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Are Project Management and Project Life Cycles Affected by

MARKETING AND NEW PRODUCT DEVELOPMENT?

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• ABSTRACT •

This study is intended to examine the relationship between marketing and new product development. It also assesses the negative effects and applications that the Marketing and NPD relationship have with regards to Project Management and Project Life Cycles. In order for companies to stay afloat in a technologically changing and increasingly competitive marketplace, they must readily update their products and services to meet customer needs and wants. It is crucial that these companies focus on product development methodologies that measure the success of a marketable project from creating the idea to launching the product in the market.

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1. INTRODUCTION

We live in an evolving and technological changing world that is filled with numerous market challenges. Today, the markets are comprised of a variety of products and services that focus primarily on serving the general populations' changing wants and needs.

It is common knowledge that products and services have a life cycle. As time continues, the market develops, and products and services can become either weak or obsolete. Some products and/ or services are not able to adapt to such a constantly advancing market (Hauser et al., 2007). This inability opens a new channel of opportunities for companies and industries around the world to redesign existing offerings or create brand new ones in order to remain competitive within the marketplace. Product development teams know that new and innovative ideas can, and should, be implemented to remain afloat.

Product development, and as some entrepreneurs say: "new product development (NPD)", relies on processes that incorporate designing, creating, and marketing products. Products and services ought to satisfy the targeted segments' needs and wants so they can enter the preferred marketing mix with success. To attain a successful product in today's market, product development methodologies must be observed from idea generation to product launch in order to maintain the notion of a marketable product. In addition, Marketing is crucial to make a product different among all others in the same niche.

The purpose of this research paper is to examine the relationship between marketing and new product development and to assess the negative effects and/or applications that Marketing and NPD relationship have in Project Management and Project Life Cycle

--- 1.1. Research Question ---

The research seeks to address the following question:

> *How are Project Management and Project Life Cycles affected by Marketing and New Product Development?*

--- 1.2. Research Contribution ---

This paper uniquely identifies the relationship between marketing and new product development. Furthermore, there are novelties in the discussed negative effects and applications that the marketing and new product development relationship have on project management and general project life cycles. It is discussed in depth, and is concluded, that the new product development has minimal impact on project management and the project life cycle. The research will explain and present novelty in the aspect that new product development cannot positively influence project management. The primary reason attributing to this novelty is that project management does not possess any characteristics pertaining to innovation.

The organization of the paper is as follows: section 2 presents the most recent studies and literature related to the topics examined in this paper. Section 3 outlines the methodology executed in order to identify the relevant literature for this study; this section is used to present the necessary background information and definitions that are needed in order to effectively understand the research explored in this study. Section 4 is used to present the specific findings from the research study, and section 5 outlines the discussion and takeaways of this study. Finally, Section 6 completes the paper by summarizing the findings alongside concluding remarks.

2. LITERATURE REVIEW

Existing research exists into this field, as outlined below.

Banerjee and Soberman (2013) performed a study which provides an understanding of a firms' product development capability (PDC) and how it affects the launch strategy for a durable product from a consumer's perspective. Their findings suggest that customers have several ways of thinking, which ultimately affects PDC. When customers are myopic and quality is observed, organizations use price skimming and restrict first generation sales for consumers with high WTP. The authors suggest this phenomenon mitigates the "Coase problem" that is created by customers thinking ahead.

Bausan et al. (2016) explored new product development projects and propose a new team-based labor assignment methodology from an organizational perspective. The

methodology proposed utilizes the hierarchical method, focusing on project value stream while aiming to decrease lead-time via waste reduction. Furthermore, the authors evaluate the methodology through real-life case study, using discrete event simulation. Findings present evidence of the effect teams have on new product development lead-time performance.

Calantone et al. (2002) explored relationships characterizing marketing-manufacturing interface in new product development (NPD). The authors specifically examine the following areas: marketing's knowledge of manufacturing, manufacturing's evaluation of communication, marketing-manufacturing integration, and marketing-manufacturing relationship. Findings suggest a strong and positive link between knowledge and integration in low uncertainty cases. On the other hand, the link is not as strong with respect to the rate of new product introduction.

Chaudhuri and Boer (2016) performed a study which tests the mediating effect of collaborative competence on the relationships between new product development (NPD) order winners and product process complexity, and NPD performance. After analyzing 343 manufacturing plants in Asia, author's findings suggest NPD order winners and product process complexity directly affect NPD performance.

Ernst et al. (2010) performed a study which examines the effect of cross-sectional cooperation among sales, marketing, and R&D on new product development (NPD). Through the evaluation of 424 sales, marketing, and R&D managers as well as project leaders, results indicated that a positive correlation exists between the respective cross sectional areas and NPD. In addition, the NPD performance caries across stages of the NPD process. Lastly, authors found Sales-R&D cooperation is important in the concept development stage but has less impact on the implementation stage.

Gonzalez-Zapatero et al. (2016) performed a study to stress the need for integration between purchasing and marketing functions. Through the use of different integration mechanisms, the authors tested 141 Spanish Industrial Companies to determine if a mechanism proved to be more effective. Although results indicated a level of effectiveness, these failed to be consistent based on the various mechanisms used. Therefore, authors concluded that, the selection of the appropriate purchasing and marketing integration is critical.

Homburg et al. (2016) explored the effectiveness of R&D –marketing when compared to R&D-sales for new-product development under different market and organizational circumstances in business-to-business settings. Through the use of dyadic data across 230 industrial firms, authors showed a significant variance between both areas. The variance was dependent on the velocity of the marketing environment, company strategy, and R&D characteristics. Data results may assist with R&D selection within an organization to maximize innovation success.

Kwong et al. (2009) performed a study, which used a methodology to generate higher customer satisfaction. The methodology used, neuro-fuzzy approach, in contrast to current customer satisfaction models; allowed non-linear and explicit customer satisfaction models opposed to the current methods. Authors used a statistical regression data as a benchmark, to determine the effectiveness of the approach. Results indicated that the neuro-fuzzy approach outperformed the statistical regression method.

Kwong et al. (2016) performed a study, which uses artificial intelligence (AI) based methodology for the purposes simultaneously integrating affective design, engineering, and marketing when defining design specification of new products. The authors suggest, failure to analyzing these three areas separately and in the early design stage of a product, create sub-optimal and sub-standard design.

La Rocca et al (2016) performed a study, which proposes a comprehensive model for customer involvement in new product design (NPD) within business-to-business markets (B2B). The model was created in three stages. First, the development of the customer involvement concept through interaction at two stages; customer and supplier organization. Second, suggesting new iterative product design through various parallel sub-processes. Third, demonstrating the central role the sales function plays in interfacing the suppliers and customer organization.

Lockrey (2015) performed a study, which identified the key aspects of the life cycle marketing strategy for the purposes of providing life cycle understanding and the extent of issues facing companies/markets using such strategy. The author analyzes life cycle marketing in the context of new product development in order to provide an understanding of where it fits with the organization. In addition, the who and what questions are answered to determine the strategy driving factors. Lastly the study contributes propositions for further organizational based research.

Mu (2015) performed a study, which proposed a mediated moderation model which links; marketing capability within organizational adaptation exploitation and exploration, organizational structural factors, and new product development (NPD) performance (from an outside-in perspective). Model testing in the USA and China suggest that; a positive correlation existed between marketing capability and the subsequent areas studied.

Najafi-Tavani et al. (2016) performed a study which introduces the cross effects of market orientation and marketing capabilities on a firms' new product development (NPD) performance. Authors introduced absorptive capacity (AC) as a moderator of the relationship among market orientation and marketing capability. Results of examination across 188 manufacturing firms in Sweden indicate a positive relationship between the three areas. In additions, authors suggest the use of AC as a competitive factor with the complementary market orientation and marketing capability.

Sale et al. (2017) performed a study, which examined the integration of new product development (NPD), marketing, and operations within a business enterprise. The study introduces a model, which integrates and builds upon the dynamic Bass model for new product diffusion and the Wagner and Whitin dynamic lot-sizing model in operations management. The introduced model simultaneously determines the optimal timing for introducing a new product, pricing, production timing, and produced quantities. Findings suggest larger profits and faster pace of new product introduction are associated with dater diffusion, lower price elasticity, and costly consumer products.

Sharma et al. (2016) performed a study, which investigated Small and Medium Enterprises (SMEs) and Multinational Companies (MNCs). Specifically, the product innovation influences R&D expenditure, brand equity, and marketing performance. By combining signaling theory and dynamic marketing capabilities authors concluded that; MNCs were able to use R&D expenditures to improve product innovation and market share. Although the same could be said for SMEs, the improvement was greater on MNCs. On the other hand, strong brand equity of MNCs may hurt the performance of their new products by inhibiting product innovation.

Wang et al. (2016) presented a case study, which used Design for Six Sigma (DFSS) along with theory of inventive problem-solving (TRIZ) approach for developing a new product. Findings suggest that DFSS with TRIZ can be applied to new product development. In addition, it identifies ~$6million profit.

Whitefoot and Skerlo (2016) studied the environmental impact, decisions on product design and policy-making; have on the life cycle assessment (LCA) of a relevant product. The authors identify four categories of market effects and present a framework to help identify whether these significantly influenced environmental impacts. Findings suggest market effects indeed alter the environmental impact of a product, resulting from a design or policy decision. Furthermore, these effects can provide insight(s) into unforeseen and unintended consequences or benefits.

Wink and Song (2007) performed a study, which examined the influences of marketing-manufacturing integration (MMI) in the four stages of new product development (NPD). Through the analysis of 467 NPD projects, authors, concluded; an increase in MMI within each stage of NPD associates to greater product competitive advantage. In addition, it relates to higher project return on investment (ROI). Results also indicate that the increase in MMI also significantly increases the product commercialization time. On the other hand, little relationship exists between NPD project time and project ROI.

Wu (2011) performed a study, which tests predictions of relationships between global marketing strategy and its relation to market orientation, international experience, and performance in the high tech products context. This, due to the limited knowledge between the respective topics and their importance. Empirical tested predictions of the relationships amongst 172 business units in high tech firms. Results indicated that market orientation, international, experience, and global marketing strategy is the key antecedents of organizational performance.

Finally, Xu et al. (2016) performed a study introducing knowledge fusion taxonomy to understand the relationship among traditional marketing analytics (TMA), big data analytics (BDA), and new product success (NPS). Findings indicate that NPS is not automatic and requires strategic choices to obtain benefits. In addition, NPS requires a great deal of information from stakeholders. Lastly, the increase in markets, technology, regulation, competition, and inputs requires organizations to increase the firm's ability to analyze information. TMA and BDA will provide firms with such ability. Although the costs associated with data collection may be high.

Investigating the literature demonstrates there are numerous studies that focus on customer satisfaction and integration into the project development, specifically pertaining to new product development. A majority of the literature also discusses the importance and effects of integrating new product development into numerous different enterprises and industries. In so doing, one can discern which industries take on the attributes of new product development and marketing better than others. All these researches present value in understanding the effects of the relationship between marketing and new product development on project management and the project life cycle in this study.

3. RESEARCH METHODOLOGY

In order to perform a study on this topic, a systematic literature search (traditional narrative review) was first performed. The traditional narrative review is used to synthesize the primary literature and also explore potential heterogeneity within it descriptively. In this particular study, the traditional narrative review was used to perform the literature review on the current fields of study and identify the potential important pieces of literature.

The traditional narrative review was searched for pieces of literature based on a 20-year window. Based on previous research into this field of study, the following online databases were used to obtain literature:

- EBSCO Host
- Elsevier's Scirus
- Academy of Management
- Google Scholar
- Intute: Social Sciences
- PROQUEST
- Proquest Digital Thesis
- Blackwell Publishing
- Networked Digital Library of Theses & Dissertations
- FirstSearch
- Emerald Full Text Database
- Academy of Management Perspectives
- Executive Development
- Journal of Management
- The Sociological Review

To run the queries within the online databases, keywords and phrases were explored (note: no filters were used and all combinations of these keywords and phrases were considered). Executing all of these searches returned a total of 60 pieces of literatures (N = 60). To filter out this large swath of literature, a meta-analysis was performed on this dataset to filter out and to identify the critical pieces of literature as well as identify potential gaps in the literature, which could be filled from this study. Meta-analysis is a technique to go more in-depth into research of previous literature; it is a systematic method of combining relevant quantitative and qualitative study data from different selected studies in order to develop one single conclusion that has a greater statistical power and strength. The conclusion of this meta-analysis is often statistically stronger than then analysis of any single one study since it involves an increased number of subjects/studies, more diversity among studies/subjects, and accumulated effects and results.

From the original pieces of literature and searches, which were based on keywords and phrases, the databases and searches were performed again using the authors' names from the relevant studies identified in the initial searches. Using a search filter further refined this analysis; the main aim of a search filter is to unearth studies and articles of interest from a database. A simple filter for a query consists of single or combined words that are entered into search parameters of a database. Within many search parameters, Boolean algebra can be used to form relationships between words or phrases in order to further refine the output of query requests; the most commonly uses Boolean functions are "AND", "OR" and "NOT" functions.

For the search filter development, two aspects need to be considered and balanced; these are generally referred to as sensitivity and precision (Taylor et al. 2003, Popay et al. 2004, Vaughan, 2004). Sensitivity is the ability of the filter to find all relevant material in the database and precision is its ability to reject irrelevant material. A filter with a high emphasis on sensitivity will tend to include less and irrelevant material where a higher precision will tend to reject some potentially relevant information.

The study investigator's approach for this study was to initially develop a filter with a high level of sensitivity and then make further adjustments towards a desirable level of precision. More specifically, important material search listings obtained from early versions of the filter was closely examined. From there, common and key terms used within this material (and used in relevant cited literature) were incorporated to develop the filters sensitivity along with the wildcarding of some terms. From the precision perspective, examining common categories of irrelevant material returned by the now somewhat more developed filter made the precision adjustment. After some further experimentation, this adjustment was primarily made by changing the structure of the filter, in particular the usage and placement of the AND operators and bracketing of the OR functions. In practice the combination of the specific requirements linked by the AND operator largely

excluded irrelevant material to a workable level.

For this study, the search filter included an "AND" relationship and "OR" (with brackets) that searched for keywords and phrases. The filter developed for this study was then applied to the search parameters of each database utilized in the initial search.

From the literature found from the first set of queries, the reference sections of the identified studies were then examined as well as existing reviews of the literature. In addition, in some ways, the filter results had limited success in finding relevant studies and materials in the wider gray literature. Gray literature is typically considered to any material that is not commercially published and can include: working papers, business documents, government reports, educational reports, institutional reports, dissertations, technical reports, and conference proceedings. In addition, gray material could be found through manual searching, which involved examination of references lists from relevant studies obtained in: searches, qualitative studies, relevant journals or books, and articles. This involved the manual examination of relevant journal indexes. Manual searching also involved general and technically oriented Internet search engines and databases, which are maintained by government or commercial organizations. Some of the search engines included: Google, British Library, US Library of Congress, Yahoo, and National Technical Information Service. As a final measure of robustness, to add in the systematic review of the available and relevant material, based on critical literature obtained, the study also utilized direct correspondence with authors identified from the above processes in order to obtain additional information and studies that be useful for this study.

All in all, the meta-analysis performed in these fields of research helped to reduce the N of 60 relevant studies or pieces of literature to a more condensed and rich sample size of 14 pieces (n=14) of literature (23.3% of the total literature found). The 14 pieces of writing that were honed in on by this meta-analysis served as the basis for performing the subsequent analysis into the research objectives and hypotheses.

4. RESEARCH FINDINGS

--- 4.1. What is marketing? ---

Marketing can be defined as "the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large" (Lilien, 2013). The concept of marketing also includes research about markets and measuring effectiveness and consumer behavior psychology. Therefore, the base of a marketing process is to focus on determining what customer needs and how marketing will add value to them.

Marketing process starts by developing a set of objectives for products or services that will support the overall business goals. Then, the marketing department decides which marketing strategy will make the objectives achievable. The strategy determines how the product will attain the targeted market and how the customers can reach it. Marketing strategies also define a unique positioning for the product or service in the market in order to make it attractive to the targeted audience, but also to stand out from the other competitors.

--- 4.2. What is Product Development? ---

Product development is the process of designing, creating, improving, and marketing products or services to the customers. It focused on developing strategies and methods for guiding all the processes involved in getting a new product to market.

Product development includes either improving an existing product or developing a new one to gain a particular target in the market. This process is a necessity for companies so they can keep up with trends in the marketplace and achieve more future profit and success. The strategy of product development provides for competition among companies that develop products to meet a targeted audience.

4.2.1. Marketing and New Product Development Relationship

The relationship between marketing and new product development exists because marketing approaches and methodologies are the basis in determining the development of new products ("Generating and screening ideas for new products", n.d.). In other words, methods like market research, positioning, and testing of new products are important in order to decide if a product will be accepted by a targeted audience. In addition, to identify gaps in the market or differentiation from similar products, the company must create a comprehensive market research. This link between marketing and new product development is crucial because if a new product does not satisfy market niches and its consumers' needs or wants, the product is most likely to fail, regardless of whether or not it has advanced promotion and marketing efforts.

--- 4.3. What is Project Management? ---

Project Management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements. Research further states that project success is defined as being an on time, on budget, and a high quality product that meets all outlined requirements. Project management incorporates five life cycles processes. They include: initiating, planning, executing, controlling, and closing. These processes act as a foundation for Project Management. Project Management is based on best practices. Its processes focus on fulfilling the scope of a project by applying all knowledge areas (Scope, Cost, Human Resources, Quality, Time, Communication, Stakeholder, Risk, Integration, and Procurement). This is how the organization can achieve all business objectives.

--- 4.4. Difference between Product Life Cycle & Project Life Cycle ---

Although Product Life Cycle and Project Life Cycle sound similar and incorporate sequential phases, they are very different from one another (Booz, n.d). A product life cycle can be depicted as a conceptual map of current and forecasted product's sales. Its stages go from product conception and design to product disposal. In a marketing context, it incorporates all stages of a product's life span as they are related to promotions and sales. What to do with the product is not a concern, other than to create a plan that forges a new product image or stops production altogether. These actions do not take the project life cycle into consideration.

By contrast, a project life cycle tends to be more defined (except for "scope creeps") and is all about action. A project life cycle will provide and manage the needed steps to complete a project according to the predetermined specifications.

Product Life Cycle: It is concerned with the amount of revenue a product generates over time. Cycles do not differ regardless of the type of product. They are sequential cycles that consist of non-overlapping phases.

The five stages of the marketing life cycle include:

- Development – no revenue. Product idea becomes a concept
- Introduction – small sales. Product is introduced to market. Marketing begins here: pricing and branding decisions are made.
- Growth – Product fully introduced and sales are growing. Brand recognition and market share increases here
- Maturity – sales peak at this stage but the market gets saturated. The goal is to maintain market share at this stage
- Decline – sales decline as market shifts to other products. Exit strategies are in the works.

Project Life Cycle: It measures the sequential work that goes into a project from beginning to end. This cycle can differ by industry, organization, and project type.

The phases of the Project Life Cycle include:

- Initiation – Goals are created and resources are assigned
- Planning – Solutions are researched to reach goals. Plans and timelines are in motion to complete project.
- Execution – Follow all planned steps and adjust them as necessary
- Monitoring and Control – tracks if team conforms to the plan, discrepancies, changes, and updates and the plan documents.
- Closure – Final details and deliverables are finalized

OR

- Initiation or Evaluate or analysis
- Design or Strategic Development
- Build or Creative Development
- Test or Final Approval
- Launch and close or Production and Delivery and Close

--- 4.5. Steps for New Product Development ---

The NPD (New Product Development) process – also referred to as the Stage-Gate Innovation Process (Commercialization Strategies, 1998), can be depicted as a structured road map that provides a clear path for a team to follow. It is a complete process that incorporates introducing a new (tangible or intangible) product to the market, understanding its customers' needs/wants (cost, time and quality), competition, and success factors. It is an ongoing testing process that is based on uncertainties and challenges that a new product will succeed. The end result may even result in reinventing the product due to errors and major redesigns issues that are encountered throughout the process.

The NPD process steps can be iterated, eliminated, or concurrent, depending on the company. Similarly, in some industries, NPD can be a proactive, reactive, or ongoing process (continuous developments) (Lundin et al., 1998).

Typically, the NPD process requires marketing and engineering teams. The teams are responsible for all aspects of the project, from generating the initial idea to bringing the product to the market. One of the NPD approaches to analyze and respond to marketing challenges is the 8 step process of Koen, as listed below:

1) Idea generation
2) Idea screening
3) Concept development and testing
4) Business analysis
5) Product Development
6) Beta/Marketability Tests
7) Commercialization
8) Post Launch Review

4.5.1. Idea Generation

Idea generation is the number of creative idea generating techniques used to generate a possible product that can be offered to the market. At the beginning, all ideas can be good to a certain extent. However, there are various approaches that help to generate ideas about starting the marketing of a new product.

Ideas can be generated in many forms, for many reasons, and from many sources. For example:

- Suggestions from target customers: needs and wants
- Basic research using internal and external SWOT analysis (strength, weakness, opportunities, threats) that incorporates current marketing trends to analyze the company's position and direction.
- Group generating ideas/brainstorming/suggestions: employees, salespeople, trade shows, companies spies, competitors, top management, scientists, among others
- Competitor's successes and failures

4.5.2. Idea Screening

New innovations are very competitive; therefore this step is crucial for the decision-making process. During this process step, keep the system LEAN, MEAN, and SCALABLE so to maintain flexibility and develop different scenarios that fit a set criterion (Sephri et al., 2006). Brainstorming about the various scenarios helps decide whether the idea should be continued or not. The purpose of this step is to eliminate unsound concepts before using any resources and to allow only promising ones. This is achieved by screening for:

- Market potential
  - o Target market benefits
  - o Forecasts of target segments and target market
  - o Identification of current and expected competition
  - o Current sales and market trends on similar product
- Product technical feasibility
- ROI (return on investment), costs and ultimately affordability

4.5.3. Concept Development and Testing

This process differs from test marketing. The idea should be a concept with enough elaborated information so consumers can visualize it. This part of the process is where high levels of comprehension (in consumer's terms) about the product come in handy. This is in terms of how knowledgeable the consumer is about the product and how essential and indispensable the product is him. Product image is the focus during this step.

Marketing and engineering details are often developed at this stage. 'Marketing' may start by surveying a number of prospective consumers to evaluate the concept with respect to other products claiming to satisfy the same or similar needs. In other words, this involves determining who is more likely to buy the product and who the competition is.

'Engineering' may prove if the concept is feasible in terms of costs, profits, ROI (return on investment), and customer requirement incorporation gathered by marketing surveys. Alpha testing (a physical prototype is used to be tested internally by engineers and employees) is further contemplated for development (Koen, 2005).

4.5.4. Business Analysis

It is very important to monitor progress during the business analysis step. The product must be assessed to determine whether or not it will be profitable and in high demand. This assessment includes a detailed marketing strategy that incorporates target market, product positioning, and marketing mix (Koen, 2004). Competition and customer feedback from input and output metrics are valuable to estimate selling prices, sales volumes, profitability, and break-even points, etc. This analysis can

be beneficial even if the idea does not launch, because it provides a basis for learning and growth.

4.5.5. Product Development

This step is based upon 'product' approval. A working prototype is created as a response to a product concept. Alpha testing is performed to ensure product quality, readiness, and that the product meets its design criteria (Zaharis et al., 2011). Upon passing alpha testing, the new product will enter the technical and marketing development stage. During this step there are three types of plans:

1. From the production Dept to make the product (Technical implementation). This is where a prototype (beta product) is developed for consumer testing.
2. From the Marketing Dept to distribute the product. Feedback is obtained for further improvement (if needed)
3. Finance Dept to provide the finances to introduce the new product.

4.5.6. Beta/Marketability Tests

During this step, a 'beta' version (a physical prototype or mock-up) of the proposed product is introduced and tested in typical usage situations. It will incorporate private test groups from targeted audiences using the already developed marketing strategies.

This test is required to validate the concept and business analysis. Product improvement (if needed) is based on the feedback from testers in order to come up with a more likeable post-beta product. This step acts as a mechanism to pre-market the product to determine customer acceptance.

Once management is satisfied with the results of consumer's tests and business analysis, marketing must start giving the product not only a brand name and an actual package, but market testing. This includes sales-wave research, simulated test marketing, controlled test marketing, and test markets (Rose, 2013).

4.5.7. Commercialization

Important decisions are made during the commercialization step. The product (post-NPD) is now live and progress is constantly being monitored. Pricing and marketing plans (timing, geography, the niche market, and how to the launch the product) must be finalized to prepare for the final step in the process. Therefore, dynamic and refreshed advertisements/promotions are needed to keep a revived image of the product in the minds of potential and promising consumers.

4.5.8. Post Launch Review

This is a step of continuous improvement of the new product. It also marks the end of introductory price. A market performance review is performed to decide on the product success. During this step, various criteria are analyzed to determine:

- Impact of the new product on entire product portfolio
- New product unit volumes, revenue and profits forecasts
- Correct segregation and targeting
- Better delivery processes.

4. RESEARCH FINDINGS

--- 4.6.1. Roles of Marketing Management in New Product Development ---

Part of successfully launching a new product is finding the people who need the product, educating them about the product, instilling product value, and helping the people purchase it. The role of marketing in NPD is to evaluate and determine price, how the product will be sold, how to find and retain customers, and how market forces will affect product sales each season. The four P's is the best way to define the marketing mix:

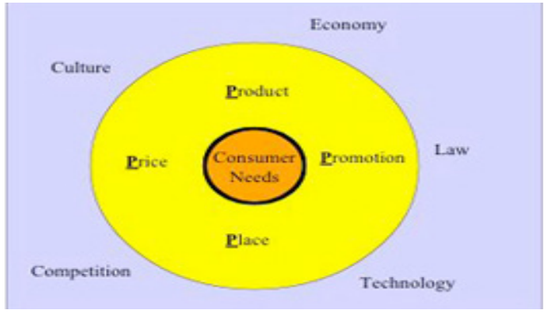

FIGURE 01. The 4 P's of marketing

1) Product
2) Price
3) Place
4) Promotion

5) Customer Service. Although customer service is not part of the traditional four P's, it has become an essential part in the role of marketing in new product development.

1 - Product

It's essential to have a clear understanding of what the product is and what makes it unique from other products before it can be successfully marketed. Most importantly, the understanding that the product is meeting the consumer's needs and wants must be clear. In addition, the product's appearance, function, and support must be addressed, especially since this is what the customer is buying. Therefore, a product that appeals to a targeted market is necessary and important when developing the marketing strategy for a product.

2 - Price

The company's goal and position in the market seems to determine what the right product at the right price may be. Therefore, the pricing approach should reflect an accurate positioning of the product in the market. Pricing methods not only may require being positioned differently based on various price points, but also results in segmented price elasticity (i.e. the degree of responsiveness of the quantity of a service or good to a change in its price).

Some pricing decisions are based on judgment and others based on complex calculation methods. When based on market forces, some pricing methods include mark-up pricing, target-return pricing, competitive, going-rate, and value-based, etc. Other methods include over-time and price adaptations intended to meet demand and supply needs. It is important to point out that prices have an impact on profit margins, supply, demand, and marketing strategies. Pricing may also influence the proceeding P's.

3 - Place

Product determines its distribution (accessibility). For instance, a business that assembles a product can either sell the product directly to consumers or sell them to a third-party. Place acts as distribution channels to get products to a business's customers. The saying: "the right product, at the right price, at the right place, at the right time" is critical for potential customers to turn into actual customers. Therefore, the success of the product launch is also based on where the product is placed and marketed (regional consumer preferences is where the potential buyer has a need for the product).

4 - Promotion

Once the product and price are determined, letting potential customers know what you have for sale is necessary and important. Before releasing a new product, advertising, social media/email/search engine marketing, and promotion of special sales are paramount messages to consumers. These messages educate the consumer on what the product is about, what it can be used for, and why they should buy it. However, this message must be clear, consistent to its image, and targeted to specified segments. Each approach should be well-positioned so that the ROI (return on investment) is maximized.

5 - Customer Service

Relationship management is very important after the product is released in order to sustain future sales. Word of mouth and social media have a major impact on advertising (good and bad) a brand, especially the new ones. Therefore, listening to customers from within different channels enable companies to reinforce products and offer ones that constantly appeal to customers.

--- 4.7. Constraints of Marketing Management in NPD ---

During the marketing of new product development process, many exercises to minimize the rate of failure were completed. There are a large number of constraints that affect this process. They include (Hofstrand, 2007):

A. Market – The amount of product development revenue is not sufficient to gain the required growth of the system. In addition, small market is an issue that causes new product failure. This is primarily the case because the large cost cannot be recovered.

B. Time – The response time of the product development supply chain, to the requirement of the product development markets is too long. This can be risk in achieving an existing commitment to customers. Additionally, it impacts the ability of the product development supply chain to win new business. A long time period requires for developing a new product which introduced after considerable time tag, fails to match the needs and wants of the market.

C. Cost – The high cost of Development and production processes reflect to the new product competitive rate and price.

D. Investment – Investment in the field of development, production, and marketing of new products is risky. Many companies are afraid of new products due to the inability to invest in such a huge fund.

E. Marketing strategy – Failure of company to formulate effective marketing strategies, including product, price, promotion, and place can be a reason for marketing failure for new product development.

--- 4.8. Real World Example ---

There are numerous existing products and services produced every day in the global market. One such product is Idea-Paint board for painting that turns any surface into a dry-erase board.

According to Chan (2010), this product started through brainstorming by a student named Jeff Avallon and his friends. They were in a study room with walls covered in Post-it notes. They thought walls could be collaborative and handy tools if people had the ability to write over them. So, they decided to produce an erasable paint to satisfy this specific want. To have investment and prove the feasibility of the idea, they asked for help from two professors, a college-board member, and a parent. They determined who the target market was, and developed the appropriate marketing strategy to help them produce a paint prototype.

Now, the idea-paint is becoming a popular product that is used in schools, universities, workplaces, and even homes. Jeff and his friends created a website that contains all their products and suppliers. They have further improved

FIGURE 02. Idea-Paint board by Jeff Avallon

and enhanced their product to not only work with walls but also tables and small boards (IdeaPaint, 2016).

5. ANALYSIS AND DISCUSSION

--- 5.1. Is New Product Development a Project? ---

It seems that projects can be considered vehicles for developing new products. New product development is referred to as product development ع. This study shows that NPD is achieved through project processes. This finding is in agreement with Lundin and Sunderholm (1995), who argued that not only organizations are integrating projects into their operations to execute activities but also organizations will undertake different projects depending on new product development.

--- 5.2 How New Product Developments influence Project Management? ---

NPD is concerned with defect-free products, product oriented processes, and product scope. It is intended to achieve customer satisfaction. On the other hand, PM is able to manage more than a line of products and is more concerned with project quality, fulfilling project scope, and achieving business objectives. PM starts before the NPD research phase and continues through the NPD launch phase.

Project Management tools and methodologies applied to NPD can positively impact cost, time, and performance, as well as serve as a guide while the customer's preferences continuously change. Change in customer's preferences requires organizations to expand their products, to improve product quality, to reduce cost, and to improve speed of bringing a new product into the marketplace. Since the focus is on time, cost, and quality, PM is not only good for NPD but it also enables organizations to effectively monitor and evaluate new product developments.

On the other hand, since every new project is different, it incorporates different risk factors that are associated with technologies and the market (from product inception to when then product is introduced into the market). Teams are usually preoccupied with NPD failure at first. For some NPD projects, the new product is targeted to customers who are familiar with the organization image.

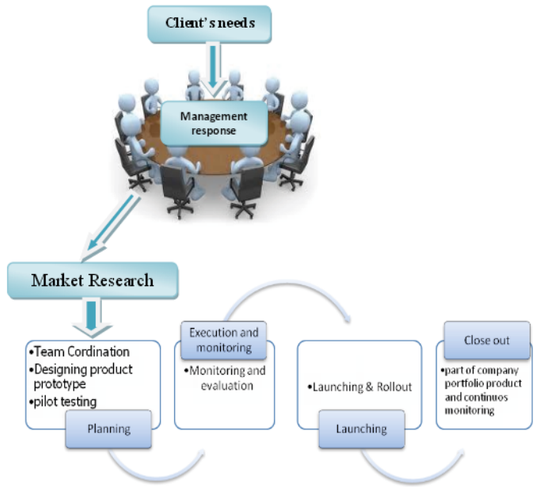

FIGURE 03. Marketing Lifecycle

As a result, their needs are very well understood and for the most part, they do not change rapidly. In these projects, the risk might be of technological nature, which has no impact on Project Management. However, if a new product is entering a new no-well-known market segment where the needs are constantly changing, some PM processes and knowledge areas may be affected. These include scope, quality, time, communication, and risk. Basic knowledge of the product and its intended audience must be defined in Scope. Planning will be disrupted as more is learned about the market. Execution and control will be constantly monitored for new changes. This type of uncertainty (risk) will impact and go beyond the engineering team and incorporate project management processes & knowledge areas, product management, and marketing.

New Product scheduling can be a significant factor early in the project. Dealing with market uncertainties and volatile market environments affects Project Management and new product success. Sometimes, multiple solutions get integrated in order to move faster and narrow the solution space. For instance, multiple types of beta products of the same type can be built, integrated, introduced, and tested at the same time to facilitate solution time reduction. However, solutions screening can become aggressive, thus making it more challenging to pick a concept and stick to it. Moreover, it can add more time to the project process. Finally, market ambiguity can slow down NPD and affect project management.

-- 5.3. What Effect Do New Product Developments Have on Project Life Cycles? --

In a marketing context, all the stages of a product's life span are related to product promotion and sales (Bhuiyan, 2011). They usually begin with initial marketing and finish with the decline in sales. However, 'marketing lifecycle' is traditionally broken down into four stages: introduction, growth, maturity, and decline. Note that the introduction stage encompasses everything that relates to Product Development. This includes design, creation, testing, and initial marketing of a new product. Moreover, the steps of NPD have a tremendous correlation to project's life cycle in such a way outlined below:

- Idea Generation and Idea Screening relate to the Initiation process.
- Concept Development & testing and Business Analysis relate to the Planning process.
- Product Development relates to the Executing process.
- Beta/Marketability Tests and Commercialization relate to Monitoring and controlling processes where processes (steps) are monitored and reflect feedback from customers and product adjustments to satisfy customers' needs for the success of the project.
- Post Launch Review relates to the Closing process. It includes customer's feedbacks and acceptance of the new product. During this step, validation and final design take place.

5.4. Can Marketing and NPD Be Used in a Project Environment?

Each project is unique as they have specially designed deliverables. Deliverables can either be used as a new product development or portrayed as products or services. Product/services require marketing strategies for a project to succeed (Nisula, 2012). The project manager ought to use marketing methods and tools, listed above in this paper, to launch the new product into the market. In addition, marketing and NPD can use the planning phase in the beginning. There are many consulting organizations that offer services to produce a project plan for different types of projects. As a result, those organizations get the benefit of marketing their services and the benefit of increasing the rate of their product development.

5.5. Project Manager and Economic Planning View Recommendations

1. Get involved in social media platforms. This can help the project manager better understand the needs of the market and consumer expectations.
2. Use marketing campaigns efficiently to build an economic feasibility for the product.
3. Apply quality criteria that are customized to targeted markets.
4. Build a risk plan that encompasses the strategies of the unexpected positive and negative risks that may occur.
5. Provide an alternative marketing plan strategy in case the main methods do not achieve the planed benefits and intended goal.
6. Identify the customer's feedback and respond effectively to their needs.
7. Use the advantages of using the 4-P's marketing strategy to gain the range income of the product sales.

6. CONCLUSION

The following conclusion was drawn: project management methods and structured tools are useful to manage some areas (but not all) of NPD projects and needs. However, new product development only utilizes some basic Project Management tools to help manage products. Because complex activities and much uncertainty characterize NPD, multiple solution paths are attributed to NPD that tend to cloud the full scope of a product.

While NPD focuses on cost and income (from product sales) to determine marketing decisions, Project Management focuses primarily on cost related to a project (a line of products). Communication (customer feedback and its applications) and human resource management (engineering teams, product and project managers, other employees, targeted market) seem to be important factors in determining the success of New Product Development.

Based on this study, we determined that new product development has little impact on project management and project life cycle. Whereas new product development is engaged in dynamic and innovative processes, project management exhibits already defined methodologies, techniques, skills, and tools. Because project management does not possess any characteristic for innovation, New Product Development cannot positively influence on Project Management. ◆

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