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THE NEW PRODUCT INTRODUCTION PROCESS AS A MANAGERIAL ACTIVITY

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Abstract — in the paper key recommendations for success of new product introduction are considered. The phase gate system of the new product introduction process is considered. It is justified that phase gate system keeps management apprised of the project progress and assures all activities.

Key Terms — new product, new product introduction, phase gate system, feasibility, validity.

New product introduction (NPI) and new product development (NPD) are often referred to in the same way or confused by many. Both are required to get products to market, but each focuses on different aspects of the product realization process.

This problem is not new for a science and was assessed by many foreign authors, such as R. G. Cooper, S. J. Edgett, E. J. Kleinschmidt, C. M. Crawford, K. B. Kahn, P. G. Smith, D. G. Reinertsen, as well as some Ukrainian scholars, such as T. P. Blyznyuk, A. V. Kotlyk, T. I. Lepeyko, I. A. Gruzina and others.

The goal of this paper is provide a brief insight about the new product introduction process.

Product design is cross-functional, knowledge-intensive work that has become increasingly important in today's fast-paced, globally competitive environment. It is a key strategic activity in many firms because new products contribute significantly to sales revenue. When firms are able to develop distinctive products, they have opportunities to command premium pricing. Product design is a critical factor in organizational success because it sets the characteristics, features, and performance of the service or good that

consumers demand [1]. The objective of product design is to create a good or service with excellent functional utility and sales appeal at an acceptable cost and within a reasonable time. The product should be produced using high-quality, low-cost materials and methods. It should be produced on equipment that is or will be available when production begins. The resulting product should be competitive with or better than similar products on the market in terms of quality, appearance, performance, service life, and price.

There are different approaches to differentiating **new product development process**.

Some frameworks, like the fuzzy front end (FFE) approach, define what steps should be followed, but leave it up to the team to decide which order makes most sense for the specific product that is being developed [2]. The five elements of FFE product development are:

identification of design criteria – involves brainstorming possible new products. Once an idea has been identified as a prospective product, a more formal product development strategy can be applied;

idea analysis – involves a closer evaluation of the product concept. Market research and concept studies are undertaken to determine if the idea is feasible or within a relevant business context to the company or to the consumer;

prototyping – involves creating a rapid prototype for a product concept that has been determined to have business relevance and value. Prototyping in this front-end context means a «quick-and-dirty» model is created, rather than the refined product model that will be tested and marketed later on;

concept genesis – involves turning an identified product opportunity into a tangible concept;

product development – involves ensuring the concept has passed muster and has been determined to make business sense and have business value.

Other frameworks, like design thinking, have iterative steps that are designed to be followed in a particular order to promote creativity and collaboration [3]. The five components of design thinking are:

empathize – learn more about the problem from multiple perspectives;

define – identify the scope and true nature of the problem;

ideate – brainstorm solutions to the problem;

prototype – weed out unworkable or impractical solutions;

test – solicit feedback.

The product development process typically consists of several activities that firms employ in the complex process of delivering new products to the market. A process management approach is used to provide a structure for NPD consistency and to enable continuous improvement. Every new product will pass through a series of stages from ideation through design, manufacturing and market introduction. In highly engineered products (aircraft, automotive, machinery) that deals with complexity the NPD process passes through phases, milestones and deliverables management requiring an equally complex organizational system to manage the process. The more complex the product the more complex the NPD process and management system. Complex NPD processes especially in military aircraft projects use an integrated product team approach. The process for managing large sale complex engineering products is much slower (10 plus years) than that deployed for fast moving consumer goods (weeks) [5].

NPD focuses more on early development to finalize the product design and requires a lot of iteration to get the product ready for handoff to operations. NPI overlaps with NPD, but focuses more on getting operations teams and supply chain partners aligned around the final released product design to effectively plan, produce, and ramp to volume production.

While NPI and NPD vary in focus, they are very complementary and require a comprehensive, unified plan to bring product and teams together from concept through volume production.

Three key recommendations for success new product introduction [7]:

1. Control. You need a single unified solution with a single source of truth during the NPI and NPD stages. This ensures that engineering, operations, and supplier partners will leverage the right information at the right time. Part of this control includes maintaining not only the latest release revision of your product record, but historical information should issues arise later. Securing access by each team should be done based on role-based privileges that guarantee teams only see what they need, when they need it. Giving manufacturing teams access to earlier revisions and designs would create confusion, scrap and rework, and costly delays when leveraged incorrectly.

2. Connection. Not only do NPD and NPI processes need to be connected as you progress from early design to production planning, but all related processes should be connected to the product record. This includes engineering changes, project plans and tasks, quality and CAPA records, and training record management for related standard operating procedures. Connecting processes and records ensures visibility and full context to the product record foundation, unlike disconnected tools such as spreadsheets, emails, and other stand-alone documents like MS Word.

3. Collaboration. Once all information, processes, and teams are connected in a single system, you can enable fast collaboration. Collaboration should support formal gated collaboration and approval processes like automated engineering change order reviews that are connected to the product record. In addition, informal collaboration should allow for shared discussion threads in between the spaces of formal collaboration to share insights and potential concerns with the product design. Having a simple, web-based cloud solution enables even the least technical of teams around the world to easily access and collaborate

around the product. Systems should be easy to set up, configure, and use. Having a cloud-based application removes not only infrastructure hurdles, but it provides a simpler and more intuitive way for teams to share information without intensive system training.

Most successful organizations realize the importance of implementing an NPI process. In today's highly competitive market, companies must develop the right product, at the right time and the right cost. Developing and following a robust NPI process can denote the difference between success and failure. Some of the many advantages of New Product Introduction include (but are not limited to) [4]:

faster time to market: with a reduction in development time, the product will reach the consumer and begin generating revenue sooner;

reduced development cost: by incorporating the voice of customer into the early stages of the project, the design team can avoid late design changes, multiple revisions and repeated costly validation testing;

more efficient manufacturing: through the effective use of design for manufacturing and assembly best practices, products are designed with the process in mind;

improved product quality: the NPI process incorporates tools targeted at ensuring the product meets customer needs and the process is capable of producing quality products on a consistent basis.

A new product introduction process can consist of various phases or gates. The phase gate system keeps management apprised of the project progress and assures all activities are completed on time [6]:

1. Define.
2. Feasibility.
3. Develop.
4. Validate.
5. Implement.
6. Evaluate.

New product introduction process is illustrated in fig. 1.

Each phase of the NPI process feed into the next. Many organizations look at the process as having a beginning (Define) and an end (Evaluate). Some variations combine Define

and Feasibility into one phase and Develop and Validate into another.

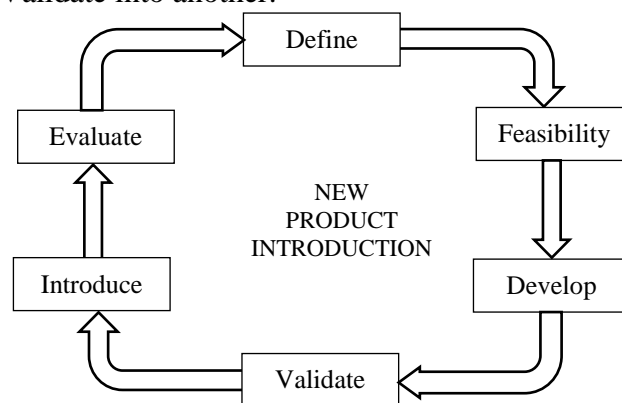


Fig. 1. New product introduction process

All too many companies leave the Evaluate phase out completely, thus losing valuable information for future projects. The fact is, the NPI process is not a straight line. Instead, it is an endless circle or loop. The hardest phase to complete for many organizations is the Evaluate phase. Once the product is on the market, we rush to the next one and then the next, failing to feed lessons learned into subsequent projects.

At each phase of an NPI project, there are inputs and outputs. In addition, there are various requirements, tools, documentation and processes within each phase.

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