

THE FITNESS BETWEEN TECHNOLOGICAL AND MARKETING STRATEGY

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ABSTRACT

Consistency between technological and marketing approach to NPD (new product development) is accomplished through adequate information processing: efficient information gathering, establishing information flow among project members, and sharing information. Keeping conflict appropriate level, participation of suppliers, definite strategic direction, and collocation of project members contribute to making a favorable information environment to NPD in an organization.

1. INTRODUCTION

Product integrity has a powerful factor to enhance product development performance (Clark and Fujimoto, 1990). Clark and Fujimoto categorizes it into internal and external integrity and proves that a heavy weight product manager is a main role to accomplish both simultaneously. They define internal integrity as the consistency between product's function and its structure and external integrity as the consistency between a product's performance and customers' expectations. However, determinant factor except a heavy weight product manager has not been suggested to contribute to product integrity since their literature, though product gets to be complicate by technological advance and a firm needs the factor more than before.

Existing literature have discussed the solutions from different viewpoints about this problem. For example, conflicts between marketing and R&D have been discussed since 1960s (Berenson, 1968; Weinrauch and Anderson, 1982; Gupta, Raj, and Wilemon, 1986), and the subject has been a main topic to some researchers even since 1990s (Dougherty, 1992; Griffin and Hauser, 1996; Menon, Jaworski, and Kohli, 1997 etc.). Their different language, orientation to market, and time span for performance have made them hard to get along with (Dougherty, 1992; Griffin and Hauser, 1992; Griffin

and Hauser, 1996 etc.). In other words, gap between their ways to acquire and recognize information causes the separation. The objective of this study is to review literature issued after Clark and Fujimoto's contribution with focus on information processing in NPD project, and to make propositions about factors contributing to the fitness between technological and marketing strategy as the first step.

2. THE FITNESS BETWEEN TECHNOLOGICAL AND MARKETING STRATEGY

What drives technological or marketing strategy? Customer demand, financial constraint, accumulated technological capabilities, and a result of quantitative marketing research, influence management's decision making about technological and marketing strategy. Their fitness in this study means that integrity among customer demand, marketing appeal, and product performance is consistent about a product. Firms have tried to resolved exaggerated or insufficient appeal in marketing communication, engineers' belief that high performed technologies are supported in a market, and misunderstanding of customer demand. This study reviews literature about approaches to correct these gaps with a focus on NPD project. Organizational efforts to gather technological and market information efficiently, to establish routes of information exchange among project members, and to promote interaction among project members enable product manager to enhance consistency in activities for NPD. In addition to this, controlling overflow information becomes also another key to accomplish the fitness between technological and marketing strategy.

3. EFFICIENT INFORMATION GATHERING

Development of information technology enables a firm to gather information much easier than before. However, a flood of information must be filtered in an organization, and making information gathering efficient is new issue to NPD project. Conflict among project members and reliable information through long term relationship contribute as the filter.

3-1. CONFLICT

Conflict among project members is caused by different orientation and objective (Coffey, Athos, and Reynolds, 1975; Griffin and Hauser 1996), original technical words in each department (Galbraith, 1973; March and Simon, 1958), and time span for performance (Gupta, Raj, and Wilemon 1986). Also, Atuahene-Gima and Evangelist (2000) suggest that subjective and objective evaluation about project performance is different between R&D and marketing. Their analysis discloses that each function's members regard themselves as contributing more to project performance. In the sample

projects, members have frequent interaction with each other, and they seem to recognize each other's importance to accomplish projects. As a reason why each function's members put a high on their own contribution despite recognizing the other's importance, the authors suggest that negative evaluation about each other may be caused by competition for power.

Moreover, Bond and Houston (2003) suggest three barriers of matching technologies to market opportunities: technology and market barriers, strategy and structure barriers, and social and cultural barriers. Technology and market barriers are whether a technology can satisfy market needs at a profit, strategy and structure barriers are whether an organization has a capability and structure to deploy a technology to satisfy market needs, and social and cultural barriers are difficulty of communication, culture, and language to match a technology to market needs. These barriers let integration of technological and marketing strategy tough.

On the other hand, Sherman, Berkowitz, and Souder (2005) show that there is interaction between knowledge management and R&D-marketing linkage. They suggest that realization of effective information flow is not sufficient condition to attain high performance, and hypothesize that integration with past projects knowledge enhances NPD performance. Knowledge management is defined as acquiring, disseminating, and utilizing information, which are concepts emphasized in organizational learning. Whether R&D-marketing linkage functions effectively depends on that an organization manages to record, retrieve, and review information brought by past project. The sample is composed of 466 projects from 248 firms. The industries are telecommunication, computer hardware and software, instrument and industrial machinery, specialty chemicals, biotechnology and pharmaceuticals, and others. The result shows the following relationship between three ways of handling information and NPD performance. Recording influences technological core competency fit, a criterion about a fit between R&D skills and the needs of projects, and product prototype development proficiency, and retrieving influences product prototype development proficiency. Reviewing doesn't influence R&D and market linkage. Therefore, utilization of past knowledge contributes to efficient information gathering.

In addition, Rein (2004) defines three processes in which firms should realize synergy between R&D and marketing with a focus on a manufacturer providing office equipment and solutions. The process is that firstly R&D and marketing members need to collaborate in clarification of the market requirements. Second, they must work together to develop a technical strategy for the market requirements. Finally, they have to transmit the value of a firm's product to a market. To enhance their synergy in these processes, which is realized by frequent opportunity for marketing and technical experts to communicate, contributes to enhancing performance (Rein, 2004).

While conflict becomes obstacles to integration among departments, it functions to monitor other department's strategy. When past success and blind belief let engineers and marketers not

causing conflict, they are not able to find fatal mistake and to overlook valuable information (Souder, 1988). Souder also describes that R&D and marketing need to exchange expertise information particularly with a complicate product or uncertain customer needs.

Proposition 1: Sharing past projects knowledge, system to recognize others' contribution to performance, and keeping a good balance of conflict between R&D and marketing enables efficient information processing.

3-2. EXTERNAL COOPERATORS

Integration between engineers and marketers is sometimes strengthened by external cooperators such as suppliers and customers. For example, Fang (2008) classifies the benefits brought about by customer participation into information resource (CPI) and codeveloper (CPC). CPI is defined as the extent to which OEM shares downstream customers' information with manufacturers during NPD process, and CPC is defined as the extent to which OEM is involved in the development task. The dependent variables are new product speed to market and product innovativeness. CPI has a positive effect on innovativeness, and high connectivity with downstream customer accelerates speed to market. CPC accelerates speed to market but deteriorates innovativeness.

Intensive competitiveness and complexity of product caused by technological advance promote to build long relationship with suppliers rather than exploiting spot transaction (Millson, Raj, and Wilemon, 1992). Particularly in research on high tech industries, firms suffering for scarce resources and volatile environment demand strong and long term relationship, which provides flexibility in deal and contributes to shortening NPD process (Gupta and Souder, 1998). Eisenhardt and Tabrizi (1995) also suggest with a focus on computer industry that early stage of NPD process is highly uncertain and hard to select an appropriate supplier. Both customers and suppliers can contribute to enhancing NPD performance only through building reliable relationship, which provide project members with selective information.

Proposition 2: Long term relationship with external cooperators in volatile market enhances the efficiency to gather information in NPD projects.

4. ESTABLISHING INFORMATION FLOW

Integration between R&D and marketing has been suggested to be inevitable to enhance NPD performance. Cross functional team with members from both functions is quite reasonable for NPD project. For example, Troy, Hirunyawipada, and Paswan (2008) shows that a combination of cross-

functional integration with some other variables explains performance better than only integration does by meta-analysis for relevant studies. Their hypotheses describe twelve conditions under which a relationship between cross-functional integration and new product success is stronger. The conditions have an inclusion of marketing function or R&D function in new development process. However, two hypotheses about both functions were not significant. Referring to cross-functional team, members from R&D and marketing are quite a natural to participate in NPD. Troy et al. interpret that both functions could constitute a necessary condition rather than a key for a successful team. Authors also guess that R&D or marketing function may contribute to particular step in NPD process. In this analysis, each step in NPD process is not controlled, so two hypotheses might not be supported.

However, exploring information route in cross functional team is an important issue to an organization, because they are likely to separate without any scheme. Bunderson and Sutcliffe (2001) propose two types of functional diversity: dominant function diversity and intrapersonal functional diversity. The former means a variety of functions in a team, and the latter means a breadth of the functional experiences of individual team members. They analyzed a relationship among two types of functional diversity, information sharing, and business performance. The result says that two types of diversity improve performance through enhancing information sharing. So it shows that not only making cross functional team but also gathering team member with abundant expertise experience contribute to enhancing information processing capabilities in a team. Project members with different experiences can bridge between members, who don't have information to share, and promote for them to exchange expertise knowledge.

Information flow also depends on organizational characteristics. Danneels (2008) focuses on a capability to build a new competence and hypothesizes that five organizational antecedents contribute to improving it. Five antecedents are willingness to cannibalize, constructive conflict, tolerance for failure, the extent to which a firm commits to environmental scanning, and slack resources. Danneels pays attention particularly to a capability to build new competence in marketing and R&D, which is to explore new market and technological domain, and empirically examines that. The results support hypotheses except allowance for failure. While existing literature have simply examined differences between R&D and marketing, Danneels' viewpoint provides a new insight to organizational design. Among five antecedents, realizing environmental scanning and recognizing slack resources lead to explore new domain. Therefore, exploring capability in R&D and marketing is strengthened in these organizational antecedents. Necessary capability to organization with budget constraint is defined through cross functional discussion, so an organization with these antecedents may have a capability to realize R&D-marketing linkage.

Proposition 3: Adopting members with different functional experiences and strengthening organizational capabilities to scan environmental and recognize slack resource promote to establish information flow among cross functional members in NPD project.

5. SYSTEM TO SHARE INFORMATION

Gap among team members' approaches to achieve organizational goal is corrected by building a system for them to share information. Top management's strategic position and reducing physical distance among them enables them to pursue a common goal and to recognize other functions' importance, so it is likely for project members to share information with each other.

5-1. TOP MANAGEMENT

Sophisticated ideas are generated through exposed to diverse objections. Berenson suggests forming a cross functional project team as an effective way to transfer R&D results to a market, and that the effect is growing, when a project manager has a strong authority to coordinate all activities. Clark and Fujimoto (1991) proved that successful teams had heavy weight product managers in the auto industry. Heavy weight product managers are responsible for the whole product development project from creating powerful product concepts to infusing them into the details of production and design. They let project members take the same direction and realize continuous successful organizations with product integrity (Clark and Fujimoto, 1990).

In addition, organizational climate, influencing members' behaviors, doesn't occur naturally but top management's efforts create it (Souder, 1988). Litwin and Stringer (1968) suggest that style of leadership is the most important determinant of creating organizational climate. It is created by rules top management emphasize, objectives they set, and informal relationship between them and other organizational members (Litwin and Stringer, 1968). In other words, organizational climate is a total of members' perceptions about strategic direction, which top management shows through reward system and objectives (Shrivastava and Souder, 1987).

Top management could also have organizational members pursue the same goal through announcing consistent strategic direction and promote information exchange among functions. For example, top executives in ULVAC (Ultimate in Vacuum), providing manufacturing equipments based on vacuum technology, announce frequently importance of cost reduction to survive. The message penetrates into the organization, and designers, engineers, operators, and researchers take cost reduction into consideration in any activities.

Rapert, Velliquette, and Garretson (2001) also suggest that the important task of top management is to demonstrate a coherent direction for strategy and enables organizational members to rec-

ognize a priority for accomplishing organizational goal. When top management monitors a project and shows high commitment to it, organizational members can recognize the project's strategic importance (Sethi, Smith, and Park 2001). That motivates project members, and the others in an organization contribute to the project such as supplying materials and supports (Andrew and Smith, 1996), which is inevitable for organizational members to share information with each other.

Proposition 4: A coherent strategic direction, which top management demonstrates, promotes for NPD project members to share information with each other.

5-2. COLLOCATION

Sharing information with each other is possible in virtual. However, the longer physical distance among organizational member is, the less incidental communication occurs (McDonough III, Kahn, and Griffin 1999). In addition, less communication caused by long distance proves to deteriorate project performance (Allen and Fufeld 1975; Allen 1977; Keller 1986; Moenaert and Caeldries 1996), and collocation for project members become a main subject to organization. Physical distance influences the extent to share information in project team more than cultural and language difference (McDonough III, Kahn, and Barczak, 2001). For this problem, Pinto, Pinto, and Prescott (1993) demonstrate that when physical distance shortened by office location and layout, frequent communication and cooperation are promoted. Short distance enables team members to share unofficial information through frequent informal communication, which lets processes in NPD flow smoothly.

On the other hand, Schmidt, Montoya-Weiss, and Massey (2001) suggest that virtual team can perform better than face to face team. Schmidt et al. regards the following characteristics of a virtual team as the reason. In a virtual team where team members doesn't have real interaction and there is no hierarchical system among members, major opinions are hard to be formed, information is rehearsed before transmitted, members are fair to get an opportunity to demonstrate opinion, and transmitted information is reprocessed again and again. In other words, a problem occurred in real time communication is compensated by virtual team's characteristics. Therefore, adequate information sharing is achieved in fair and tense among project members.

Proposition 5: In case that fair and tense relationship is formed, the shorter distance among NPD project members is, the more information sharing in NPD project team is.

6. DISCUSSION

NPD is a process of information processing (Clark and Fujimoto, 1991). Although development

of information technology helps NPD process efficient, inflow of sudden affluent information confuses project members. While IT makes connecting members easier than before, informal communication decreases. The fitness between technological and marketing strategy also depends on dealing with this informational environment, and project manager manages to control information processing to realize their best fit.

This paper emphasizes on three steps in information processing: gathering information efficiently, establishing information routes among NPD project members, and providing opportunities for project members to share information. Each step is executed in some concrete activities described in propositions. Some difference of engineers' and marketers' approaches to satisfy market demands is corrected by management of information processing. The extent of gap between them represents how much technological seeds developed in an organization match market needs. When a product manager builds portfolio of technological seeds necessary for NPD project, acquiring accurate information from market enhances a probability of success. In other words, the fitness between technological and marketing strategy means how much both information is integrated to meet customer demands. Avoiding over-specification and unmet customer needs, the best fit is realized through filtering overflow information.

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