# AN ORGANIZATION DESIGN FOR NEW PRODUCT DEVELOPMENT OF A PACKAGING PAPER COMPANY IN THAILAND



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# Thematic paper entitled THE ORGANIZATION DESIGN FOR **NEW PRODUCT DEVELOPMENT OF** PACKAGING PAPER COMPANY IN THAILAND

was submitted to the College of Management, Mahidol University for the degree of Master of Management

on



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#### ABSTRACT

The purpose of this research is to determine the organization design for new product development affecting Thai organizations to become an innovative organization with effectiveness of alignment of marketing, production and R&D. The information and data are studied and gathered through the literature review to find key factors affecting new product development process and interview with the top management of production units.

This paper uses a qualitative approach and interviewing a group of managers and section managers in production line to find optimal R&D organizational model. The results this study shows pros and con of those three models of new product development organization; 1) centralized R&D 2) decentralized R&D and 3) hybrid models. Moreover, recommend new product development organization is considered and discussed in detail how this organization is able to manage and ramp-up production effectively of packaging paper manufacturer in Thailand.

KEY WORDS: Organization design / Centralized R&D model/ Decentralized R&D model / Hybrid R&D model

30 pages

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# CHAPTER I INTRODUCTION

Nowadays, Firms are seeking transformational growth and opportunity to win in the complex markets. Companies are looking for new ideas that can lead to transformative innovation in their products and services by investing in research and development (R&D) for breakthrough ideas, incremental and next generation projects. To achieve growth goals, companies are restructuring their innovation and R&D organization for matching with current situation to increase competitive advantage. However, organization design for new product development is a complex process due to this involves many departments in both formal and informal formats. The more difference of the products, the more people involve in the development process and need more effort to work together. Considering that many people from different responsibilities and functions need to be involved in the development effort, one functional question arises: How should an organization design be organized to maximize the chances of successful product development?

Organizations for developing new products face two fundamental challenges: decomposition and integration. There are pros and cons associated with every type of R&D organization model. Then the overall design effort needs to break into individual tasks and more importantly work on these tasks need to be integrated into overall design. For Thai organization, there are many type of R&D model should be considered such as centralized R&D, decentralized R&D, and hybrid models. Central to question of organizing R&D is how people and functions are linked into group and network of product development team which can fulfill all specific purpose to development new product from idea generation to commercialization state. Putting a formal organization structure together implies assigning individuals to group and create the boundaries and scope of work for these groups. Informal organization structures are determined by actual communication ties that emerge between individual actors within and across group during the development effort.

Therefore, the objective of this study is to determine the organization design for new product development affecting Thai organizations to become an innovative organization with effectiveness of alignment of marketing, production and R&D. The information and data are studied and gathered through the literature review to find key factors affecting new product development process and interview with the top management of production units. The results from the organization design for new product development show pros and con of those three models of new product development organization; 1) centralized R&D 2) decentralized R&D and 3) hybrid models. Moreover, recommend new product development organization is considered and discussed in detail how this organization is able to manage and ramp-up production effectively of packaging paper manufacturer in Thailand.



# CHAPTER II LITERATURE REVIEW

This review of literature is structured into 2 sections. The first section presents an overview of the theories about organization design for new product development, followed by a discussion of research approaches that have been employed. The second section discusses the main factors that have been included in previous studies to find the appropriate organizational structure for increase interaction and coordinate among marketing, production and R&D.

#### **Overview** of Organization Design for New Product Development

Every development project needs the collaboration of many individual functions. Consequently, the process of developing a new product is divided into many different tasks. Development organizations need to engage different specialization such as production, R&D or marketing. Sosa, M.E. and Mihm, J. (2011) showed that in new product development (NPD), specialization also occurs within functions, along the lines of different components of the product or service to be designed. For a complete product, there needs to be a process for integrating such a specialized knowledge into a solution. Development organizations need to provide for integration. Combining the knowledge and determining how they will eventually be delivered is the challenge of integration. Determining the level of specialization, organizing the specialized subunits and providing for integration processes is the task of the formal part of organization design for NPD.

There are many types of the formal organizations of NPD. Each one has its advantages and disadvantages. The nature of the formal organization structure initiates boundaries within organization but the informal organization structure also establishes due to that fact that there is communication across the groups.

## **2.1 Functional Organization**

One of formal organization types is a functional organization. Individuals who work on one or a limited number of tasks are grouped according to their knowledge and skill. Thus, individuals with similar technical background form the basic building blocks of the formal reporting lines. The main mechanism for achieving integration is the process - the determination of who has to contribute what information at specific time. Typically, the functional organization relates with a staged process by which the NPD progresses with function after function adding their input to the design. It is clear that functional organizations allow for very good exploitation of technical knowledge since they focus on technical skills in one area. Individuals strongly identify with their functional tasks and their values. Dougherty (1990, 1992) finds that functions are 'thought worlds,' with their own knowledge base. Technical knowledge is appreciated and generates status. Career paths emphasize technical competence. Internal communication mainly concerns about technical topics. As a result, organizations can easily create strong technological collaboration with the others. Alternatively, they are good sources for technological advances themselves. Allen (1986) calls the functional organization the input-focused organization.



#### Figure 2.1 A functional organizational structure.

In addition, central coordination is facilitated by a functional setup. This way any form of knowledge and technology transfer between products is made quite possible. The prototypical functional organization is the university. Its goal is to create deep functional expertise. The high tech companies may also lean towards a functional organization. Being able to apply the new advances in science, maybe even creating own core technology. Functional organization also has the biggest weakness. The functional focus makes integration with other functions. Because people are motivated by the need to be expertise in certain area, these groups face difficulties when try to integrate their findings into a specific product to address a specific market need. Communication within a project combining the effort of several functions tends to be formal and infrequent. Thus, functional organizations lack product focus. The organization may easily neglect the view of the customer. As a result, functional organizations tend to show low external coordination. Furthermore, functional organizations create the question of business responsibility and do not master at integration. Therefore, the CEO is the only person responsible for the success of any product.

### 2.2 Project Organization

For the project organization, individuals are grouped into an organizational subunit responsible for one product or service. All members report to a project leader. Although from different backgrounds the group builds a group entity (Sethi, 2000). Their focus is to create a product (Allen, 1986). The project leader takes the voices of customers and focuses the team on defining and creating a product. Main objective of goals between the team members leads to fast decision-making. The product is mainly concentrated in internal communication. The communication between functions is frequent and informal. The project leader is responsible for the feasibility and economic study of the project and thus balances firm and customer interests. Thus, a high external collaboration with the market, a rich focus on the timeline and the overall profitability of the project are the strong points of the project organization.



#### Figure 2.2 A project-based organizational structure.

Start-ups with one product in the making are an example of project organizations. Three major drawbacks limit the effectiveness of this organizational setup. First, since organizational barriers limit the communication outside the organizational bounds (Allen, 1977), the collaboration with other individuals of similar technical and knowledge background is scatter. As a result, it is difficult for the overall organization to build technical excellence. Integration with outside technical communities is a persistent problem. Second, for the same reason coordination among projects becomes a challenge. All projects take the position of their customers and defend their own economic viability. Therefore, reaping synergies from inter-project coordination such as product and service component sharing is notoriously difficult. Third, the homogeneity of teams may lead to teamwork phenomena such as groupthink and an enhancement of commitment. Therefore, management oversight is also importance. Project organization is the exact mirror of functional organization. It focuses on the result and the product but they are neglecting building own technology in the long term. Functional organizations, in contrast, focus on building technological excellence, while neglecting the cohesion of the product.

#### **2.3. Project Matrix Organization**

The alternatives of functional and project organization are only polar ends of a continuum of different ways of organizing NPD. The information processing view of organizations shifts the focus away from formal lines which are the major design elements of organizational structures. Galbraith (1972) emphasized the role of what he termed lateral relationships such as liaison roles, task forces, teams, integration personnel and integrating departments. Integration can also take place through establishing a secondary structure, overlaying the primary functional structure with a project organization creating a project matrix organization. In NPD cross-functional teams have become the major tool of that secondary structure (Clark and Fujimoto, 1991).

Cross-functional teams meet members from functional entities such that all technical and functional expertise necessary is represented in the team. While members keep their affiliation with their functional homes, they are also responsible for commonly achieving project success. This two-way communication is established. The usefulness of cross-functional teams in many diverse settings has been verified (e.g., Dougherty, 1992) thus ensuring that cross-functional collaboration is more important than just mere exchange. Therefore, cross-functional teams, which share values and creations, produce better results in NPD than a formal system of pre-scheduled meetings and paperwork.

The intensity of collaboration of different functional entities at different points in the development process may have different effects (Song et al.,1998). Marketing effort is most necessary at the starting point of the development process to find market opportunity then involvement of manufacturing may sometimes even prove to be counterproductive (presumably, because it is deflating in an expansive phase). In further stages, R&D and manufacturing integration is most needed. It seems that collaboration in the first phase of the project is more related to project success than at later stages (Olson et al., 2001). Beyond the mere installation of crossfunctional teams, several organizational building blocks need to be aligned to make these teams work appropriately. What role does the team leader play and what his decision rights are, are the most important questions Figure 2.3 illustrates the two structures that have emerged to address such questions.



Figure 2.3 Matrix organizational structures

## 2.4 Contingency of Organizational Forms

The appropriateness of organizational structures depends on environmental factors and task characteristics. Thus, organizational structures are good to the extent that they 'fit' the task requirements of the groups they form. Maximizing the 'fit' is important to minimize the unnecessary interactions that consume organizational resources during product development. Therefore, grouping individuals by common disciplines fosters interactions of the same type and deepens knowledge of the same discipline whereas grouping individuals from different disciplines to complete specific projects facilitates coordination when developing specific products. Cross-functional integration in its different forms allows for intermediate choices. The designer of the formal organization thus has a continuum of choices at hand, spanning the functional and the project organization. While many factors may influence the details of the structure to be created (Allen, 1986), there are two variables mainly determining the structure: technological uncertainty and market uncertainty. If the rate of change in basic technologies is high and market needs can be easily formulated, functional organizations and their kindred are appropriate. In that case, technical expertise is the best predictor of product success and the organization needs to reflect that. As the rate of change in technologies declines and the rate of market change increases, more project-like organizations become preferable. In the extreme case where the

technology is well established and there is not much change, project organizations provide for the market integration that companies in such an environment typically compete in.

### **2.5 Relevant Empirical Studies**

Comparison between Centralization, Decentralization and Hybrid R&D Structures: Decentralization would be associated with efficiency advantages stemming from improved information processing and reduced scope of managerial opportunism. Decentralization may be outweighed by the inability to achieve economies of scale or scope in R&D.

Centralization of certain functions may enable a firm to exploit economies of scale, scope, and spillovers that arise when the outcome from one R&D project reduces the cost of carrying out another project, or delivers benefits to multiple subsequent products or activities.

Hybrid organizations may be able to achieve the 'best of both worlds' by combining the advantages and disadvantages of centralized and decentralized structures.

Bowon Kim and Jongjoo Kim (2009) strongly supported that both the colocation and the balanced composition are instrumental in improving manufacturability. For manufacturability, the design function must play a significant role for an innovative product: note that an innovative product poses novel challenges to the firm since it does not have enough experience and/or expertise that is readily applicable to the new innovative product, and thus the design function must continue to be heavily involved.

Jukka Nihtil (1999) focuses on the integration between R&D and production by interviewing with project team members and line organization representatives. He found that

• The effectiveness of project planning as an early cross-functional integration mechanism is positively related to 1) the degree of production representation in terms of resources, 2) definition of the planning phase duration and 3) availability of historical NPD-process data.

- The effectiveness of the early mission as a cross functional integration mechanism is positively related to 1) available producibility data, 2) experience of project team members, 3) documented guidelines for execution of the reviews, and 4) analytical capabilities of the project team members and line organization representatives.
- The effectiveness of the individual integrator and the cross-functional team as an early integration mechanism is positively related to 1) a clear distinction between NPD and operational activities, 2) the integrators ability to disengage from prior projects, 3) planned across-project transitions, and 4) balance in recruiting between R&D and production.
- Formal, predefined integration mechanisms are needed to ensure early cross functional integration.
- Lack of functional, line organization, resources e.g., production. is a more significant hindrance to early cross-functional integration than lack of R&D resources.
- The lack of cross-functional information systems is more due to organizational and behavioral issues than an inadequate technological knowledge base within the company.

Nusa Fain, Mihael Kline, Jozef Duhovnik (2011) also found that formalization has received mixed support in the previous studies; the lack of support for our first hypothesis was not very surprising. The lack of correlation between the level of formalization and the size of the cross-functional integration gap might be due to the cultural background of the studied economy.

Centralization was also found to be a controversial integration mechanism in previous studies on R&D - marketing integration. Some studies confirmed its positive effect on R&D -marketing integration, others a negative effect. Our results showed that centralization has no significant effect on the R&D – marketing integration or NPD success. Organizational climate has on the other hand proven to be an important factor, affecting the R&D - marketing integration, as well as the level of NPD success.

Ely Laureano Paiva (2011) found that all manufacturing integration aspects are positively related to sales growth, but only manufacturing-R&D integration

is positively related to profitability. Therefore, managers interested in improving the performance of their plants should favor the integration between manufacturing and R&D teams, at all hierarchical levels. However, that direct interaction between manufacturing and marketing improves performance.

Behnam Adib and Dr. Steve Jackson (2010) focus on different models for integration of R&D processes with production to increase efficiency. He concluded that R&D cannot remain isolated from the production team during the entire process of prototyping and design. The integration between R&D and production is critical and convoluted. Integration of R&D with production transpires not just while finishing the design process but it is fully involved from the beginning to the end. The predictive engineering methodology should be used to determine what tools, resources and services would be needed to have a successful on-time production with no interruption.

Edward Aihua Fang, Qizhi Wu, Chaowei Miao, Jian sheng Xia and Dezhi Chen (2013) focus on study chooses two product technological elements (customized design and modular design)and two operations technological elements (process automation and process flexibility). This study found that the introduction of new technological practices can lead to decentralization, less specialization, less formalization and lower span of chief managers at the early stages of implementation. Following a U-shaped curve, the impact of new technological practices would reverse course.

Thomas J. Allen (2001) found that First, we now have a rational scheme for defining the appropriate structure for a product development organization. This structure must provide for good communication with both the sources of technical knowledge and of market intelligence. The organization must also enable very complex technical tasks to be coordinated effectively. These often conflicting goals can be accomplished if we fully understand the circumstances facing a project.

Hsing Hung Chen, Sen Qiao and Amy H.I. Lee (2014) focus on the relationships between R&D organization structures and the performance of firms. This study identifies suitable management controls that can be influenced by organizational institutions and working attitudes and that are fundamental to the success of organizations. Developing new products by network collaboration is no longer an

unusual occurrence but has become part of daily business. Ad hoc decisions no longer suffice to manage effectively. Rather, it takes systematic management routines to generate the maximum value in strategic and executive integration. Companies need to evaluate if they are providing sufficient supports for leveraging integration experience and converting their integration experience into organization-wide know-how. In conclusion, the findings of this study can serve as a useful basis for making decisions as to which factors management should focus its attention on to improve the performance.



# CHAPTER III RESEARCH METHODOLOGY

## **3.1 Research Design**

To find whether organizational structure and structural factors for design appropriate new product development organization can maximize the chances of successful product development. To answer the research objective, this research used a qualitative approach by a face-to-face interview and asking open-ended questions that will deal with activities and opinion related to new product development organization and processes. The result aims to determine the insight reason and influencing factor for designing new product development organization such as location, team composition, type of product (incremental and innovative product), time to market, manufacturability and flexibility.

## **3.2 Population and sample**

**Population:** Population of this study is group of managers in production lines in Packaging Paper Company in Thailand.

Sampling Size: 7 respondents

**Qualification:** People who is production manager or production section manager involved in new product development process

**Interview tool:** show cards and picture of many types of current R&D organization in the world such as Centralization, decentralization and Hybrid R&D Structures

Factor	hypothesis		
Location	R&D should work close to production		
Central R&D	line and marketing will increase new		
<ul> <li>Business unit</li> </ul>	product productivity		
Team combination	The integration between R&D and		
3 3	production is critical and convoluted and		
	balanced team composition is		
	instrumental in improving		
2.	manufacturability		
Quality	To improve the performance of plants		
Time to market & flexibility	should favor the integration between		
Rate of ramp up production	manufacturing and R&D teams, at all		
	hierarchical levels.		
Product type	Incremental and innovative products need		
Incremental	integration of both R&D, marketing and		
<ul> <li>innovative</li> </ul>	production in all development state.		
Cost effectiveness	Centralization of certain functions can		
$\varphi$	enable a firm to exploit economies of		
	scale		
Communication 01 91 -	Decentralized structure provides good		
Technology transfer	communication with both the sources of		
<ul> <li>Collaboration</li> </ul>	technical knowledge and of market		
	intelligence		

#### Table 3.1 The factors related to the hypothesis

After defining the research objective and target group for interviewing. The question will concern with 6 key factors to R&D organization design. Those factors are used to identify and clarify the key for design team stakeholders both core team and non-core team for new product development, identify a model that aligns with key consideration to get the most effective new product development for increasing R&D, Marketing and Production Alignment, driving more breakthrough innovation, speeding up to market, and ensuring a tailored response to business need.

## Table 3.2 Questions used in interview

### General questions for understanding current situation, problem, and challenges

This part will be used to gain general information of the respondents and build rapports between the interviewer and the respondent

Construct	Question No.	Question	
		What is the current structure of your new product development organization?	
0	2	Which department is a key for new product development process nowadays? What is the discipline of this department?	
	3	Do you think new product development process is important for our company?	
Current	4	<ul> <li>In your opinion, what are most challenging problems for new product development?</li> <li>1) Increase R&amp;D/ Marketing Alignment</li> <li>2) Drive more breakthrough innovation</li> <li>3) Rationalize the cost base</li> <li>4) Speed to market</li> <li>5) Ensure a tailored response to local/businesses'R&amp;D need</li> <li>6) Improve integration between production and BU R&amp;D</li> <li>7) R&amp;D Alignment with manufacture</li> </ul>	
	5	What is your expectation from your R&D and product development team?	
	6	Describe your worst experience with the new product development process.	
	7	Describe your good experience with the new product development process.	

Table 3.2 Questions used in interview (cont.)

Specific	Questions	for	understanding	structural	factors	for	design	appropri	iate
new pro	duct develo	pme	ent organization	1					

Construct	Question No.	Question			
Location	1	Before asking question number 4: Interviewer show many types of R&D models such as Centralization, decentralization and Hybrid R&D Structures. In your opinion, do you think location of R&D is one of important factor for increasing new product development efficiency?			
	2	Which location is the most suitable for R&D to ramp up new product productivity? Please describe your reason.			
	3	Which department is core team for new product development process? What is the discipline of this department?			
Team combination	4	Which department is non-core team for new product development process? What is the discipline of this department?			
	5	How core and non-core team work together?			
T C	6	For increase success rate for new product development, which departments have to work together and how?			
	10	What is the current structure of your new product development organization (Centralization vs. decentralization vs. Hybrid R&D Structures)?			
Quality	8	In your opinion, What are the pros and cons of your current model of new product development organization?			
Quanty	9	If you can change new product development organization, Which model is the best suitable for your company to ramp up time to market, rate of success? And please give me the reason?			
	10	How will the structure affect market need and competition (customer service and marketing)?			

Construct	Question No.	Question			
Product type	11	For incremental product, which model is the best suitable for our R&D structure? And please give me the reason?			
	12	For innovative product, which model is the best suitable for our R&D structure? And please give me the reason?			
	13	Which model is fitted with you products? How well will the structure align with the organizational strategy and support achievement of strategic goals?			
Cost effectiveness	14	In your view, Does cost of R&D is important factor to concern in setting R&D structure? Please give me the reasons.			
$\diamond$	15	From your opinion, how will the structure affect costs and support realization of financial goals (resources and scale of economic)?			
Communication 16		Have you ever had problem with the technology transfer or communication between R&D and production team? Please describe you experience.			
	17	How will the R&D structure affect key processes of new product development and decision making (processes and coordination)?			
Ranking	18	<ul> <li>Please rate the level of importance for each criterion you used to make the decision to construct R&amp;D organization? (1-5 scale)</li> <li>Location</li> <li>Function</li> <li>Technology transfer</li> <li>Speed</li> <li>Collaboration</li> <li>Flexibility</li> <li>Communication</li> <li>Cost effectiveness</li> </ul>			

Table 3.2 Questions used in interview (cont.)

# CHAPTER IV RESEARCH FINDINGS

According to the methodology, the researcher interviewed 7 respondents who are managers and section manager in production lines of Packaging Paper Company in Thailand. The questions are focused on 6 main factors; location, team combination, quality, product type, cost and communication. This chapter will explain and analyze the result related each factor that will affect the structure of product development organization.

# 4.1 Location

To determine the most promising R&D locations for construing new product organization is the first thing to concern since there are many types of R&D model such as Centralization, decentralization and Hybrid R&D Structures. Its location is crucial to the development of company-level technology capabilities and competitive advantage.

The results from the interviews show that more than half of respondents agree that location is important to setting new product development team and they do agree that specify location help to classify the function and responsibility of each team in new product development team. For hybrid structure, location is one factor to separate and classify the responsibility and function of Central R&D and Business R&D. Central R&D should focus to make a research for medium to long project and deep down in basic knowledge and technology for serving every business unit and new business for sustainability. Business R&D should work for connecting Central R&D, production and marketing for short term product and technology development. The reason why Business R&D should work for current product and technology are researchers who work close to production line will more understand about the configuration of machines, condition of processes and current competition in this

market. However, there are 2 respondents have different opinions. Location is not key factor to setting R&D due to even though R&D center is located for centralization, researcher can work anyplace and anywhere but researchers have to understand and good at current machines, technology, processes and facility. Moreover, researchers should know well in differentiation between laboratory factors and mill factors to increase speed for launching new product and to reduce the cost and time for trial new products and processes. From interviewing, I found pros and cons for each R&D organization as shown below:

#### **Centralized R&D:**

Pros:

- Allows teams to focus on longer term projects
- Emphasizes technology and technical differentiation

Cons:

- It tends to become too ivory tower in nature and researchers traps in the ivory tower
- Too far removed from market need, customer insight

#### **Decentralized R&D**

Pros:

- More responsive to trends and shifts in markets/customers
- Efforts are aligned to business priorities

Cons:

• Work tends to focus on incremental products

## **Hybrid Models**

All hybrid models take on the pros and cons associated to whichever model they skew towards

Pros:

• Protects against risks associated with each model

Cons:

• Are complex operationally

- Decision rights are often unclear and ambiguous
- Redundant work is may occur

#### **4.2 Team combination**

Marketing, Production, Business unit R&D and central R&D are core team for developing new product due to majority of new product development is market pull then after marketing team receive voice of customer; they will identify and evaluate market opportunities. The market evaluation will be sent to new product development team to study the feasibility of both technology and cost of product for filtering opportunities. During study technical feasibility production and business unit R&D will be involved by giving mill factors information which ones have to be concerned and translating opportunities into project requirements for developing new product matching with customer need. Either business unit R&D or central R&D will be the main team for doing research based on type of product. After trial lot of products pass testing product performance against specifications, marketing will send new products for testing product usability and customer acceptance. However, finalizing product design and production process will be completed after customers satisfy. Then Marketing will prepare and execute market launch.

For this company, they implemented host of integration mechanisms and structures which are Business unit R&D and Business unit marketing of new product to achieve truly collaboration between Marketing, Production and R&D. Business unit R&D is the host of integration production, central R&D and Business unit marketing of new product. Due to Business unit R&D has more understanding in current technology and financial feasibility. Technical feasibility based on current machines will be analyzed by Business unit R&D will be transferred to Business unit marketing of new product which is integrator facing with marketing and sales team.

The non-core team is also important due to lot of interviewees mention that the Strategic Sourcing Management is key team to find sufficient raw material and fuel for new and high value added products. Due to the projects will be feasible when cost is low enough to gain enough contribution per day and per ton papers.

## 4.3 Quality

Based on quality or success rate of new product development, 6 interviewees agree that hybrid structure of R&D enhances the percentage of success. Since this structure leads to separate function clearly of each discipline. BU unit R&D works for support chain of product directly such as current problem solving and complain claim. This will increase speed of innovative process and time to market and the connection of each unit will be initiated. While BU unit R&D work for supporting BU directly, Central R&D focuses on fundamental knowledge and technology for building up core technology or new business for supporting every BU unit in case new product or process need to use new or advanced technology. R&D delivers demonstrable technology value to business units, thereby boosting overall commercialization rates.

### 4.4 Type of product

Packaging Paper Company delivers both incremental and innovative products depending on the needs of the business. A recent result from interviewing shows the same direction that a hybrid R&D organization is suitable for both types of products. Central R&D and BU unit R&D have different focus on platform development or product features development depending on the type of product. BU unit R&D is the host for incremental product features development due to they understand more in current processes and problem. However, Central R&D is the host for innovative product and new platform technology which is not gotten use to by BU unit R&D.

#### **4.5 Cost**

All of interviewees agree if concerning only on cost for investment on R&D, centralization structure uses the lowest cost for initiating. This structure using same platform reduces the cost of developing new products by reusing common technology and infrastructure of different product lines. However, they think of benefit

to all chain of businesses then cost to serve is more important. Cost to serve is a process-driven accountancy tool to calculate the profitability of a customer account, based on the actual business activities and overhead costs incurred to service that customer. The hybrid structure is the most suitable for reducing the cost to serve due to the benefits of hybrid structure are increasing speed-to-market due to closer coordination between R&D and manufacturing in the development process facilitates frequent design iterations and early consideration of potential production challenges, minimizing delays resulting from quality problems and cost overruns. Time is also cost of investment. If launching product more delay than competitor by getting not clear voice of customer, setting product wrong feature s and giving bed experience for customers. All of these situations are cost. Using more time to product customization and commercialization tend to be expensive. However, any hybrid R&D model is susceptible to redundant (and therefore costly) activities across locations but time is more cost.

## 4.6 Communication

Significantly results shown that communication between Central R&D and production team are still problems due to the conflict of interest. Central R&D would like to create new and value added products but using time to do research and development. On the other hand, production would like technology which can be promptly implemented and they would like to solve facing problem and launching product in fast time based on lowest cost and minimizing lost during mill trial. The answer for solving this problem is using hybrid structure. BU unit R&D is responsible for integrating and compromising the requirement to get the most appropriate solution. BU unit R&D share information, configuration and condition of current machines for increasing awareness about the mill factors to let Central R&D do the research based on current equipment and technology.

To maximize communication and coordination work across functions, company should be host annual and semi-annual retreats to provide all team to cultivate personal relationships and break down organizational silos. Since face-toface interactions may be limited for teams working in different locations, companies can provide teams with a common set of IT tools to increase to channel and opportunity to communication.

## 4.7 Key Strategic Objectives

After interviewing, there are many strategic objectives for new product development team in current situation such as location of R&D, clear function & responsibility, technology transfer, speed (time to market), collaboration, flexibility, communication and cost of R&D.

However, the priority objectives or three key objectives which are getting the highest score for building or design R&D are collaboration, technology transfer and setting clear function. Due to the fact that everyone needs R&D to be the good integrator or collaborator to align and integrate production and marketing, this will lead to increase the efficiency of new product development process. For technology transfer, interviewees would like to see R&D have an efficient process to transfer knowledge and technology to production team. Moreover, they would like to build R&D model which has clear function and responsibility and reduce the redundancy of work.



**Figure 4.1 Key Strategic Objectives** 

# CHAPTER V DISCUSSION AND LIMITATIONS OF THE STUDY

The main objective of this study is to determine the organization design for new product development affecting Thai organizations to become an innovative organization with effectiveness of alignment of marketing, production and R&D.

The results of the analysis are useful for companies which would like to build or change their R&D organization. These results educate pros and cons of different types of R&D model. However, the optimal R&D model is not guides and show the best results for every company due to the fact that each company has a different parameter. In some company cost and location may be the important roles then the decision is always case specific.

### 5.1 Recommendation

After seeing all result of all factors, the appropriate model for this company is hybrid structure (Figure 5.1) because this company has both short team and long term goal to initiate new product to support sales and marketing direction. They would like to strengthen competitive advantages in terms of cost and quality and expansion to utilize machine competitive edges. Short time and flexibility to launching new product is the most important for increasing competitive advantage.

Companies should tailor their R&D model around strategic priorities and desired future technology capabilities. R&D group should operate as a hybrid function, with an established business unit R&D for each of its respective business units and a Central R&D which is expertise in core and advanced technology.

Business unit R&D should be located in the main current site locations and has responsibility by doing research and development for supporting whole product areas or line of business and adapt technologies for their chain of products. Business unit R&D reports directly to the top managers. Recognizing the growing opportunities in emerging markets, company also has Central R&D which has tasked to develop innovative product and build own know-how and core technology with increasingly important roles in research and development. R&D center should be located in key area which is the center of business and maintain close working relationships with the Business unit R&D working on similar product categories.

Company should create "Core Team" for each of its product categories to facilitate cross function and location communication, corporation and collaboration. Each team consists of production, marketing and technology individuals selected from Central R&D, Business unit R&D. Their main focus is to integrate all functions to be borderless and study marketing opportunity, financial feasibility, technical approach as well as opportunities to expand the business for making product and technology roadmap which is the direction of new product development of this company. This R&D model will maximize technological specializations and breakthroughs in line with corporate strategy reduce redundancies and increase knowledge and technology transfer across an extended technological organization. Moreover, business units can receive research and technology that is applicable from other business areas by Central R&D. Business Unit R&D offers flexible customizations for markets and business unit priorities. Therefore, the time to market by new product development will be shorten and more efficient.



Figure 5.1 Recommend R&D model: Hybrid organization

#### Table 5.1 Detailed Description of the R&D Function

Central R&D			Business Unit R&D		
Responsibilities of Central R&D		Responsibilities of Business Unit R&D			
•	Collaborate and create network with	•	Taking and using technologies		
	internal and external research institute		developed in the Central R&D and		
	and research centers.		combine them into product programs		
•	Conduct long-term research	•	Collaboration among Central R&D,		
•	Development of technology platforms	ļ (	production and sale & marketing team		
•	Technology upgrades	•	Medium-term R&D (two to three		
•	Developing and improving properties		years)		
	of all products	•	Conduct short-term and fast-track		
•	Delivering and transferring	2	research		
	technologies	•	Application work		
•	Managing own intellectual properties	•	Develop manufacturing technology to		
	and own technology	Ά	make the business a cost-leader		
•	Working with Business unit and	3			
	Business unit R&D				

# **5.2 Limitation**

There are some limitations in this study. First, because of the time limit, this research was conducted only on a small amount size of population who are managers or section manager in production lines. The second limitation is type of business of this company. I selected to interview people who working in only one company then the result from this report may not appropriate to every company and there are pros and cons associated with every type of R&D organizational model. All organizational structures fall somewhere on the spectrum of centralized to decentralize. Therefore, on one right answer, it based on each parameter of each company.

## **5.3 Future Research**

To develop the research and fulfill all factors to get the complete requirement of all function in company both core team and non-core team in new product development. The group of interviewees should be the representative from all function and increase number of interviewees. Moreover, other factors such as cost to serve and benefit to all supply chain should be studied. It could be more effective study to guide the same type of company to build or organize their R&D model.

