

Prisana
Suwannaporn
*Kasetsart University,
Bangkok, Thailand*

Mark Speece
*Asian Institute of
Technology*

Organization of New Product Development in Thailand' Food Processing Industry

ABSTRACT: Asian food markets are large and growing very rapidly. Per capita food consumption is increasing as income rises, and food consumption habits are changing. Asian food retailing is also changing rapidly, as distribution and transportation modernizes. Consumers are becoming more sophisticated, with increasing awareness of hygiene and safety, and expectations of better nutrition and more convenience. This rapid development of food markets creates opportunities in food processing as great as in high tech industries (Selwin, 1992). It also puts pressure on food manufacturers to continuously upgrade their products and to offer new products. Management of research and development (R&D) is becoming critical to competitiveness.

There is often a high failure rate in introduction of new food products everywhere, and Thailand is no exception. R&D capabilities in the food processing industry are significantly poorer than Thailand's technological capabilities because R&D activities are poorly managed or non-existent. In the public sector, some food products research is done, but few results ever reach commercialization. In private sector R&D, most new product development is Me-Too or line extension products which follow foreign trends. Marketing is mainly focused on advertising, promotion, and sales push, with little attention to product differentiation.

Thai companies must upgrade new product development (NPD) as competition becomes tougher. The growing market is attracting multinational food companies, which are strengthening their positions in Asia. The most successful ones have

Table 1. Summary of Companies Participating In Study

Company	Share Holders*	Annual Sales* (Thailand, 1996)	Profit* (Thailand, 1996)	Interviewees	Main Products
MNC1	Swiss 100%	16,408,280,000 B	972,602,000 B	Senior manager product development	Coffee, coffee creamer, dairy product, ice cream, beverage, breakfast cereal, infant food, culinary product, chocolate & confectionery, Culinary, frozen foods, ice cream, tea and yellow fats
MNC2	Dutch 100%	11,791,683,000 B	486,152,000 B	R&D manager Manufacturing manager (ice cream SBU)	Health food
MNC3	Singapore 89.99 % Swiss 10%	2,830,861,000 B	662,481,000 B	Marketing manager (new products)	Snack food (potato chip, corn chip etc.)
MNC4	Thai 51% American 49%	**1,600,000,000 B	No data	Technical Manager Group product development manager Technologist	
MNC5	Thai 52% Japanese 48%	712,281,000 B	31,490,000 B	R&D division manager	Biscuit, confectionery
Thai1	Thai 100%	18,560,548,000 B	152,998,000 B	R&D/QC executive R&D vice executive	Farming, slaughtering, frozen poultry, frozen value added poultry (integrated chicken business)
Thai2	Thai 100%	7,493,487,000 B	1,826,000 B	Assistant vice president Marketing manager	Frozen seafoods (mainly OEM manufacturer)
Thai3	Thai 100%	2,886,784,000 B	235,988,000 B	R&D manager (new products)	Instant noodle, rice noodle, vermicelli, porridge, bakery product, beverage, confectionery

Thai4	Thai 75.31% Singapore 14.83% British 7.10% American 2.76% Thai 100%	2,070,226,000 B	196,643,000 B	R&D manager	Tapioca flour, instant noodle, breakfast cereal, sweetener, mungbean based product
Thai5		966,967,000 B	-44,356,000 B	Deputy general manager General manager (factory) QC/R&D Manager	Bakery product, frozen food such as Chinese bun, dumpling
Thai6	Thai 100%	931,439,000 B	29,327,000 B	R&D manager	Snack food, breakfast cereal
Thai7	Thai 100%	641,124,000 B	24,423,000 B	R&D Manager	Confectionery, glucose syrup
Thai8	Thai 100%	no data	no data	Production manager	Snack food, confectionery, biscuit, drink
Thai9	Thai 100%	**189,790,000 B	no data	Production / QC manager	Ice cream
Taiwan1	Taiwan 100%	no data	no data	Vice president planning department R&D manager	Flour mill, edible oil, bakery, beverage, canning, frozen vegetable, processed meat, food service and restaurant.
Taiwan2	Taiwan 100%	**27,200,000,000 NT\$	no data	Marketing manager Third food group assistant vice president (Bakery SBU) R&D section chief Marketing manager	Flour mill, edible oil, animal feed, instant noodle, cereal, beverage, dairy products, soy products, dessert, health food, frozen finished food, meat products, soy sauce and condiment, bakery product, fast food restaurant and convenience store.

Source: * ARCC, Thailand Company Information 1997-1998

** Company information from brochure, internet, personal interview etc.

established a strong presence throughout the region, with regional headquarters, manufacturing facilities, or R&D facilities. Nestle, for example, is strongly committed to local manufacturing. Campbell's Soup has located its regional R&D to Hong Kong and New Zealand (Oates & Crippen, 1995). Thai companies will need to manage the NPD process better to keep the increasingly sophisticated Thai consumers. The first stage of upgrading NPD is simply understanding how it is managed, which this paper discusses.

1. METHODOLOGY

Since very little has been done previously on NPD in the food industry in Thailand, we relied on in-depth interviewing to thoroughly understand the NPD process. Preliminary pilot work and interviews in four companies suggested that NPD management did not differ much by specific product categories, but rather depends on the level of newness (new product line vs. addition/modification of existing products), and on the nature of the business and customers. For the main study, ten Thai companies and five multinational companies were included in the sample. (Many of the Thai companies have joint ventures with foreign companies, but these form a small part of the overall business, and the joint ventures were not the divisions interviewed.) Companies in our sample manufacture branded packaged food products which are retailed to consumers; branded products for food service and catering customers; and some manufacture unbranded products according to specifications for OEM customers.

Within each company, we mainly talked to R&D managers, marketing managers, manufacturing managers, and sometimes the CEO or other top management. For comparison (mainly because the first author happened to travel to Taiwan and had good access) we included interviews with two major Taiwan food processing companies. They turned out to fit very much within the range of NPD organizations found in MNCs, so we rarely mention them specifically in further discussion below. Brief profiles of the companies are noted in Table 1. We also talked to officials and researchers in the Thailand Development Research Institute, which is currently setting up a food industry R&D center and has strong ties to agribusiness in Thailand. Interviews were usually over two hours, with additional follow-up to clarify issues as we learned more about NPD in the industry. In addition, we had access to many corporate documents on NPD process within the company.

1.1. The Thai Food Processing Industry

Agro-industry represented 56.3% of total manufacturing in Thailand in 1990, and food and beverage processing accounted for more than a quarter of larger agro-industry (FAO, 1992). Thailand's total domestic food market is valued at US\$ 10.5 billion. Thailand ranks among the world's five biggest suppliers of food products, with exports valued at US\$ 6 billion in 1995 (BP, 1996). About 70% of

total food exports consisted of processed food. Thailand is the world's chief exporter of frozen and canned shrimp and canned tuna, and second of canned pineapple after the Philippines. However, recently many such exports have been hit by tough price competition from lower wage Asian countries (BP, 1996). To remain competitive, Thailand will have to focus more on value added food products in the future, which will require increased investment in R&D.

Better R&D is also becoming important in domestic food markets. Modern retailing and changing consumer preferences foster demand for products with standardized good and high quality, longer shelf life, and better packaging. Foreign brands which were previously imported for a high income minority are now manufactured locally and affordable to the average Thai. However, local food manufacturing (whether Thai or foreign owned) is heavily protected by high tariffs and quantitative import restrictions. Such protection may encourage prolonged use of obsolete technology and uneconomic scale of operation (FAO, 1992), and it likely also has discouraged development of better management of the NPD process.

Further, localization of MNC operations in Thailand brings in world standard NPD. Even if the most innovative NPD is not done inside Thailand, local subsidiaries and joint ventures (JVs) have access to new products developed anywhere in the MNC. Many food MNCs have major R&D facilities in Asia, some have local facilities in Thailand, so that products can easily be adapted to local markets. Currently, many Thai companies do not consider NPD to be a priority factor. They cannot remain competitive in the long run by following traditional practices of just copying foreign products, sometimes with minor changes, and ignoring consumer needs. They must upgrade NPD capabilities or slowly be squeezed out from the higher end of the market by MNCs, and from the lower end by low cost producers in lower wage countries.

Upgrading NPD will not be an easy task. The food industry worldwide has relatively low R&D intensity compared to most other major industries. Traditional competition is mainly by price with food products that are essentially commodities. Modern brands often compete more on advertising, sales promotion, and strong distribution than on real product differentiation. Subjective criteria such as consumer tastes, preferences, and eating habits often play major roles in food NPD worldwide. When consumers choose new products, they tend to be somewhat risk averse. They want new products, but the new product must seem familiar (Galizzi and Venturini, 1996).

The Thai food industry, as many others, responds to this risk aversion by mainly introducing new products which are only incrementally different from existing products. This somewhat limits creativity, as well as technology opportunities. So far, many Thai companies continue to compete successfully against strong brands of the multinationals, but this may change as consumers become ever more sophisticated. Thai companies are less likely than MNCs to integrate the more subjective measures of consumer preference and satisfaction into the NPD process. This

could eventually make NPD less effective and efficient, leading to higher failure rates (i.e., more wasted R&D money) for newly introduced products.

1.2. Problems of R&D in Thailand

In more developed regions, food processing companies must invest in R&D to remain competitive in the marketplace. However, R&D is quite low in Thailand across all industries. The total of all R&D expenditure in Thailand accounted for only 0.22% of GDP in 1993, and nearly 88% of this was public sector R&D. By comparison, Korea commits approximately 2 percent of GDP to R&D, and allocated .5% even 15 years ago, when it was at a similar stage of development to Thailand now (AIT, 1996; Chantramanklasri, 1997). R&D in food processing is a very small part of total R&D spending; agriculture R&D accounted for 19 percent of all R&D in 1991, and most of this was for primary food crops research, not food processing (AIT, 1996).

Even if R&D spending in Thailand increases, several problems need to be addressed to make R&D more effective. Public sector R&D results are poorly communicated to the private sector, so most R&D results are never commercialized. Private sector needs are also communicated poorly to public R&D projects. Much public sector research is quite vague and general, and not commercializable. A 1989 survey on Thai biotechnology industries, which include the food processing sector, showed that innovation capability of the food sector was significantly poorer than its technological capability, and lower than in industrialized countries. The absence of R&D activities in the private sector and weak science and technology infrastructure were cited as the main reasons. Failure to integrate commercial considerations into research agendas was specifically cited (TDRI, 1989; Bhumiratana, Tachayapong, Siriwatanay, Othin, and Youvittaya, 1992).

Weak commitment to R&D by the private sector is due, partly, to booming demand during the past two decades, which caused an emphasis on capacity expansion and utilization rather than on innovation. It is also, partly, because of a lack of awareness of the importance of R&D and the lack of fiscal incentives (UNIDO, 1992). Also, the private sector tends to depend on foreign technology—without much R&D for assimilating, learning, or adapting such technology. Part of the reason for this may be because the companies are partially protected from competition, and focus only on the local market. There is not much pressure to build technological capability.

Both public and private sectors realize, in theory, the importance of technology to improve the quality of processed food products and boost the country's competitive edge in export markets. TDRI has suggested that Thailand should study a country like Japan, where the government supports consumer research in leading markets. This has led to the concept of a "National Food Institute" to provide training and knowledge to food industry companies both on technical and marketing

issues, and to be a coordinating body within the food industry and public sector (Chantramanklasri, 1997).

However, despite awareness of the importance of R&D, few local food companies have separate R&D budgets and staff. They often believe that small firms cannot benefit from R&D, since it is too expensive and they lack skilled personnel. They prefer to buy technology and know-how in the form of machines, franchising, licensing, joint venture, or acquisition. Often, they have even failed to build their own competency in the search process for appropriate technology, and must rely on consultants even to acquire technology.

2. NEW PRODUCT NEWNESS TO MARKET AND COMPANY

Cooper (1994) adopted the concept of Booz, Allen, and Hamilton (1982) in categorizing new products by newness to the market and to the company. "Newness" is the key criterion, so commercialized results aimed at product improvement, cost reduction, and repositioning are hardly considered new products at all. Key categories are:

- *Innovation*: products which are totally new to the world;
- *New to market and new to company*: products which are totally new to company and also offer new features to an existing market;
- *New line*: products or lines totally new to company but which are already present in the market, at least in similar form;
- *A new item in an existing product line for the company*;
- *A modification of an existing company product*.

This classification has its advantages from a marketing or investment perspective, but it only partially reflects the situation in the Thai food industry.

One major MNC food company in Thailand classifies its new products according to consumer value perceptions and enabling technology. This helps the company specify type and mix of new products for resource allocation, and to leverage and expand innovation capability or R&D perspective. The four categories are:

- *Breakthrough*: First to market new core product exploiting radical technology and/or unique market concept;
- *Platform*: Superior product concept or attribute relative to available products in the market, a base for future derivatives;
- *Derivative*: Extension of platform product which offers distinctive claim, feature, and market position relative to competition;
- *Support*: Maintaining contemporary market image, such as through product variant.

These two schema can be used to identify the main types of NPD found during our survey of food companies in Thailand. NPD resulting in new to the world innovations, or breakthroughs, are apparently rare in Thailand; at least were not found in our study. On the other hand, NPD for product quality improvement and cost reduction (such as finding less expensive inputs without reducing consumer perceptions of product quality) are routine. We classify new products in the Thai food industry similarly to Cooper's final three categories, which might match Unilever's platform, derivative, and support new products:

- *New product lines*: This refers to new products which are produced for the first time by the company. They may be new to the Thai market, or already available from another company. For example, one company has begun to produce prune extract, which had never been sold in Thailand, but was already available in other countries. Another company has invested in new facilities to produce corn flakes, but this product and other breakfast cereal products are already imported and sold in the Thai market by other competitors.
- *Additions to existing product lines*: The company uses existing or minor modification of existing facilities to produce new products (to it) which may or may not be new to the market. This new product is an extension of platform, offering a distinctive claim, feature and market position relative to competition. For example, a company may use existing facilities which produce fruit juices to manufacture new items of coconut milk, expanding its consumer beverages line.
- *Modifications of existing products*: The company adds more varieties of taste, aroma, form, content, and packaging to their existing products. The purpose of this type of new product is to maintain market image, particularly by satisfying the desire for variety. For example, a company can diversify its existing instant noodle products by adding spicy and non-spicy versions, soup and dry, chicken, pork, and seafood flavors, small sizes for children and larger size for adult, flat and curl noodles, or cup and sachet packaging.

NPD for a new product line is considered more risky than other NPD. It often requires large investment in both manufacturing facilities and marketing/promotion. In our survey, investment cost becomes a key decision criteria for screening such new product concepts, and decisions take on strategic implications. Risk is reduced if the new line is at least in a field where the company has some type of expertise. For example, Frito-Lay Thailand focuses their business within the snack product line and Cerebos (Thailand) Ltd. focuses in the health food segment. They may consider new lines not currently produced, but the line would generally have to be within the broad category where they already operate, so that they already know something about the basic manufacturing and marketing.

Ideas for such NPD originate from top management or senior marketing managers, and depend very much on top management's vision of market and business opportunities. Top management in local companies traditionally base their deci-

sions on experience and rough analysis (usually not formalized marketing research) to get their “feel” for the market. If they decide the product line is necessary for their company’s long term growth, they will push it into NPD. Once top management is behind the product, it is accepted without passing through additional screening, though details of the NPD project are adjusted by R&D and marketing.

Thai companies often make such decisions in the areas of fad/fashion food products with short life cycles. The company just invests in a new product line to copy very successful products of other companies. There is not much effort to incorporate any superior product concepts or attributes which customer can perceived. MNCs are somewhat more likely to consider whether they can gain advantage, not merely presence, in the market. However, the close involvement of top management in Thai companies, and their closeness to the market does often allow the Thai companies to move faster in introducing *me-too* new product lines.

In evaluating the more risky new lines, companies also often consider whether they should do NPD themselves, buy the technology and/or market access, or collaborate through some means such as joint venture or licensing. Some of the giant local food manufacturers often prefer to collaborate with MNCs to gain access to their core brands and technology. Many MNCs also prefer collaboration in developing new lines, mainly to gain market access through local companies’ distribution channels, or to quickly gain local production capacity. However, once the MNC brand becomes widely accepted in the Thai market, the relative power in the relationship shifts more toward the MNC. Thai food manufacturers which have experienced this then try to use the technology and know how obtained from MNCs to introduce similar product lines, and end up trying to built their own brand.

Some Thai food manufacturers, especially those whose local brand names are already well established, prefer to build their own new brands brand extensions. They usually buy technology and obtain know how from suppliers and consultants, so that NPD is closely tied to suppliers. For example, top management of one Thai snack food manufacturer spends most of the time finding appropriate machinery (extrusion technology) and major ingredient (flour) suppliers. Such suppliers provide R&D functions, working together with the snack food company until the prototype has been produced successfully. When the equipment is actually purchased and installed, the technology supplier sends experts to help get production running smoothly.

MNCs have some advantages over Thai companies in NPD for new product lines, especially those which are totally new to Thai market. The international operations of MNCs give them new product knowledge worldwide, so they may be able to identify new products outside which have good potential in Thailand. The Thai subsidiary of one Japanese confectionery manufacturer tracks new products worldwide, and is itself developing new product lines in many markets. Marketing

and R&D in this subsidiary can access this worldwide corporate database and easily get product samples of anything that looks promising for Thailand. Most other MNCs have similar organization.

The MNCs have more coherent strategies for addressing all three types of new product categories. Most have larger NPD budgets specifically for researching “platform” technology, or new lines. One giant MNC, for example, budgets separately to allocate NPD funds to each type of new product, platform, derivative, and support, because it believes that all types of new products contribute to market strength. Thai companies, as noted, do sometimes invest in NPD for platform, or new product lines, but not as often from a strategic perspective. As described, it is usually because top management has seen that a competitor has been highly successful with the line.

NPD for addition and modification of existing product lines is usually far less risky. Existing facilities can be used with little adjustment, the company has some experience with marketing similar products in the lines, and consumer “risk aversion” to radically unfamiliar food products is reduced. Investment cost is much lower, and top management usually does not need to be involved in the larger companies to move NPD. Ideas are generated both by marketing and R&D, often with reference to customer preferences.

However, in Thai companies the input of this market information is not formalized. NPD is internal, and most firms do not gather detailed data on real needs and wants among consumers during early phases of NPD. Market research does begin to play a role, later in the process, but by the time the product is already developed and ready for launch, it is difficult to change it much. Even in these categories of new products, top management still makes most decisions in small Thai food companies. They rarely use any kind of market study during any phase of NPD.

MNCs make extensive use of market information, and many even have their own marketing research departments. Product concept screening, initial market analysis, detailed marketing research, and comprehensive business plan based on such information play a large role in decisions from the beginning of the NPD process right through to product launch. MNCs may have stronger performance in core products with long term potential because of this. Many Thai companies seem to focus too much on fad products; when they see a very popular product, they rush to copy it and gain immediate sales, without thinking much about long term sustainability.

3. CORPORATE CULTURE, PRODUCT NATURE, AND NPD

Manufacturing led NPD occurs in food companies which focus mainly on manufacturing issues such as productivity and cost control. They tend to do OEM production, especially in mature markets for commodity type processed foods. This part of the industry is usually more labor intensive, and often competes in the low

end of the market. Such producers are often local family-owned food processors, rather than the bigger Thai companies that compete more directly with their own brands.

New product ideas in manufacturing led companies are screened mainly by considering existing production facilities, investment, labor cost, and productivity. Many of these companies show strong involvement by top management in NPD decisions, as noted above, because the top managers are focused on manufacturing. Marketing's function in such companies is mainly to sell, so marketing has little role in NPD. New-to-market and new product line products are hardly ever developed within this kind of food company because of its high risk, high investment nature. Most R&D is focused on process innovation rather than NPD, since the main purpose is to increase productivity or reduce cost.

There is usually no customer involvement in the NPD process. Some companies may have small market tests before product launch in order to get customer feedback, which they may then incorporate into product adjustments. But marketing research is rarely done in these companies which compete mainly by price in the low end market segments. Market forecasts and customer needs are assumed from the experience of top management or plant managers. The frozen and canned seafood industry in Thailand mainly belongs to this type. Companies manufacture according to customer specification or recipe, but do not develop their own products. Their core competencies are in process, not product technology.

Top management led NPD is usually found in Thai family-owned food companies. In the pure form of this type, top management dominates NPD activity, from product concept to final product introduction. Decisions are based on top management's own feel for the market, rather than the voice of the customer. Functions such as R&D, marketing, and manufacturing have little influence on NPD (or most other) decisions, and only are responsible for implementing what top management decides. As noted earlier, top management is most likely to get heavily involved when new product lines are involved. Indeed, this may be the only way to introduce new-to-company, or platform products to such companies.

For example, top management of one Thai snack food company sees market potential in developing a new breakfast cereal product line. They believe that changes in eating habits and more working women will reduce consumption of cooked breakfast. Moreover, they see growing imports of breakfast cereal, but the imported brands are too expensive for many consumers. Although the company has little experience in this product line, top management feels that existing snack food technology can be modified for some types of breakfast cereal, especially various puffed grains. Since top management supports the addition of the product line, the concept is moving quickly through the NPD process. Respondents in this company feel that without top management support for a new-to-company product, which will require some technology acquisition and additional marketing efforts, such a concept would be killed.

Marketing led NPD considers market potential, opportunity, and consumer voice as key issues. Among Thai companies, such corporate cultures are more often found in companies with strong presence in fashionable consumer packaged food, and food service manufacturing and catering. Most leading MNCs are marketing oriented in NPD. These companies compete most often in the middle or higher parts of the market, where price is not as important, and product characteristics can give key competitive advantage. Marketing research plays a major role, as companies seek to understand consumer needs and wants in great detail throughout the NPD process.

However, often marketing research is not as effective as it could be because it may not be specific enough to the particular new product, especially among Thai companies. This is primarily because many companies are afraid that competitors will learn of the NPD and push their own new products into the market first. Even marketing oriented Thai companies sometimes introduce new products in which poor analysis of customer needs during the NPD process leads to market failure. As previously noted, most MNCs make fairly effective use of marketing research.

In our study, there were no Thai food companies with purely market led NPD process, though very strong (if not complete) market driven NPD is more common in MNCs. Some were a mixture between marketing and manufacturing oriented, where both functions have considerable input into NPD. There were also some Thai companies which were mixed between marketing and top management led, usually with marketing taking a larger role in additions or modifications to existing product lines, and top management dominating NPD decisions on new-to-company product line additions. The latter mix is also quite common among some food MNCs.

Products with short life cycle, or “fashionable” foods are often targeted at children or teenagers, and include snacks, confectioneries, ice cream, and bakery items. Companies marketing such products must introduce new products, frequently and quickly, to keep ahead of fads and desire for variety, or consumers lose interest, and move on to other brands. Those more comfortable with risk introduce many, and hope that some of these many new products can succeed in the market. The NPD process moves from idea through a rather superficial definition, right into full scale development. Throughout, product and market are only roughly defined. Marketing is often consulted about consumer preferences, but little effort is made to actually incorporate consumer response through integrating marketing research into the process.

More risk averse food companies are “laggards,” which always follow others in NPD. They do not want to take the risk of introducing unproved products. Their NPD is mostly focused on developing their own versions of products which have already been successfully launched by competitors. This strategy also requires a certain amount of marketing expertise, and usually can be applied successfully only by companies which have well established brand names. Subsidiaries of

MNCs may be either type, but often strictly follow the policies of their mother companies concerning NPD and branding.

In our study, MNCs in such markets mainly have marketing led NPD, and a few mix between marketing and top management led NPD. Thai companies tend to have strong marketing skills, but are likely to have elements of top management led NPD. Marketing is critical because it is difficult to manage rapidly changing multiple products in multiple lines. Too many new products can cause poor product focus, confuse consumers by diluting brand identity, reduce economies of scale, and make inventory control more difficult. In markets with short product life cycle, new products result in increased sales to replace declining sales of other product. The declining products must be phased out, or the line becomes unmanageable.

One local manufacturer which supplies bakery products (such as breads, cakes, cookies, buns, pastries) to retailers and fast food restaurants introduces at least three new products per line each quarter. This manufacturer tries to keep the total number of products constant at about fifty, or about 6 to 10 varieties per line. At this level, production is complicated and somewhat difficult to control, but still manageable. To maintain product lines, poor performing older products are phased out as new ones succeed. Many new products themselves are dropped if they do not reach projected sales targets. Since consumer perceptions are not very strongly integrated into the NPD process, the failure rate can be high. Because of the constant need for many new products, NPD concentrates on the addition or modification of existing product attributes such as taste, aroma, size, form, and packaging.

Manufacturers of these foods face more pressure than most food producers, since such products usually have low profit margins and must maintain high inventories, to accommodate ever changing tastes. One Thai company claimed that the popularity of western media, trade liberalization, and changes in marketing channels have made it imperative to upgrade products and NPD, since Thai consumers now judge products by global standards, and compare to global brands. Another local company decided to sell its potato chip factories and brand name to Frito Lay (Thailand) because the market has become too competitive and will get even tougher with more MNCs moving in. It plans to focus its NPD on upgrading existing products in slower changing markets rather than attempt to continuously introduce new products (Jitpleecheap, 1997).

Long life cycle food products allow different NPD strategy. Companies which produce such things as health food, baby food, dairy products, beverages, and canned food must be much more careful in NPD. Simply coming out with many new products quickly gives little advantage. The long term viability of the brand depends much more on introducing quality products with real product benefits which consumers accept. Much NPD is oriented toward upgrading quality with better ingredients and/or formulations, rather than coming out with truly new products. NPD is also oriented toward learning to produce the product more efficiently.

According to Utterback and Albernathy (1974), NPD for short life cycle products would focus more on product innovation. For long life cycle food products, usually in the mature stage, NPD would focus more on process innovation. This is somewhat apparent in Thailand, where manufacturing issues take on stronger importance in companies with long life cycle products. Manufacturing usually plays a stronger role in NPD, and top management is usually more involved in manufacturing. For short life cycle food products, marketing is often more involved with NPD, and marketing has stronger top management involvement.

3.1. CORPORATE ORGANIZATION FOR NPD

According to Clark and Wheelwright (1992), organization structure in innovative companies should serve two conflicting requirements. It must facilitate coordination of NPD tasks, and also facilitate flow of information, and each must work both vertically and horizontally. Vertically, the linkage between strategic management innovation activities is critical. Horizontally, several functional areas are important to effective NPD; for example, we have already noted that manufacturing and marketing may play important roles in Thailand. This is important for innovation which is a combination of several, often unrelated disciplines which can cross fertilize ideas.

Dynamic, growing organizations should have very strong team orientations, especially across functions to achieve focus on customers and knowledge sharing. Recent studies have shown the advantages of flat, lean team organization built around business processes that cut horizontally across functions, driven by customer satisfaction and product improvement (Clark and Wheelwright, 1992; Twiss, 1992). Conversely, Olson, Walker and Ruekert (1995) proposed that the more bureaucratic organization can achieve better NPD in less innovative products.

However, the bureaucratic process in a large, complex organization can require tedious documentation and approval at every stage, causing delay in developing both new product lines, and additions or modifications to existing lines. For example, one large MNC uses a very complex team structure, including multiple representatives of some functions. Manufacturing participates through top management in manufacturing, the factory manager, and the production manager. Marketing representatives include top management in marketing, the group product manager, and the brand manager. There are still other members on the NPD team, such as from finance, manufacturing service, food registration and application group.

Every stage of NPD requires approval and comment from all functions, and procedures must be documented and circulated to every related function as well as to the mother company. Moreover, there is no local R&D, so new products and processes are developed through coordination of all this between regional R&D, and local functional team members. This tedious and inflexible organization, together

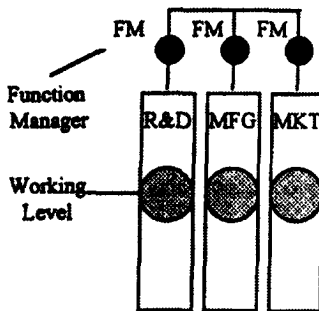


Figure 1a: Functional Team Structure

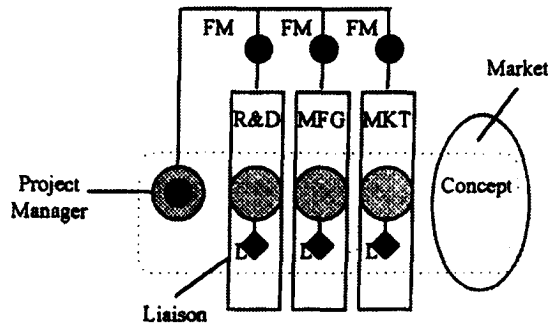


Figure 1b: Heavy Weight Team Structure

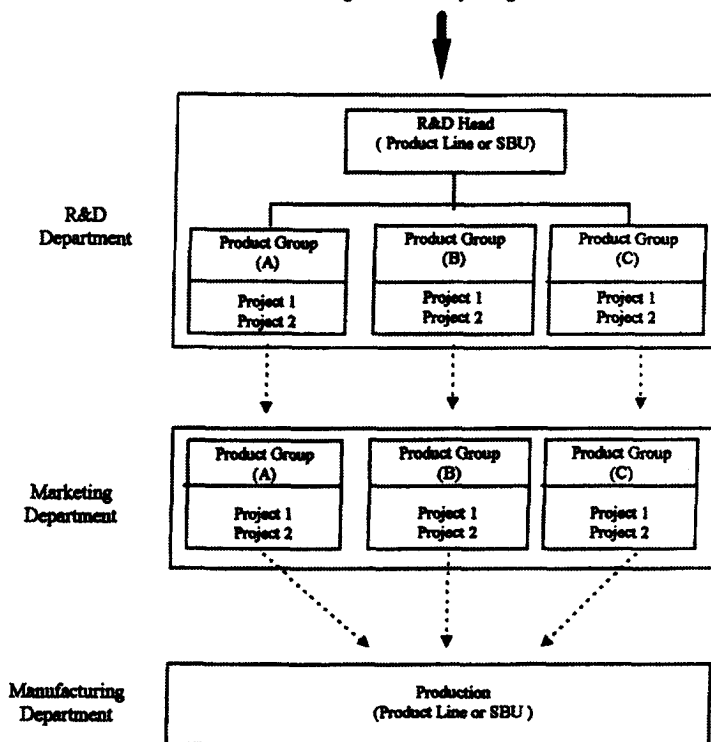


Figure 1c: Organization of Project Team by Product Group

Figure 1. Project Team Structure and Team Organization
(adapted from Twiss 1992; Clark & Wheelwright 1992)

with the lack of local R&D focus, almost guarantees that this company is a follower in introducing new products into the market, even though it may have started with a concept earlier than some other competitors.

Among Thai companies, these frameworks do not seem to apply well, either. While both cross-functional and bureaucratic organization are present, they seem

to be applied in reverse of what might be expected from Western literature on NPD. As discussed above, heavy top management involvement in the NPD process is stronger for new product lines, which are unfamiliar, more risky, and may require high investment in both production facilities and promotion. This seems to be the case both in smaller, leaner companies and in large bureaucratic organizations. In our study, such investment is almost impossible without participation of top management. But top management can speed the NPD process up in such conditions, so that it operates faster than cross-functional team approaches.

In most manufacturing or top management led Thai food companies, the project team is permanent, consisting of team members grouped by discipline into the "functional team structure" (Figure 1a). NPD projects often start from ideas which each function agrees to at the outset. However, the NPD process is separated into several independent activities, and the project passes to each function sequentially by "throwing it over the wall" (Clark & Wheelwright's terminology, 1992). Each function tries to finish its tasks without much attention to the overall process, usually viewing the ultimate success as the responsibility of marketing or top management. Most local R&D personnel think R&D's task is only developing the prototype according to marketing's product definition. Marketing is charged with test marketing and should approve the final product, and as such, is responsible for the success of the new product.

In marketing led NPD, marketing would evaluate the market and forecast potential for the new product idea without consulting other functions, but organization of the NPD project is similar. R&D, considered a separate function, is responsible for developing a prototype according to marketing's product definition and concept. Once the prototype recipe or formulation has been adjusted to meet marketing's satisfaction, this is the end of R&D's task. Success or failure of the new product is not R&D's concern since they simply follow specifications and instruction from marketing. Manufacturing then becomes responsible for converting the lab prototype recipe and process into real production, following the specifications obtained from R&D. Manufacturing tries to do this, and the finished product coming off the production line becomes the responsibility of marketing to sell.

Many MNCs apply matrix organizations to NPD project management, designed to clearly separate managerial and professional responsibilities for the project. R&D, manufacturing, and marketing are responsible to a project manager for progress on the project, and are also responsible to their discipline head for the routine work (Clark and Wheelwright, 1992). Team members physically reside in their functional areas, and each function designates a liaison person to represent it on a project coordinating group (Figure 1b). This approach usually figures as an add-on to a traditional function organization. The project leader who coordinates the activities of different functions is appointed based on project characteristics. For example, if the project emphasizes process innovation, someone from manu-

facturing will become project manager. The project leader has direct access to and responsibility for the work of all those involved in the project.

However, many MNCs and large Thai companies with more effective NPD organize by dividing into several product groups. These companies tend to be quite marketing oriented, and each group is differentiated by important characteristics of products or markets. For example, Unilever (Holding) Thailand groups its NPD team, by using target customer segments, into children, teenage, and adult product groups. Frito Lay (Thailand) groups by product brand, into Lay, Cheetos, and other brands. CP (Bangkok Produce) groups by customer location, into Asia, USA, Europe, and Japan. Each team consists of R&D and marketing within the same product group, which results in more product focus and accumulated knowledge sharing within the group (Figure 1c). This organization strengthens the marketing orientation of R&D, since R&D and marketing in each product line will work together within the same product groups.

Each product group chooses NPD projects according to the group's area of interest. For example, the "children" ice cream product group in Unilever handles projects such as Fantasy ice cream, Pop ice, Ice jelly, or Push up ice. The "adults" group covers Magnum, Asian delight, Carte d'or, Viennetta, Cornetto, and American snack, while the "teen" group looks after Fruitline bar, Yogurt ice-cream, Calippo, and Carbonated ice. Project members are usually assigned to a project team on a permanent basis. Some companies circulate team members to help bring in new perspectives and fresh ideas to every product group and its projects. Manufacturing in such structure is not divided into product groups, because most product groups within the same product line do not differ much in manufacturing process.

3.2. R&D Relations to Functional Areas in NPD

In organizations where functions are not entirely separate in the NPD process, R&D is often subordinate to one of the business function, often marketing or manufacturing. Business managers and R&D managers may have very different incentives, motivations, and personality. Frequently, the commercial orientation of most marketing managers and many manufacturing managers may lead them to terminate long-term uncertain or risky projects, while R&D managers still believe in their potential value. The business managers may refuse to fund or support early stage research, which can result in little significant NPD if carried too far (Arnold, 1992).

The goal of placing *R&D under marketing* is to bring scientists closer to customers and stimulate information sharing between R&D and marketing in order to make research faster and more productive. This reduces communication problems and time to market of new products. However, NPD under this kind of organization can succeed only when the marketing or brand manager actually take part in the NPD process. The company needs a distinct policy on new products, otherwise

the marketing manager may just work on marketing current products and leave the R&D department to develop new products without any input about market needs. If that is the case, many new products may never be commercialized.

In many Thai companies where R&D is formally under marketing, marketing does not actually become highly involved in NPD. It may not want to take risk and put in extra work, preferring to sell existing products which are more predictable. For example, in one leading Thai instant noodle manufacturer, R&D for new product lines (platform products) falls under marketing. R&D came up with an idea for instant rice, a new product line, and developed a prototype in the lab. There was no participation by marketing, and without marketing support, the project is on hold even though the prototype is already developed. Never having investigated whether there would be any demand for instant rice, marketing is waiting to see market opportunity demonstrated by the successful launch of a competing brand, after which they can rush in.

Even if marketing realizes the importance of new products, they often prefer to devote more attention in minor modifications such as changing taste, flavor, size, or packaging of the established instant noodle brands. Consumers are risk averse about new products, they argue, so marketing must be cautious. (Consumers are cautious about truly new product concepts, but companies in Thailand are not introducing new-to-world products.) It is better to be a fast follower than an innovator, and the leading brand name in instant noodles can quickly regain any advantage lost to a more innovative competitor. Marketing wants R&D to develop several potential new products (such as the instant rice) and wait until market opportunities present themselves.

This kind of attitude is quite discouraging to R&D personnel, and can stifle their innovative capability, since they are isolated from other corporate functions and see no immediate results from their job. To make NPD work better when R&D is under marketing, NPD must be explicitly included as one part of the marketing manager's job responsibility. Goals for new product introductions and associated sale targets should be set, so that marketing is more proactive about new product introductions.

One other problem of placing R&D under marketing can be poor communication with manufacturing, so that R&D for process development and cost reduction are less efficient. *R&D under manufacturing* is supposed to solve this, especially when NPD is mainly oriented toward product line additions or modifications. For example, the instant noodle manufacturer noted above had R&D for new lines under marketing, but other R&D was subordinate to manufacturing. This organization also has advantages for R&D activities related to process development and cost reduction.

Of course, this can lead to ineffective communication between R&D and marketing. Preliminary screening of product concept is done by the manufacturing function, which considers mainly manufacturing facilities. For example, in one

Table 2. Company Characteristics vs. NPD Activities and Competitiveness

Company Characteristics	NPD Characteristics	Competitiveness in NPD
Company culture		
• Top management led NPD	<ul style="list-style-type: none">• Usually found in family owned local company.• Top managers dominate NPD activities and make final decision based on their own feel for the market and customer.• Usually in MNCs producing fashionable food targeted at children or young adults, short life cycle food products, and manufacturing for food service and catering.• Market potential, market opportunity, and voice of customer are considered key issues for NPD.• Market research plays a major role in NPD (but local companies usually apply in the latest stage of NPD).	<ul style="list-style-type: none">• Top managers are risk taking, have high decision power so the NPD process can be speeded up, especially for high risk new product lines.• Lower risk of mismatching new product characteristics with customer needs and preferences.• Market oriented NPD enables fast response to market changes and customer behavior.• Marketing activities such as promotion and advertising are highly applied.• Communication between R&D and marketing increases, but is lower between R&D and manufacturing.
• Marketing led NPD		
• Manufacturing led NPD	<ul style="list-style-type: none">• Usually in food manufacturers for OEM customers or in companies targeting low price market segments where cost and productivity are the most important issues.• NPD screening criteria are mainly use of existing facilities, investment cost, labor cost, and productivity.• R&D focuses mainly on cost reduction and product improvement rather than NPD.• There is usually no customer involvement in NPD process.• New to market and new product line are hardly developed in this type of company.• Marketing research is seldom conducted. Market attractiveness and customer needs are assumed from top manager or plant manager’s experience.	<ul style="list-style-type: none">• Makes full use of existing facilities.• Effective for mature long-life food products, new products targeted at low price market segment, or OEM customers for whom price is the major criteria for buying decision.

(continued)

Table 2. (Continued)

Company Characteristics	NPD Characteristics	Competitiveness in NPD
R&D organization		
• R&D under top manager	<ul style="list-style-type: none"> • R&D department is under top manager, at the same level as marketing and manufacturing departments. • R&D manager is autonomous, has decision power in new product projects, especially in technology related issues. • R&D has direct and equal communication with both marketing and manufacturing. 	<ul style="list-style-type: none"> • R&D is autonomous, empowered, and communicates directly with project team members. The project team has more decision power concerning NPD and more effective information flow among project team members.
• R&D under marketing	<ul style="list-style-type: none"> • R&D department is under marketing, as an operational function. R&D develops new products according to marketing or top manager's vision. • New products ideas are usually created by marketing, based on experiences, market analysis, and market research. R&D develops prototypes according to marketing. • If NPD activities are not specified as marketing's job, then marketing usually neglects R&D, and does not support strong research budget. In such cases, R&D usually develops new products without much attention from marketing, which are seldom pushed into the market place. • NPD in new product lines is usually inactive since marketing may not want to take risk. NPD in existing product lines is more active, because marketing needs low-risk new products to boost sales. 	<ul style="list-style-type: none"> • R&D under marketing can react quickly to customers via information sharing between R&D and marketing. • NPD process can be faster and more productive if marketing also involved in NPD process and new product marketing. • Less effective NPD is found in companies where R&D is under marketing but new products are not considered marketing's responsibility.

<ul style="list-style-type: none">• R&D under manufacturing	<ul style="list-style-type: none">• R&D department is under manufacturing especially in companies where manufacturing process and cost of production are critical, such as OEM manufacturers or low price food products.• R&D usually involved in manufacturing issues such as cost reduction, product/process standardization, product/process improvement, and cost reduction. New product ideas mainly screened by considering manufacturing issues such as productivity, investment cost, and uses of existing facilities.• R&D department may be split into R&D of existing product lines organized under manufacturing, and R&D of new product lines organized under marketing. This type of organization causes loss of accumulated knowledge and information flow within R&D department.	<ul style="list-style-type: none">• R&D under manufacturing is effective for product and process improvement, cost reduction by manipulating product ingredients, and process optimization. But product quality may be impaired since R&D may relax specifications to make the manufacturing job easier.• NPD is usually not effective especially for new product lines. NPD for new product lines is quite impossible in this type of organization except when the NPD
<p>Nature of product</p> <ul style="list-style-type: none">• Long life cycle new product	<ul style="list-style-type: none">• New products with expected long term viability, such as baby food, health food, dairy products, beverages, canned foods and core brand products, etc.• New product success means significant benefit to company, so marketing research and customer studies are usually applied.	<ul style="list-style-type: none">• Long life cycle product success should be targeted at long term.• New product should incorporate brand image, quality, and distinct product benefit which customer can perceive, rather than introduce too many fad new products targeted at short term success.• Cost reduction and product improvement are considered when the products become mature or when there are many competitors in the market.
<ul style="list-style-type: none">• Short life cycle new product	<ul style="list-style-type: none">• New products which are fashionable, targeted at children or young adults (they like to try new things) such as snacks, ice cream, confectionery, bakery products, etc.• Companies usually introduce too many fad new products targeted at very short term success.• NPD process usually moves from idea through rather superficial definition into full scale development with only rough product or market definition.• New products are usually incremental, following market trends or competitors.	<ul style="list-style-type: none">• Should continue to introduce substantial new products and limit numbers of on-the-shelf products.• New products require fast reaction to market and customers, so preliminary market research and customer studies are important.• Exciting qualities such as product characteristics, packaging, design, promotion, and advertising are important.

(continued)

Table 2. (Continued)

Company Characteristics	NPD Characteristics	Competitiveness in NPD
Project team organization • Independent functions	<ul style="list-style-type: none"> • Each NPD related function is independent. New product projects are passed sequentially to the next function without much attention to the overall process. New product success/failure is pushed to marketing or top management's responsibility. • There are no real project teams, only groups of people who work on new products as an add on to their routine jobs. • Team members physically reside in their functional area and each function designates a liaison person to represent it on a project group. • Project teams are empowered, much decision making power concerning new product project. 	<ul style="list-style-type: none"> • NPD activities are not considered as team members' job responsibility, but rather as add on to everyday job. Members consider themselves in operational functions which just do according to the normal routine. New product success has no benefit to their work performances. • NPD is considered major part of their job. New product target is set and has to be achieved. • NPD team works closely together and is responsible for different tasks. Communication and information flow within project team is high so every aspect and problems related to new product are discussed. Participation by all project team members. • All team members consider themselves as one part of project team. New product success is greatly attended to by every team member. • Similar to cross functional team but this organization focuses within each product group. This makes the NPD activities more focused towards target customer, market, and brand name. It benefits in the accumulation of technology, market, and customer knowledge specifically within the product group.
• Cross functional focus around product group	<ul style="list-style-type: none"> • Team members physically reside in their functional area and each function designates a liaison person to represent it on a project group specifically in the product group except manufacturing function. (For example, project team in ice cream product line is divided into kid, teen and adult product group which the project team are focus within each product group). • Project teams are empowered, much decision making power concerning new product project. • Project leader who coordinates the activities in different functions is appointed based on project characteristics. (e.g., if the new product concerns process technology such as new form or new design of food product, then manufacturing should become project leader, etc.). 	

<div>• Bureaucratic NPD Process</div>	<div><div>• In local companies the bureaucratic NPD organization is usually found in top management led NPD, where senior managers dominate NPD process and decision making. Other functions are operational functions which follow the top manager.</div><div>• In MNCs, this is often found in NPD of the corporate core brand. Every stage in NPD must be reported and gain approval from mother company. Often, core brand new product ideas are initiated by mother company, or it is the mother company's policy to launch this new product.</div></div>	<div><div>• In local companies, this type of organization can speed up NPD process.</div><div>• In MNCs, this organization enables total control of core brand's product quality and specifications, brand image, and cost. Moreover products under core brand are manageable and controllable according to the mother company's policy.</div></div>
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local company, the factory manager makes the final decision in preliminary screening of every new product idea. Any new product which requires investment in new machinery or has a complex production process is rejected out of hand.

Moreover, manufacturing sometimes conflicts with R&D on product quality, compromising specification's set by R&D in the attempt to boost productivity, reduce costs, and improve production planning. The plant manager may have authority to approve lower quality inputs or change product details to streamline production. According to R&D respondents in most Thai companies with this organization, this had happened frequently. In extreme cases, R&D's main task is reduced to finding substitute raw materials and modifying process. Placing R&D under manufacturing, then, does give some advantages to companies that are highly concerned with manufacturing efficiency and cost, but it makes it difficult to maintain much customer orientation in NPD.

R&D is sometimes directly under top management, operating as an autonomous function. This can give R&D direct, equal communication with both marketing and manufacturing, and preserves more decision power for R&D. Ideally, through marketing, it has information on customer needs and preferences, and through manufacturing, it knows key production parameters to keep specifications realistic for efficient production. Of course, in practice, this organization works well only with good communication. Otherwise, products may not match market needs, and process or specification may be unreliable or uneconomical. These organizations of NPD are summarized in Table 2.

3.3. Organization of NPD Activities

Information flows are very important for the success of NPD. Internally, R&D must have good linkages with marketing and manufacturing. Functional specialists in these fields bring accumulated knowledge to NPD projects, reducing difficulties and development time, and increasing the options open to the NPD team (Olson et al, 1995). Externally, linkages with suppliers, customers, and technology sources must be good. Information flow among multiple R&D projects is also important. Otherwise, some things get developed more than once, or some innovations never get introduced in other areas where they may be popular. Poor information flow in any of these components can greatly reduce the effectiveness of NPD.

Linkages across R&D Projects: In the MNCs in our study, local R&D, the regional R&D center, and R&D in the mother company usually had some sort of communication. Giant MNCs such as Unilever manage their innovation effort across countries, across product categories, and between all parts of the business (R&D, supply chain, marketing, etc.). They aim for rapid communication and diffusion of successful innovations throughout the company, and strongly link innovation strategy to business strategy and improved efficiency in the innovation process.

Thai companies usually do not show this level of integration of information. For example, one major local conglomerate has businesses in a very wide range of products in many countries, including chicken farming and processing, prawn farming and processing, sausages, dairy products, bakery products, and very many frozen foods. However, the R&D groups in different businesses have never communicated or shared information, and there is no corporate policy on sharing such information. Often business groups even regard themselves as competitors, and would be likely to resist sharing information on R&D.

Internal Linkages: In well organized NPD, marketing contributes to product idea/concept and product definition/specification. R&D uses this information to create prototypes, reducing the number of experimental formulations during prototype development, and increasing the chances that the new product will ultimately be accepted by the market. Manufacturing considers similarity with existing process and management an important issue in NPD, and favors new products for which it has substantial experience and existing facilities. R&D considers these views, and uses knowledge of existing products and production process in its NPD process. Part of this linkage is internal to the company, but much of this sort of knowledge is outside, since many food companies actually subcontract the manufacturing of some or all of the product and/or package.

Leaving out one of the key functions can cause problems. For example, in developing new ice cream bars, the project team in one leading MNC included representatives from R&D, marketing, and process development. The process development person specialized in ice cream production equipment, but did not routinely work on the production line. The team developed prototypes of new bars consisting of several colors, which could be produced with technology already

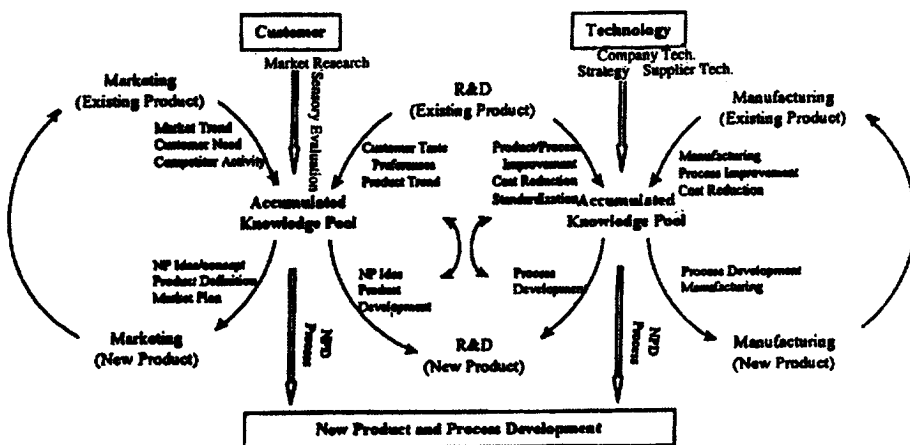


Figure 2. R&D, Marketing, and Manufacturing in NPD

existing in the factory. Once in production, however, the need for color purity for each new batch resulted in high wastage and uneconomical production. This unexpected problem arose because manufacturing was not strongly integrated in NPD.

Figure 2 demonstrates how NPD should work in the Thai food processing industry. Marketing must provide knowledge of what is happening in the market place. It should participate in developing and screening new product ideas/concepts, and it should be able to outline a marketing plan right at the beginning of the NPD process. R&D needs to know the potential market impact before it commits resources to the project. Manufacturing should also be involved early. While it might have somewhat less to contribute to development of product ideas/concepts, it should certainly begin to evaluate production feasibility as soon as there is a concept, rather than wait until after prototypes have been developed. R&D must be aware of the production line impact of whatever specifications and standards it proposes. R&D becomes the integrator of accumulated knowledge.

Supplier linkages: Marketing and manufacturing are also the conduits through which pass accumulated knowledge from customers and the external technology base. These two functions must have systems in place to capture such information and integrate it into the work carried out by R&D. This may translate into formal marketing research functions, explicit technology strategies, or a somewhat less formal method of integrating outside sources of knowledge, but there must be some form of information linkage. Of course, the model (Figure 2) is not always achieved in practice, as previous discussion indicates.

Increasingly, suppliers are becoming the source of technology and information about technology in the food processing industry. Supplier expertise in basic technology is one consideration when food companies select vendors. Suppliers play a major role in developing new packaging or raw materials, as well as processing equipment (Hollingsworth 1995). A great deal of R&D is imported into the food industry, embodied in processing and packaging equipment. In-house R&D is less necessary in such cases (Galizzi and Venturini, 1996).

This is a common pattern in Thailand, especially among Thai companies. Most innovation in process technology depends mainly on expertise acquired from equipment suppliers, rather than direct R&D. Much product technology actually comes from ingredient suppliers. Thai food manufacturers themselves are not major sources of technology innovation. This gives suppliers a role in NPD, especially if the result would require unique process or product technology. It also limits the scope of NPD, because supplier technology is usually aimed at a broader market, not customized to a particular food company's requirements.

Production ability cannot give sustainable competitive advantage in much of the Thai industry, because competitors could easily acquire similar production technology if they wished to buy it. In our survey, no basic research on production was conducted by any local or MNC food company in Thailand. However, in Thai companies, the extent of technology collaboration with suppliers depends on the

technology needed to produce food products. Where production (or product) technology is more complex, there was closer collaboration, such as in extrusion technology for many snack foods, or nutritional science for health foods. This pattern was also present in MNCs, but with them, higher competence in the technology by the mother company often reduced the need to collaborate with suppliers.

The degree of collaboration also depends on the management's concept of where competitive advantage comes from. OEM manufacturers, and also those which try to maintain price advantages based on efficient manufacturing (rather than by lowering product quality) sometimes collaborate less, on the theory that the process technology is the basis of their competitive advantage. Some companies also have proprietary technology in the form of product formulations/recipes, and they do not collaborate as readily on NPD. Companies which believe that their main strengths lie in marketing tend to be more open to collaboration, even though they still require substantial levels of trust before they will start working closely with suppliers.

Whatever level of collaboration, R&D in Thai companies mainly plays an integrative role, combining externally obtained technology and innovations through manufacturing expertise and knowledge of market to come out with new products which have potential in Thailand. Competitive strategy depends on expertise in this integrative function, not innovation. For example, a supplier of flavors conducts R&D with Thai customers, who are constantly developing new flavors of current products. The customers do not do much basic research on flavors, that is the role of the supplier. Customers concentrate on very applied R&D for specific products, and rely on the supplier to solve any product flavor problems when the flavor is applied to a new product.

Some food companies invest more in basic research so that they can compete not only with products, but also with proprietary technology. In Thailand, these are usually MNCs. While some of the research may be conducted in Thailand, the strategy is worldwide, not specifically Thai. For example, Nestle conducts considerable basic research in nutritional science, and applies it to product lines such as health food, baby food, and feed. Unilever conducts research in biotechnology, such as genetic engineering of palm oil. P&G does research in fat substitute food ingredients. This last example shows that some food manufacturing companies have expanded vertically to become food ingredient suppliers. These ingredient supplier subsidiaries may become involved in R&D support for Thai companies, as noted above.

Consumer knowledge: In our survey, R&D personnel often claimed that information was not efficiently transferred from marketing to R&D. This led to poor product definition and caused R&D to develop prototypes which did not correspond to real market needs. Nevertheless, local food companies usually overlooked the importance of directly measuring consumer attitudes toward new products or concepts. They did sometimes measure response to objective attributes

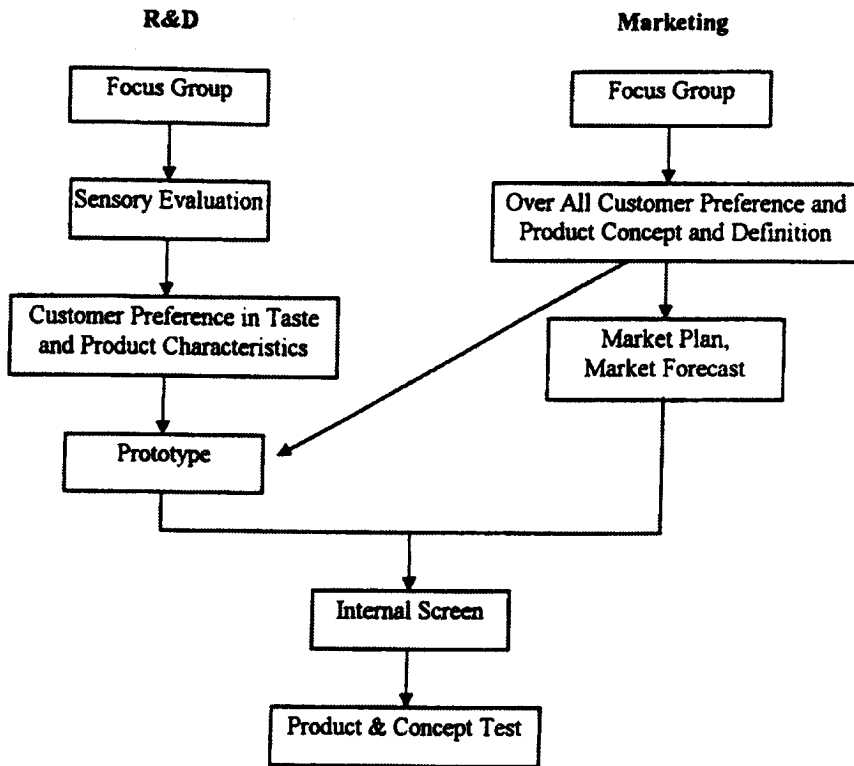


Figure 3. R&D And Marketing's Customer Interface For Prototype Development And Market Planning

such as appearance, size, shape, or package, but rarely pursued more qualitative issues such as sensory evaluation or assessment of product personality.

MNCs with strong market positions were more sophisticated in their integration of marketing research into the NPD process, and paid substantially more attention to such subjective measures, as well as measuring response to objective product attributes. One snack food MNC routinely conducts sensory tests of potato chips by using a series of focus groups in various age groups. R&D tests potential new product ideas, and records results for use also in future projects. This knowledge of flavor and taste profiles for various age groups helps substantially reduce prototype development by eliminating unacceptable combinations.

Extensive knowledge is available, for example, about response among different age groups to pork flavors created by various flavor suppliers flavors and seasoning combinations R&D has created using these flavors. Such information is used right at the beginning of NPD, when concepts about new flavor combinations are

being screened. Marketing also evaluates the potential market, outlines a marketing plan, and forecasts sales. As the NPD project develops a prototype, marketing conducts more research to determine response to an actual physical product, and refines other product aspects. Figure 3 presents a simplified summary of such integration of marketing research into NPD in many MNCs.

Potato chips, for example, may be developed in ruffled or flat form, depending on how consumers respond to the tastes combined with different physical form. Usually, different segments prefer different combination, in this case, teenagers liked the ruffled chips better, while adults preferred flat ones. The testing of the prototype allows R&D and marketing to modify product and marketing plan. The modified prototype may need more marketing research before it is finalized and the project moves on to later stages.

Some companies integrate customer knowledge in a sporadic manner, but one giant MNC cited the potential for failure if it skimped on marketing research. A leader in infant milk powder, it tried to come up with a cheaper alternative for low income mothers, but it neglected detailed marketing research as it developed the product concept. Its soy protein substitute milk powder was nutritionally sound, and cheaper than genuine milk powder. But low income Thai mothers did not accept the product because they wanted top quality for their babies, which they associated with the more expensive, genuine milk powder.

4. CONCLUSION

NPD in Thailand is heavily oriented toward specific new products and does not aim to develop truly new-to-world products through major advances in product or process technology. Very few Thai food processing companies compete on innovation in technology. New product lines may be developed, but based on technology and products available in other companies or countries. Most new products are simply additions to existing product lines or modifications of existing products. Some food MNCs do compete by developing new technology, but the majority of new technology which they use in Thailand was probably developed in R&D in other countries.

Thai companies see their competitive advantage in NPD as lying in an integrative form of R&D. NPD brings together marketing and its knowledge of customers, manufacturing and its knowledge of process, and R&D to develop products which fit market needs and are efficient to manufacture. However, actual organization of R&D in Thai companies does not usually match this ideal thinking about how Thai companies use NPD to compete. They are likely to place R&D under either marketing or manufacturing, rather than as an integrative function, and sometimes it is under top management, subject to whims of key executives or owners. In most cases, the more effective organization of NPD is found in MNCs.

This is not to say that Thai companies do not keep up with NPD, or that all Thai companies have inefficient NPD. Some are efficient, and most larger companies do keep up, but the NPD process is sometimes not very efficient. Often, it is simply a matter of developing a lot of products continuously, putting them on the market, and seeing which ones make it in terms of sales volume or profitability. Of course, our research uncovered cases where MNCs also operate this way, but not as frequently.

The Thai food processing industry is still very competitive in Southeast Asia, but this cannot be taken for granted forever. As the economy continues to develop and markets continue to expand (notwithstanding the current temporary recession), MNCs will increasingly be attracted and competition will get tougher. NPD must be upgraded. There are several key areas of difference where the average Thai food company could learn from how many MNCs operate NPD.

Focusing on core competency is one area. Many Thai companies are conglomerates operating in a wide variety of food areas. R&D in one area may be little relevant to another area, so knowledge accumulates more slowly about any one product line. Many MNCs are more focused, operating in fewer product lines but much more widely geographically. R&D in many countries, all on related issues, provides much greater knowledge accumulation. On this issue, there is some indication that several major Thai food processing companies have been forced by the current economic circumstances to focus more carefully. Whether this will translate into benefits in NPD remains to be seen.

Strategic thinking about new product lines (platform products) is another key difference. Many Thai companies do develop new product lines, but it is usually because top management has seen the product performing well for a competitor. MNCs are more likely to evaluate how the product fits into their overall strategy, including fit into current manufacturing technology, current marketing and distribution, and the importance of the market for the new line to future sustainable growth. Particularly in companies where manufacturing dominates NPD, any new line requiring substantial investment in production facilities is likely to be rejected, regardless of its strategic potential.

Internal flow of information seems to work better in some MNCs than in most Thai companies. While they view themselves as being good at the integrative R&D noted above, most Thai companies do not actually organize NPD projects to facilitate information flow which could enhance this integrative role. NPD often passes from function to function sequentially, rather than gaining input from various important functions, particularly marketing and manufacturing, at several stages throughout the NPD process. MNCs are more likely to have NPD projects with matrix organization, where the functions all have their input throughout the process.

Integration of customer information is also somewhat weaker in most Thai companies than in MNCs. Marketing research is often not used until late in the NPD process, often after the prototype has been produced. We have no quantitative data

to assess this difference. But anecdotal evidence seems to indicate that a higher proportion of new products introduced by Thai companies are unsuccessful than is the case with some of the MNCs which have high integration of marketing research into the NPD process.

In some cases, some Thai companies may be able to operate better than MNCs. For example, where top management dominates R&D, decisions about new line introductions can usually be made more rapidly than in MNCs. Provided that top management has some basic knowledge of markets and manufacturing, this can help a Thai company respond to the market more quickly. Of course, as noted above, many of these decisions are not strategic, so whether this is an advantage in the long-term is debatable. Also, top management led NPD in Thai companies is more frequent in products with long life cycle than in those with short life cycle, but the short life cycle products are the ones which need faster response to the market.

Thai food processing companies also seem to do quite well at integrating knowledge from suppliers. The Thai food industry itself is not a major source of technology innovation, but it is fairly up to date on product and process technology because of access through suppliers. Suppliers do participate in NPD, which allows the Thai companies to develop new products more rapidly than if they depended completely on their own resources. It is rare that a MNC can bring out new products and maintain a monopoly on a product for very long if the Thai industry decides to jump into the market.

In short, Thai companies do need to upgrade their NPD process. They may have a few advantages over how their MNC competitors organize NPD, but in many aspects they seem to be much less effective. MNCs have already made a huge impact in the Thai food processing industry simply by getting Thai companies to worry much more about competitiveness. While certainly not perfect in how they do NPD, MNCs can serve as a useful benchmark in the initial stages of reforming the process.

Enhancing NPD should not be a major challenge for many Thai companies. Many larger ones already have modern management, and incorporate some elements of effective NPD, especially those marketing products with short product life cycle. Smaller family companies, usually dominated by top management, and those with long product life cycles, have substantially farther to go to remain competitive. Nevertheless, the Thai industry achieved international success because Thai companies are quick to learn and adapt to new conditions. Some companies will undoubtedly fail to upgrade NPD to remain competitive, but the industry as a whole is likely to make the necessary changes to become a much stronger source of new products.

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