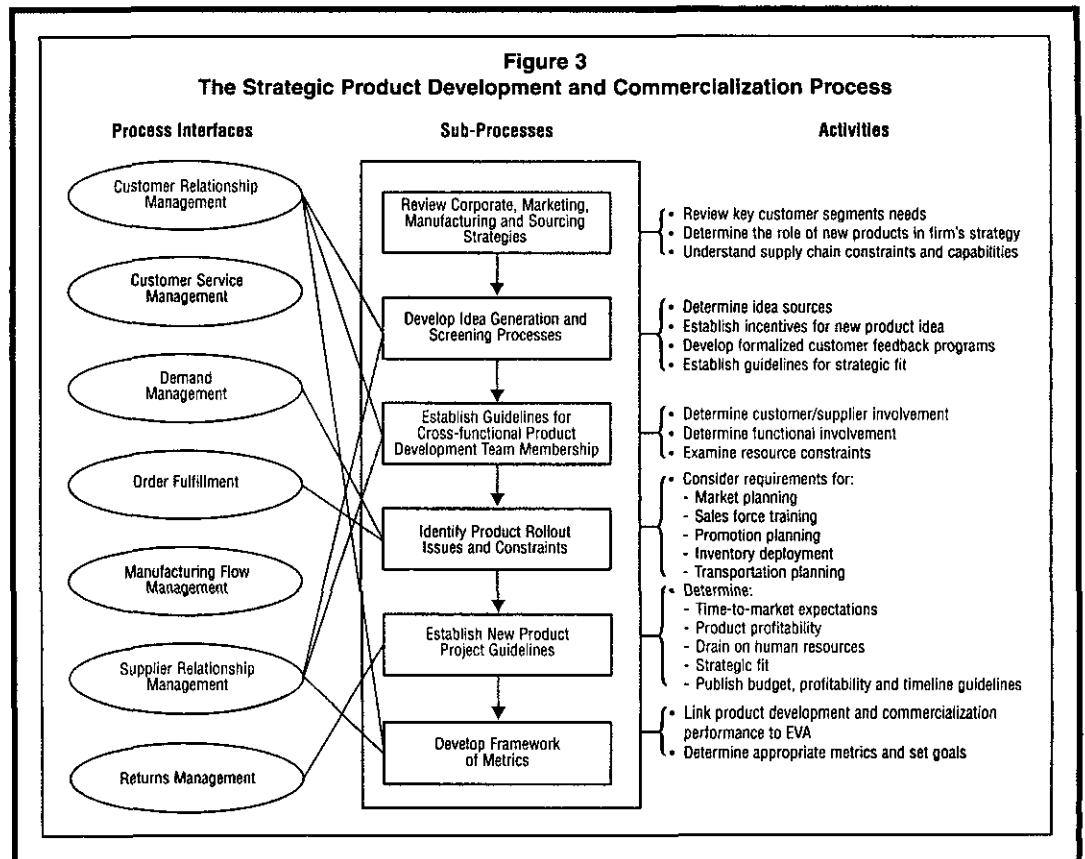
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development cycle times. This gives the product development and commercialization team detailed objectives that are aligned with overall firm strategies and budgets, and include time to market objectives. Research has shown that managers in successful firms clearly communicate the organization's overall strategic direction, and then implement the product development and commercialization process in a manner consistent with their business strategies [14]. A review of a firm's marketing strategy should allow the product development and commercialization team to more effectively identify projects that address customer needs. While the marketing strategy identifies these customer needs, the product development and commercialization process implements the activities to meet those needs [15].

The review of corporate, marketing, manufacturing and sourcing strategies is particularly relevant as management establishes the objectives for the product development and commercialization process and examines how resources and competencies support achievement of these objectives. For example, the product develop-

ment and commercialization team at Moen Incorporated is driven by a corporate edict that SKU growth will be proportional to sales growth. Therefore, as the team reviews the organization's three-year product strategy to identify and prioritize new product opportunities, they rank the revenue potential and operational complexity of the opportunities. The revenue potential is provided by the marketing function and is based on market intelligence. Market intelligence is largely driven by gap analyses of the current product portfolio which management uses to identify style and/or price point gaps within the current product mix. The operational complexity rankings are developed through consultations among the sourcing, manufacturing and engineering functions. The complexity rankings reflect the ability of the organization to source, make and deliver the desired product. A fundamental business strategy question is whether the product design should simplify rather than complicate the supply chain management processes. A proliferation of products and product variations may cause complications with little or no payoff.



In addition to reviewing of the overall product strategy, the product development and commercialization team reviews the sourcing, manufacturing and marketing strategies in order to assess the fit of the product development objectives with current capabilities. Then, the team provides feedback of future product development requirements to the sourcing, manufacturing and marketing functional areas so that the acquisition of needed capabilities can be integrated into their future strategies.

Develop Idea Generation and Screening Procedures

The idea generation and screening procedures are developed next. The outputs of the first sub-process are objectives that will drive the idea generation and screening procedures. This can include determining sources for ideas, considering incentives for developing products for the focal firm, for the suppliers, and for customers. In addition, this sub-process will begin to develop formalized customer feedback programs. At this point in the product development and commercialization process, there needs to be an interface with the customer relationship management process to determine how new products will impact key customers and whether those products will be accepted.

Ideas for new products may come from several sources, including [16]:

- Marketing and sales personnel
- Research and technology development teams
- Product development and commercialization teams
- Manufacturing and operations organizations
- Customers and potential customers
- Suppliers and third parties
- Competitors and potential competitors.

The product development and commercialization process team should develop a methodology for generating these opportunities. As an example, 3M has implemented the lead user methodology to generate new ideas. Lead users are defined as users of a given product that expect attractive innovation related benefits and whose needs for a given innovation are typically earlier than the majority of the target market [17]. 3M's methodology involves identifying and learning from lead users both within the target market and in "advanced analog" markets that have

similar needs in a more extreme form [18]. Lead users provide information on both needs and ideas for solutions.

Establish Guidelines for Cross-functional Product Development Team Membership

Next, the process team establishes guidelines for the membership of the cross-functional product development team. It is critical to have the right people from the internal functions along with key customers and suppliers involved in the product development and commercialization process. The involvement of the process teams from customer relationship management and supplier relationship management is central to managing the relationships across the supply chain. Business rules related to the product development and commercialization process should be included in the PSAs.

While the strategic product development and commercialization team is a standing team, the operational level teams are formed on a project by project basis [19]. There are two basic types of operational product development teams. Operating and innovating teams [20] are identified based on the underlying objectives of their project. The operating teams are concerned with evolutionary development of current product and service offerings. Operating teams span boundaries, but tend to be more internally focused. Innovating teams, which pursue new business opportunities that are distinct from existing offerings, span organizations and have a wider perspective. Innovating teams interact with consumers, retailers, wholesalers and suppliers. The strategic level team should take these differences into consideration when establishing the guidelines for team membership.

The strategic product development and commercialization process team works to determine the extent of involvement from key customers and suppliers. Partnerships might be formed with customers and suppliers to complement internal knowledge as well as to learn about new markets and technologies, and reduce overall risk [21]. Relative strengths, weaknesses and roles of personnel within the internal functions are assessed to determine their involvement. Resource constraints are examined to determine which resources can be utilized on specific new product projects.

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As part of the product development and commercialization process at Lucent Technologies, involvement guidelines by functional areas are established for each stage of the process. Functional representatives on the team are identified as either deliverable owner, input provider, or consultant. Functional representatives might include corporate, legal/contract management, development, sales, marketing, services, finance, product management, logistics, intellectual property, quality management as well as an advocate for the user.

Identify Product Rollout Issues and Constraints

The fourth sub-process is the development of product rollout issues and constraints. Pinch points that will hamper the product development or commercialization process are determined. This sub-process includes considerations of market and promotion planning, sales force training, inventory deployment planning, transportation planning and capacity planning. Each of the internal business functions needs to be involved to avoid poor product rollouts. In addition, the team should get input from the order fulfillment process to assess how new products will impact this process.

It is critical to identify potential commercialization problems and think about solutions to these problems. As part of this sub-process, the team works with the supplier relationship management and manufacturing flow management teams to determine if there are constraints related to components for the new product. In the case of completely outsourced manufacturing, the manufacturing flow management team helps to identify problems with scheduling or production. A linkage to order fulfillment assists in the consideration of rollout issues. Typical decisions to be made at this point are initial inventory levels and its positioning.

Unisys has standardized product rollout procedures because of the complexity and high cost of their products and the difficulties and expenses associated with sourcing, manufacturing and distribution. Utilizing project management tools that allow all of the key issues to be considered is important when the price of a computer can be greater than \$1,000,000. Anticipating pinch points and

developing a solution in advance can determine a product's success.

As part of their product development and commercialization process, Lucent Technologies produces a detailed financial assessment, product description and execution plan for a successful rollout. This enables management to examine rollout issues and constraints when making the business decision to commit significant resources to the project.

Establish New Product Project Guidelines

Next, new product project guidelines are established. In this sub-process, expectations for time to market are developed. Product profitability scenarios are developed and the implications for human resources resulting from new product projects are determined. The guidelines for evaluating the strategic fit of new products are established. Ritchey Bicycle Components, a high-end bicycle parts company, provides an example of establishing new product project guidelines. Before a new product is approved, the team must submit a plan that includes budgets and project guidelines to the Chief Operating Officer. If it does not appear that the project will be a strategic fit and successful in the marketplace, the project will not move forward without changes. Finally, budget, profitability, and timeline guidelines are published.

At Unisys after the customer need is identified, the product management process (PMP) begins, encompassing the feasibility, design, development, qualification, support and termination stages of the identified product. To ensure that supply chain requirements are defined and included, Unisys generates detailed documents and provides them to engineering to be embedded in the marketing statement of requirements, the starting point of the PMP process.

Develop Framework of Metrics

The final sub-process is to develop the framework of metrics. Typical process metrics might include time to market, time-to-profitability and initial sales. As with the other processes, the metrics that are chosen need to be coordinated with communicated to the customer relationship management and supplier relationship management process teams to assure that they do not conflict with other metrics or the firm's overall objectives.

As part of this sub-process, the team develops procedures for analyzing the total cost of product development and commercialization and the impact of new products on current ones. Product development and commercialization can be a key driver of profitability. At Colgate-Palmolive, the development of innovative products with key suppliers has been identified as a strategy for achieving their stretch financial goals.

Figure 4 depicts the relationship between product development and commercialization and the firm's financial performance as measured by EVA. EVA considers not only revenues, costs and profit, as well as the cost of assets required to generate the profits. For example, better management of the product development and commercialization process can lead to sales increases as a result of rolling out successful new products, improving product availability, retaining existing customers, and attracting new customers. Cost of goods sold can be reduced by lowering material requirements, reducing setup and changeover costs, increasing labor utilization, and reducing packaging requirements.

Expenses can be reduced by increasing productivity, optimizing the physical network of facilities, leveraging new and/or alternative distribution channels. Management can leverage product development and commercialization to help reduce the costs of freight and warehouse labor, customer service, order management, information, human resources, overhead and/or administrative costs. In many companies, managers not only focus their product development and commercialization activities on developing a particular product to take to market, but also to find ways to more effectively and efficiently perform supporting processes.

Better management of product development and commercialization can result in reductions in component, work-in-process and finished goods inventories. Other current assets also can be reduced as a result of better new product planning and introduction. Finally, better management of new product development and commercialization can lead to lower fixed assets as a result of improved asset utilization and rationalization, and better investment planning and deployment.

The product development and commercialization process can have a significant impact on the profitability of customers. For this reason, every attempt should be made to identify and report the revenue, cost, and asset implications of this process on the profitability of key customers and segments of customers. The cost of customer specific assets can be reflected in customer profitability reports by incorporating a charge for assets employed.

The Operational Product Development and Commercialization Process

The operational portion of the product development and commercialization process is the implementation of the structure developed at the strategic level. It is a template for the synchronization of product development and commercialization activities and consists of eight sub-processes as shown in Figure 5.

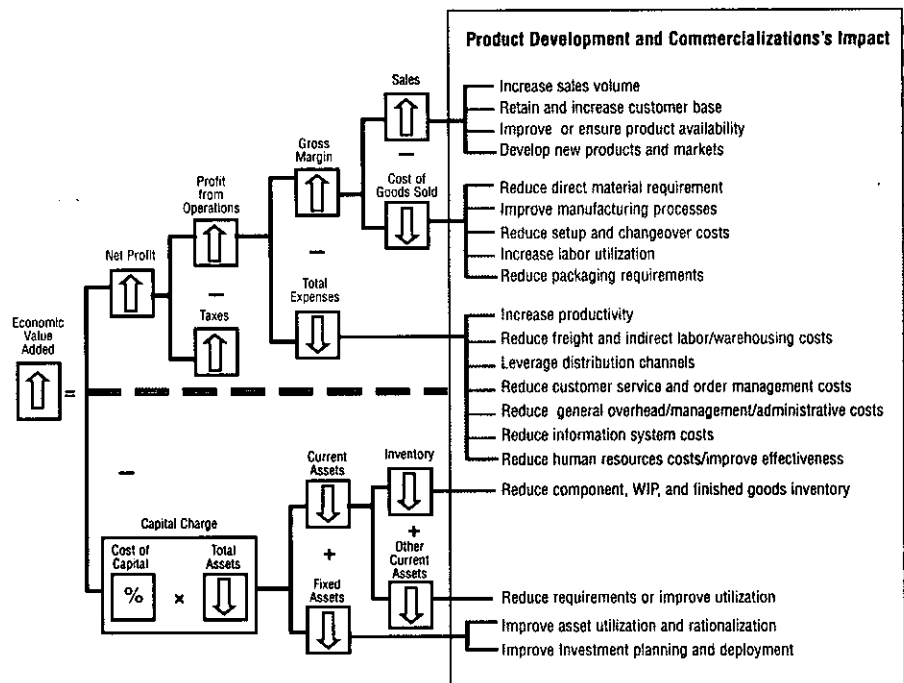
Define New Products and Assess Fit

The objective of this sub-process is to define new products and assess their fit. New product ideas are generated and screened. A market assessment is completed, key customers and suppliers are consulted, and the fit with existing channels, manufacturing, and logistics is determined. This sub-process involves interfaces with customer relationship management and supplier relationship management, as well as with the business functions in the firm.

Moen Incorporated utilizes various forms of customer input in the product development and commercialization process. In a few instances Moen has used retailer input as a means for identifying new product opportunities. Retail buyers along with their Moen sales representative have identified new product opportunities while reviewing current products within the store aisle. The retail buyer requested a product that was similar to a previously successful product but had certain stylistic adjustments that reflected changes in consumer preferences. The Moen sales representative and the retail buyer contacted a product development and commercialization process team to determine the potential feasibility of the request.

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Figure 4
How Product Development and Commercialization Affects Economic Value Added (EVA)



Source: Adapted from Douglas M. Lambert and Terrance L. Pohlen, "Supply Chain Metrics," *The International Journal of Logistics Management*, Vol. 12, No. 1 (2001), p. 10.

Establish Cross-functional Product Development Team

Using the guidelines developed at the strategic level, the cross-functional product development and commercialization teams are established. Internal and external parties such as suppliers or customers whose input is necessary for the success of the new product need to be included on the team as early as possible. These teams formalize the new product development project.

One of the barriers to including suppliers and customers on the product development and commercialization team is the geographical separation of the potential members. Virtual teaming has been proposed as a model and practice that can overcome this geographical barrier [22]. This approach utilizes technology to form collaborative relationships, unconstrained by geography that can quickly apply knowledge and expertise that affect the new product development and commercialization process.

Differences in corporate culture represent another barrier that impacts the involvement of suppliers and customers on the

team. A culture must exist in each of the organizations involved on the team that facilitates and encourages joint problem solving and decision making across organizational boundaries. The internal functions of the individual organizations must be willing to pursue collaborative relationships. This requires a culture permeating each organization that encourages and values collaboration [23].

At Unisys, the product development and commercialization team involves marketing, engineering, sales, operations, logistics, procurement, field service, and external suppliers. The establishment of cross-functional, boundary spanning teams is driven by the dedication to the principles of supply chain management and concurrent engineering. When they adhere to these principles, design time and cost is reduced while maintaining product quality and reliability.

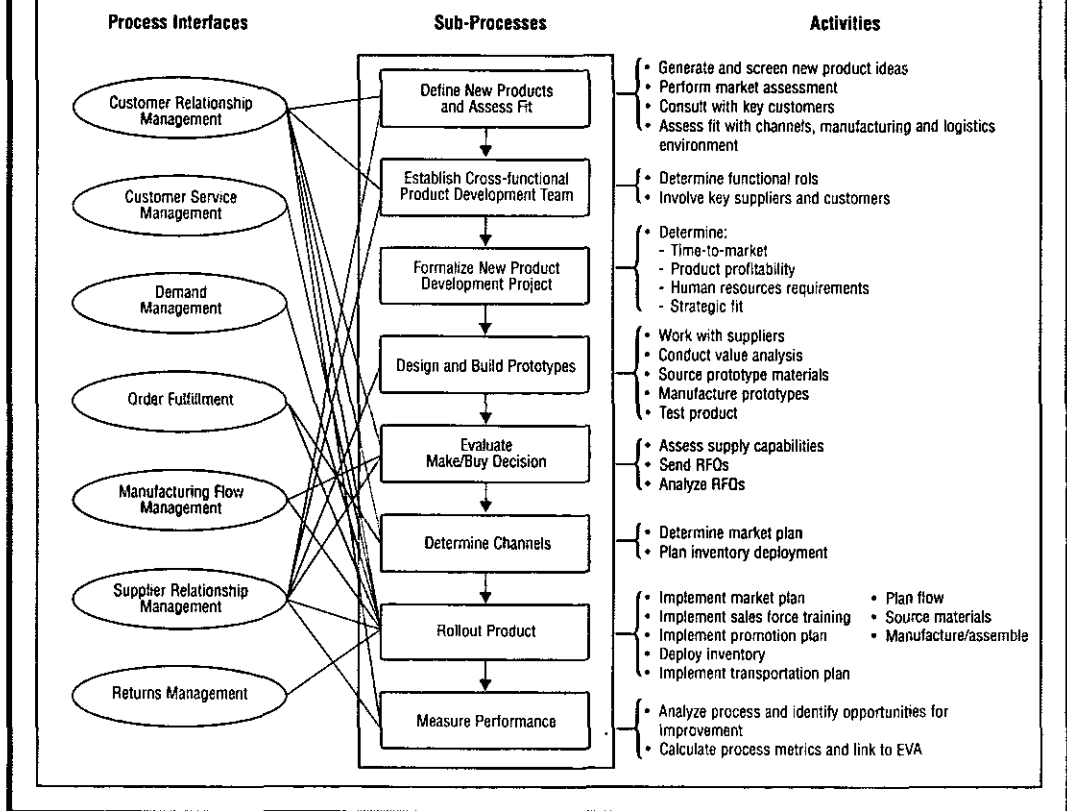
Formalize New Product Development Project

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Figure 5

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development teams examine the strategic fit of the new product within the organization's current product portfolio. The team working with key suppliers to formalize time-to-market expectations, product profitability goals, and budget requirements. Any potential implications for human resources are identified and addressed.

The formation of budget and resource needs within this sub-process are particularly relevant given that 75 percent of new product development programs fail commercially [24], while 55 percent of manager report that product development efforts in their companies failed to meet its sales and profit objectives [25]. The reasons for facilitate include lack of market information, a failure to listen to the voice of the customer, poor up-front pre-development homework, unstable product definition, poor quality of execution of key product development tasks, and poorly structured, ineffectual project teams [26]. A closer examination of these reasons combined with recent benchmarking studies suggests that many problems are interlinked, and traceable

to resource deficiencies [27]. Devoting adequate resources to the project is important for increasing the likelihood of success.

Design, Build and Test Prototypes

The team manages the process of designing, building and testing prototypes of the product ideas. For example, auto companies develop concept cars to test new product ideas. In this phase, teams work with suppliers and perform a value analysis to determine what portions of the product design and rollout process truly add value. Then, they source prototype materials and manufacture product samples. The final step of this sub-process is to test the product.

Ford Motor Company invested in a prototype optimization model with its related expert systems to budget, plan and manage prototype test fleets, and to maintain testing integrity. The model reduced annual prototype costs by more than \$250 million [28]. This has shortened the planning process, established global procedures for prototype development, and created a

common structure for communication between budgeting and engineering [29].

At Harley-Davidson, suppliers that only provide prototypes have been eliminated. Harley-Davidson works exclusively with ultimate production suppliers for the supply of prototypes. While these suppliers will either build prototypes or contract them out to an outside organization, they nonetheless are directly involved in this stage of the process. Management believes that product development success has been improved by having direct design input and oversight from suppliers at the prototype stage [30].

Evaluate Make/Buy Decision

Once the prototypes have been evaluated, the team needs to determine whether the product should be manufactured in-house, or purchased from suppliers. Part of the make/buy decision is to determine how much of the new product should be made in-house and how much by different portions of the supply base. In many firms, management has a short-term perspective for make/buy decisions which erodes long-term profitability. These decisions might have strategic implications for the firm and should be formulated from a strategic perspective with senior management involvement [31].

The decision to outsource or keep the product sourcing and manufacturing within the firms is a critical one. There might be strategic reasons for keeping the product in-house. The need to control costs or to retain product knowledge within the firm might lead management to keep the product in-house. This decision involves interfacing with other supply chain management processes including customer relationship management, manufacturing flow management and supplier relationship management. Once it is determined what will be sourced, supply capabilities are assessed and requests for quotations are sent, received and analyzed.

Determine Channels

In the sixth sub-process, the marketing and distribution channels for the new product are determined. The customer relationship management and order fulfillment process teams provide input at this stage. Then, the

market plan for the product is developed, and initial inventory planning is performed.

The team needs to consider the channel choice decision carefully. In some cases, the channel decision is the primary factor in determining a product's success. Strengths and weaknesses of various channels need to be analyzed. Consumer packaged goods companies are often faced with the choice of moving product through mass merchandise channels where price is low and vendor compliance demands are high, or through lower volume channels where price is protected and logistics requirements are lower. The products also might have cost or physical requirements that necessitate specific channel characteristics. It may be useful for the team to work with the customer relationship management team to determine how current and potential customers will react to the new products that will flow through existing or new channels.

At Moen Incorporated, the channel implications of the product development and commercialization process is a critical consideration. Depending on the channel used to rollout the new product, the inventory loading curves will vary. The retail channel requires that minimum inventory levels of the new product are available in their stores at launch. The wholesale channel is characterized by a much slower ramp-up period, but demonstrates a higher level of demand volatility. Moen's retail channel is becoming more demanding with regard to new products. In order to maintain shelf space, Moen must consistently provide retailers with a flow of new product offerings that are specific to their organizations. The wholesale channel is also looking for new products that are specific to individual firms.

Rollout Product

Many products are unsuccessful because of poor product rollout. Materials need to be sourced, inbound materials positioned, and products manufactured and/or assembled. The market plan is implemented, the sales force is trained on the new product offering, and the promotion plan is executed. Inventory is deployed using methodologies developed through the transportation plan. It is important that all of the other processes are involved in planning

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and executing the product rollout.

In the early 1990s, Coca-Cola developed Fruitopia and Powerade which were juice-based, non-carbonated products. The group responsible for the rollout did not adequately consider the manufacturing and sales requirements for pasteurized beverages. With the majority of their other products, the bottlers would buy concentrate, use a cold-fill process, and distribute the product to stores and restaurants. For juice-based products that required pasteurization, new equipment was needed that the bottling network was not ready to purchase themselves. So, the burden of producing bottled finished product was shifted back to a group that was unfamiliar with rolling out products that did not move in tank trucks. Because they did not anticipate the complexity involved, it took longer than to establish Fruitopia and Powerade as strong brands. After rethinking the rollout process, they were able to successfully relaunch the brands.

A successful rollout can enhance the impact that a new product has in the marketplace. Having the right amount of product available at the right time in the right place are key elements of product success. No matter how much potential a new product has, if it is not moved to market efficiently and effectively, it is likely that the product development process will not be successful.

Measure Process Performance

In the final sub-process, performance is measured using the metrics developed at the strategic level, and communicated to the appropriate individual both within the organization and across the supply chain. Communications with other members of the supply chain are coordinated through the customer relationship management and supplier relationship management processes.

Tracking new product performance is important at Moen Incorporated which has established three distinct product groups: core products, custom products and new products. Moen requires a 95% fill rate for three consecutive months in order to move new products into the core product category.

Research Opportunities

This article builds on work previously supported by The Global Supply Chain Forum

in which the eight supply chain processes were described. While this paper provides a more detailed explanation of the product development and commercialization process, there are still several research opportunities remaining. These include:

- Measuring the impact of product development and commercialization initiatives on cost and customer service levels throughout the supply chain.
- Determining the costs and benefits to the supply chain derived from improved product development and commercialization.
- Identifying the information technology and types of systems that are needed to fully support product development and commercialization.
- Developing metrics that can be used to evaluate product development and commercialization performance beyond the borders of the firm.

Conclusions

Product development and commercialization is one of the eight supply chain management processes that transcend the boundaries of the firm. Effectively implementing product development and commercialization can reduce a firm's costs, increase revenues and positively impact Economic Value Added (EVA). The need for managers to implement product development and commercialization across the supply chain is increasingly necessary for business success and value creation. By tapping into the knowledge and skills of other supply chain members, a firm can expand its information resources and gain access to ideas for product development or increased development efficiency.

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