

SUCCESS FACTORS OF NEW PRODUCT DEVELOPMENT PROCESSES

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Abstract:

Developing new products is difficult but vital for organizations to succeed. This paper examines the critical factors of new product development and the influence of each of these factors on product development outcomes. This investigation involved a literature search and the findings are presented as a matrix of citations that identifies which of the product development components of product performance, speed, and development costs is enhanced by the key success factors of cross-functional teams, upper-management support, and a supportive organizational structure. Findings indicate that all three key success factors are necessary for a successful product development process and may not be used cafeteria style where a firm selects which to apply to projects. This is the first research to suggest that sponsors of project development teams must give each of the process key success factors a high priority to improve the probability of a successful product development effort.

Key Words: Product Development, Project Management

1. INTRODUCTION

Launching new products is an essential attribute of successful businesses as they survive and grow [1][2]. The ability to develop these new products to compete in existing or new markets is a core competency of many successful firms [3]. It is important for the survival of these firms to understand which factors affect the components of successful product development processes.

In early studies of product development, research focused on the product to be developed rather than the process of product development. By the 1970's, the focus expanded to include the study of the process of new product development [4]. Product development efforts are typically organized as projects and managed by the classical triad of project components; product performance, schedule, and cost. In the context of product development, these project components are often termed product performance, speed to market, and development cost. These three components are each influenced by the product development process.

There have been a number of studies to suggest the key success factors used in the process of successful product development include the use of cross-functional teams, support of upper-management, and support of the organizational structure [5][6][7][8]. Lacking from this analysis is the understanding of which key success factors contribute to which of the specific product development components of product performance, speed, and cost. A better understanding of this relationship would aid managers to focus their efforts by supporting product development with the most essential key factors to optimize the product development components that have the highest priority, whether it is product performance, speed to market, or development cost.

2. REVIEW OF THE LITERATURE

The literature review is organized into three sections. The first section examines the measurements that define a successful product development. The second section reviews the literature that analyzes the key success factors that result in a successful product

development process. The third section examines the affect these key success factors have on measurements of product development success.

2.1 Measurements of new product development

Measurement of new product development is not consistent throughout the literature but most variations of measurement focus on product performance, development time, and the cost of development [9]. Successful new products in the service industry can be more difficult to measure than manufacturing products but may use the same measurement categories [10].

Product performance may be defined as the product performing to its specification [9]. Quality may be analyzed as a separate measure [3] but it is common to assume that products meeting specification are quality products and meet the needs of the customer. Product specifications are typically created by marketing and used by the development team to determine the features of the product being offered [9]. Product specifications usually include the features of a product and its target market and cost. Marketing is tasked with determining the product performance requirements and it is the development team's charter to meet those specifications. While determining customers' needs is critical to a successful product development, the scope of this review is limited to the product development team and so will consider the process of developing the product after receiving the specification from marketing.

Speed of development time is important for company survival [6][3]. Firms focus on gaining competitive advantage by developing products in short time periods [11][12]. Rapid product development allows a company to react quickly to changes in the competitive environment and has been identified as an attribute of successful firms [1]. By developing products faster, companies not only bring them to market quicker, but they can launch additional products with the same level of resources [11].

The cost of project teams to develop new products is mission critical to the success of a firm [11]. It does more than affect the bottom line; it can be linked with the number of projects a company can develop with limited resources. A company that spends fewer resources than competitors on new product development may choose to do additional development or use the saved money for other competitive advantages. The results of reduced development cost on the firm may only marginally improve the bottom line; it is the ability to seize market opportunities that presents the biggest opportunity.

2.2 Key success factors of new product development

Researchers have concluded there are many critical components of new product development but the most common organizational traits found in firms with a successful new product introduction process are the use of cross-functional teams, management support, and a supportive organizational structure. Each of these facets will be examined in greater detail.

The multi-functional co-operative approach using cross-functional teams has been reported as the most important factor in improving development processes [5]. Cross-functional teams are widely used throughout industry to resolve complex issues such as the challenges of new product development [13][9]. These teams are often the only means of developing complex products. Cross-functional teams are more difficult to manage but their combination of differing skills allows them to solve intricate problems [11]. Communication both within the cross-functional team and between the team and the outside organization is a critical issue that must be resolved to enable superior team performance [14].

Senior management commitment has also been identified as an important ingredient to a successful new product development [4][7][14]. Further research determined management support improves project team performance reducing the duration to make key decisions while the team receives key political, emotional, and financial support [12]. Management planning and reviews ensure that human and financial resources are available and set the

The concept tested was that a new product development process may be broken down to its specific components of product performance, speed to market and development cost and these components are individually affected by the key success factors of cross-functional teams, management support, and supportive organizational structure. The current literature of product development was reviewed for evidence of these relationships.

3. RESULTS

The results of the literature review are compiled in Table I. Articles supporting the link of specific key success factors to individual product development components are listed. Each of the individual product development components; product performance, speed, and development cost, is examined to determine if there is evidence that each of the key success factors of cross-functional teams, management support, and a supportive organizational structure are important to its success.

3.1 Product performance

Researchers identified that cross-functional teams improve the performance of a product due to enhanced problem solving skills [17][11]. Many problems are too complex for one discipline to resolve. By the application of various skills, these teams were able to significantly improve product performance. The combination of differing skills of cross-functional teams has been demonstrated to yield better products with reduced resources [9].

Investigators determined management support communicated a clear vision of team objectives while simultaneously giving team members the freedom to pursue that vision resulting in improved product team performance [18]. Senior managers may use control through the project leader or with direct influence. These managers help project leaders gain resources while increasing the respect the leader receives from the team. The product vision from senior managers aids in problem solving for the team. Research found this vision and direction for the team is especially critical in the development of high-tech products [17]. Close monitoring of project status by senior managers demonstrates the importance of a product under development to both team members and others in the organization [13]. This close monitoring also helps the team gain cooperation from others in their organization while increasing risk-taking and innovation.

Supportive organizational structure for product development has a number of influences that have a positive effect on team success [13]. Organizational structure, particularly a deliberate development process, is vital to the success of product development. This purposeful, formalized development process increases project planning and success. An organizational structure that improves communication both internal and external to the team is critical [18]. Furthermore, an organizational structure based on the concepts of Just-In-Time may significantly improve product performance, including 61% better quality [3].

Table I: Results of literature review.

Product Development Component	Key Success Factor	Article
Product Performance	Cross-Functional Teams	Griffin (1997) Lynn & Akgun (2003) Ulrich & Eppinger (2000)
	Management Support	Hayes, Clark & Lorenz (1985) Lynn & Akgun (2003) Sethi, Smith & Park (2001)
	Supportive Organizational Structure	Hayes, Clark & Lorenz (1985) Meybodi (2003) Sethi, Smith & Park (2001)
Speed	Cross-Functional Teams	Griffin (1997) Lynn & Akgun (2003) Ulrich & Eppinger (2000) Zahra & Ellor (1993)
	Management Support	Cooper & Kleinschmidt (1995) Cooper & Slagmulder (1997) Hart & Service (1993) Hayes, Clark & Lorenz (1985) Lynn & Akgun (2003) Sethi, Smith & Park (2001) Zahra & Ellor (1993)
	Supportive Organizational Structure	Griffin (1997) Hayes, Clark & Lorenz (1985) Lynn & Akgun (2003)
Development Costs	Cross-Functional Teams	Likert (1975) Ulrich & Eppinger (2000)
	Management Support	Cooper & Kleinschmidt (1995)
	Supportive Organizational Structure	Hayes, Clark & Lorenz (1985) Meybodi (2003)

3.2 Speed to market

The link between cross-functional product development teams and the speed of product development has been repeatedly demonstrated [11][17][12]. These diverse teams act concurrently and require less time than the previous development method of functional groups operating in a linear approach. By project teams working simultaneously, product design is shorted by reducing project errors and rework [9]. Empirical evidence supports using cross-functional teams to reduce product development time and the more unique or complex the product, the bigger the savings from using cross-functional teams [11].

Management support has been empirically demonstrated to improve the performance of cross-functional teams and therefore improving speed to market in addition to improving cooperation from other resources within the organization [5][13][12]. Additionally, this support reduces the time to make decisions to keep teams on schedule [12]. A clearly defined management vision for a project improves the focus of the project team toward their goals [17].

Top management support is important to secure resources, both personnel and financial, for the prompt completion of a development effort [20]. Executive champions help to acquire human and capital resources. Furthermore, they stimulate communication and cooperation between different functional groups which helps reduce cycle time [18][19].

Internal organization structure is critical to supporting cross-functional teams, making it important in minimizing speed to market. Speed depends on the internal organization, including carefully planned predevelopment activities [18][11]. Additionally, the increased communication of a proper organizational structure improves project speed [17]. Empirical evidence indicates that formal product development processes improve an organization's ability to manage interactions and interfaces and increases the probability of on-time project completion. As products grow more complex, organizational interfaces become exponentially more complex and the need for a formal process significantly increases [11].

3.3 Development costs

Cost to develop new products is referenced far less in the literature than product performance or speed of development. The rewards for getting to market with the first and best product overshadow excessive cost. High development cost may be passed on to customers in high technology markets if the product has enough superior performance to warrant the additional price [21].

There is more literature studying the cost of the products developed than the development costs. Measurements indicate that 89% of product costs are designed into the product during development [19]. Additionally, the use of JIT principles during product development resulted in 38% less manufacturing cost [3]. The manufacturing costs of most products outweigh the development cost resulting in less study of those development costs. However, a productive process yields lower project costs [18]. Therefore, it may be inferred that a supportive organizational structure, particularly an efficient formal product development process, will yield lower development costs. Furthermore, teams with management support have more productive product development efforts [20]. Studies of cross-functional teams tend to focus on speed and product performance but other research has found the use of cross-functional teams also resulted in lower development costs [22][9].

4. CONCLUSIONS

This paper investigated linking the key success factors of the product development process, such as cross-functional teams, management support, and a supportive organizational structure, to the product development components of new product development such as product performance, speed and development costs. Much of the research on product development processes focuses on determining the key success factors of successful new product development processes and not the specific individual project metrics, such as performance, speed, and costs. However, the author was able to find evidence in the literature that the three key success factors each had a part in improving the individual components of product development. These findings indicate that all three key success factors are necessary for a successful product development process and may not be used cafeteria style where a firm may select which to apply to projects. Sponsors of project development teams must give this a high priority to improve their probability of a successful product development effort.

The primary key success factor of the development process that has been reviewed in previous literature is the use of cross-functional teams. This review has shown there is

limited research into the influence of cross-functional teams on product performance or the cost of product development but there has been extensive study into the speed of product development which has been demonstrated as aiding competitive advantage and is critical to the success to many companies. As a measure of successful product development, cost of development is viewed as much less significant as the advantage gained by rapid product development.

The study of firm level variables such as a supportive organization provides only limited explanation of project outcomes [13]. The same organizational structure may be used on all product development efforts with widely varying results but different projects have varying levels of senior management support and that has a consequence on team member performance and innovativeness, which is reflected in the level of success of the project.

4.1 Future research

There is an opportunity for future study to examine these relationships. These relationships may seem obvious but industry is still coupled with product development processes that are vital for company success but fail nearly 50 percent of the attempts. Researchers note a better understanding of the linkages within the product development model would be useful [18]. An opportunity to learn more about the components of new product development and their influence on several of the measures of new product success may improve our understanding of the vital process of new product development.

Other researchers support the need to improve our understanding of how the influence of senior managers affects product development results [18]. This research demonstrates management support as a vital factor in all components of the development process indicating a better understand of senior management support might improve the performance of future product development efforts.

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