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RESEARCH REPORTS

New Food Products: Innovation, Improvement, or Imitation?

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Researchers have little understanding of what lies beneath the increased numbers and declining "innovativeness" of new food products. This paper investigates product innovation by focusing on both market- and firm-level relationships. Structural data is compared with innovation trends to determine possible associations. A mail questionnaire of 27 food manufacturing firms investigates the issues of strategy, practices and performance. The food manufacturing industries reflect the conventional wisdom that larger firms in concentrated markets invest more in product innovation efforts, but do not contribute proportionately more to innovative output. The declining "innovativeness" of food products results from emphasis on developing product improvements and imitations.

The number of new food product introductions over the past decade has almost tripled (NPN, 1990.) While not having gone unnoticed by consumers, market participants, and policy makers, little is known about the nature of product innovation in the U.S. food manufacturing industries. Does product innovation improve firm performance? Does product innovation alter the nature of competition and the structure of food markets?

Generally, what is known about product innovation has been studied and researched by industrial organization (IO) economists and business management scholars outside of the scope of the food industry. IO economists have studied market-level economic motivations for product innovation (Scherer; Acs & Audretsch), while business management scholars have studied new product development at the firm level (Crawford; Guiltinan & Paul). These two competing frameworks, one focusing on the market and the other on the firm, have recently been formulated into a new synthesis of strategic market management (Porter; Rogers and Caswell). However, thus far this framework has not been directly applied to

product innovation issues within the U.S. food system.

Joseph Schumpeter was among the first to recognize the integral role of innovation in economic growth:

*... the fundamental impulse that sets and keeps the capitalist engine in motion comes from new consumers' goods, the new methods of production or transportation, the new markets, the new forms of industrial organization that the capitalist enterprise creates.*¹

Much more recently, the editors of *New Product News* reinforced the importance of innovation to individual firms when, in 1995, they wrote "*Innovate or die.*"² This notion appears to be particularly true in the food industries. The CEO of General Mills was quoted in September, 1995, as saying "Food categories are absolutely driven by new products, product improvements and marketing innovations."³

Clearly, innovation is a dominant trend in the U.S. food industry. Two observations about re-

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¹ See Schumpeter, Joseph A., *Capitalism, Socialism, and Democracy*. 1950.

² See *New Product News*, January, 1995.

³ See Stephen W. Sanger, CEO, General Mills Inc., September, 1995 in the *Wall Street Journal*.

cent trends in food product innovation in the U.S. food industry are widely apparent. First, the number of new food products introduced by food manufacturers each year is large and increasing. *New Product News (NPN)* reports that in the ten years between 1984 and 1994, the number of new food products increased from 5,376 to 15,006. *NPN* projections for 1995 show continued increases, as the number of new food products is expected to reach a new all-time high. Marketing Intelligence Service (MIS) also reports a large amount of new food product activity. According to MIS, innovative product "introductions" stood at 4,758 in 1994, while new food product stock-keeping units (SKUs) totaled 13,451⁴. The *NPN* measure and the MIS "new SKU" use similar criteria. "Introductions" ranged between 35 to 41 percent of "new SKUs" from 1986 to 1994, suggesting that each "introduction" consisted of multiple SKUs. MIS reports that in 1994 alone, new food products accounted for 61 percent of all new consumer packaged-good SKUs.

Even though neither the "introduction" or the "SKU" measures reported by MIS correlates directly with the new product measure reported by *NPN*⁵, both the *NPN* data and the MIS data clearly show an increasing trend in new food products. *NPN* reports a 179 percent increase in the number of new products over the decade from 1984 to 1994. The introduction and new SKU totals reported by MIS show an increase from 1986 to 1994 of 38 and 59 percent, respectively.

The second observation in food product innovation is that while the volume of new food products is large and increasing, the percentage of new food items described as "innovative" by MIS is low and decreasing.⁶ In 1988, only 10.1 percent

of all new food products were considered innovative, and this measure fell to 4.6 percent in 1994.

This paper investigates these product innovation trends by focusing on both market-level and firm-level relationships. Specifically, this paper will:

1. Analyze new food product trends within the context of a changing competitive environment.
2. Investigate relationships among a company's new product strategy, behavior, and performance.

Together, these two objectives will hopefully lead to a deeper understanding of the nature of product innovation behavior in food manufacturing industries.

New Food Products and the Competitive Environment

The industrial organization theory has provided a useful framework for testing empirically the competitive environment and product innovation. Specifically, several studies have shown that (1) larger firms invest more into research and development (R&D), and (2) market concentration is positively correlated with these innovative efforts. Additionally, even though larger firms in concentrated markets are believed to invest more into innovation, proportionately speaking these firms may not contribute more to innovative output (Scherer, 1984; Acs & Audretsch, 1990). Are these relationships reflected in food manufacturing?

Product Innovation Input Relationships

As measured by R&D expenditures, the product innovation input relationships described in the literature appear to hold in the food manufacturing industries. While R&D in food manufacturing is far below the expenditure levels in other manufacturing sectors, and the positive relationship between firm size and R&D expenditure level witnessed in food manufacturing is less prominent than in other manufacturing sectors, large food manufacturers clearly spend more on R&D than do smaller food manufacturers. On

⁴ Generally, "introductions" are of broader scope than SKUs, as each introduction may contain multiple SKUs based on package size or formulation differences.

⁵ The definition each source uses to categorize a new product and the methods used for gathering data likely account for the differences between *NPN* and MIS data. Regardless of the exact magnitude, each measure points to a large number and substantial increase in the number of new food products introduced annually.

⁶ Products are classified as innovative by MIS if the product "offered consumers significant new or added benefits in one or more of the following areas: formulation, positioning, packaging, technology, or previously unmet market need" (MIS).

average, firms with less than 10,000 employees spend \$9.13 million (0.53 percent of net sales) on R&D, firms with 10,000 - 24,999 employees spend \$16.21 million (0.44 percent of net sales) on R&D, and firms with more than 25,000 employees spend \$60.64 million (0.54 percent of net sales) on R&D (NSF, 1990).

R&D activities are skewed toward the larger food manufacturing firms. Sixty-two percent of the R&D performed in food manufacturing is conducted by firms with 25,000 or more employees, while the remaining 38 percent is conducted by firms smaller than 25,000 employees. More specifically, the top 20 R&D performing food manufacturing companies account for 81 percent, and the top four companies account for nearly 44 percent of R&D expenditures (NSF, 1992). Therefore, the food manufacturing industry reflects the conventional wisdom that larger firms in concentrated markets invest more in product innovation efforts (R&D).

Product Innovation Output Relationships

The best available measure of R&D output is new product totals. New product introductions are somewhat concentrated. The twenty most active new product introducers, which make up just 0.001 percent of the 17,000 food manufacturing firms, accounted for 11.7 percent of the new food products introduced on the market in 1994. The twenty most active new products companies generally are comprised of the largest food manufacturing firms, suggesting that large food firms produce proportionately more new products than smaller firms. So, in the food manufacturing industry, firm size and innovative output appear to be positively correlated, contrary to conventional wisdom.

However, this conclusion can be refuted by three points. First, it is important to realize that in 1994, the remainder of the food manufacturing firms produced 88.3 percent of all new food products - a substantial 13,250 new food products. Second, even though the twenty most active product developers account for more than a proportionate share of new product introductions, this share has been declining. In 1987, the twenty most active companies accounted for 17.7 percent of new products, but by 1994 this had decreased

to 11.7 percent. Finally, it is clear that the true "innovativeness" of new food products is decreasing. Recall that MIS reports that in 1994, only 4.6 percent of new food products were considered to offer consumers any new benefits (versus 10.1 percent in 1988). Perhaps simply counting new products is not a completely accurate means for assessing innovative output. Unfortunately, no other measure is available.

Coinciding Trends

Aside from the large and increasing number of new food products each year, and the proportionately fewer products which offer consumers new benefits, the food manufacturing sector has witnessed several other distinct trends. The competitive environment of the food manufacturing industries has been characterized by decreasing numbers of firms, a shift toward larger firm dominance, and increasing market concentration (Connor, et. al, 1985; Census of Manufactures, 1992). Could these trends in the competitive environment be related to the product innovation behavior discussed previously?

The ability to test empirically a relationship between these trends is hindered by the limited nature of new product data. Very little new product data exist, and what does exist is not entirely complementary between sources. However, it is useful to investigate how trends in the competitive environment and product innovation behavior in food processing may be related.

It has been determined above that R&D activities are skewed toward the larger food manufacturing companies, and that these larger food companies produce more than their share of new food products. Since food manufacturers are becoming larger, and the industry is becoming more concentrated, it would be reasonable to expect that total R&D expenditures would increase, as well as the number of new food products.

R&D expenditure data shows a rise from \$1,081 million in 1984 to \$1,376 million in 1990 (NSF). Additionally, the number of new food products has clearly increased, suggesting that the structural trends of food manufacturing may be associated with the increase in new food product introductions.

New Product Development at the Firm Level

To this point, little has been said to explain the decline in the level of innovativeness of new food products. Why are firms producing fewer innovative products? To answer this, it is necessary to gain an understanding of firm-level product development behavior.

Methods

The business management literature suggests several key areas of importance in the study of product development within the firm: strategy, practices (both processes and structure), and performance (Crawford). A mail questionnaire was developed investigating each of these key areas. The survey was mailed to a sample of 27 food manufacturing firms, purposefully constructed to include a wide variety of companies. The sample included private, public, and cooperative firms varying in size, who offer commodity-based to highly value-added products. It was constructed through personal contacts made at the Food Marketing Institute annual convention, the Food Industry Management Executive Education Program at Cornell University, and referrals obtained from departmental faculty. Finally it was comprised of companies marketing brands with "household" names.

The mail survey method was chosen over a case study approach because it made it possible to include a larger number and a wider variety of firms. Furthermore, the small mail survey approach allowed the collection of quantifiable data from a wide variety of firms while still allowing for some personalized knowledge and understanding of the operations of the firms in the sample. Since so little information about food product innovation is available, knowledge of the participating firms, their products, and their operations aided in putting into perspective the responses to the survey.

A small sample was chosen because the delicate nature of the subject would have resulted in quite low response rates. For instance, a mail survey studying manufacturing methods sent to 3,120 food manufacturers resulted in responses from just 228 companies, or 7.3 percent. Because the sample for this project was generated from

personal contacts, the survey received a much higher response rate. Fourteen of the 27 firms participated in this study -- a response rate of 52 percent. The 14 companies represented a wide variety of firms, as five of the 14 companies were privately-owned, six publicly-owned, and three-cooperatively owned. Firm size ranged from \$25 million in sales to \$7 billion in sales.

Findings: New Product Strategy and Behavior

Respondents were presented with descriptions of three types of new products, and asked several questions about each new product type: (1) products that create an entirely new product category in the marketplace; (2) products that represent major (but evolutionary) improvements over products (yours or competitors') currently available to consumers in the marketplace; and (3) products that are generally similar to products (yours or competitors') currently available to consumers in the marketplace, with perhaps some modest enhancements. For this discussion, the first type will be called "innovations," the second type "improvements," and the third type "imitations."

Three questions were asked about these three types of new products. The first question asked was: "What percentage of your company's new product introductions fall into each class?" The second question asked was: "On which product class does your company concentrate the majority of its development effort?" The final question asked was: "Which type of new product do you believe contributes most to the long-term performance of the company?"

Interestingly, 44 percent of the new products introduced by the participants are "imitations," 39 percent are "improvements," and just 17 percent are "innovations" (Table 1). Only one company spends the majority of its effort on developing products that create an entirely new product category in the marketplace. Seven companies focus primarily on product improvements, while the remaining six companies focus the majority of their development efforts on products that are generally similar to products currently available to consumers in the marketplace.

Table 1. Relationship Between New Product Strategy and New Product Effort and Performance Measures.

	All Companies	New Product Strategy:		
		"Innovations"	"Improvements"	"Imitations"
Average Percentage of Introductions in Each Product Class:	100%	17%	39%	44%
Majority of Effort:				
Number of companies:	14	1	7	6
Average perceived new product effort ¹ :	4.86	4.00	5.29	4.50
Average perceived new product success rating ² :	4.36	3.00	5.14	3.67
Actual percent of introductions over past five years still on the market:	52%	50%	63%	39%
Actual percent of annual sales from products introduced during the past five years:	17%	10%	25%	9%

¹ Participants were asked to rate their own new product development effort level versus the effort of competitors on a 1-7 scale, where 1= "less effort than competitors" and 7= "more effort than competitors." Mean ratings are presented.

² Participants were asked to rate their own new product development performance on a 1-7 scale, where 1= "unsuccessful" and 7= "very successful." Mean ratings are presented.

Source: Survey of Product Innovation in the Food Manufacturing Industries.

While only one company focuses development efforts primarily on "innovations," four of the respondents recognize "innovations" as the types of products contributing the most to the long-term performance of the company. Of the six companies focusing primarily on "imitations," only three believe that "imitations" contribute the most to their long-term performance. The remaining seven companies believe that "improvements" are the key products for long-term company performance.

Relationship Between New Product Strategy and Performance

The actual and perceived new product effort and performance of responding companies varies between companies focusing on different types of new products. Companies focusing the majority of development efforts on product improvements generally rate themselves as having higher overall effort and success ratings (5.29 and 5.14, respectively) than companies focusing on product innovations (4.00 and 3.00, respectively) or product imitations (4.50 and 3.67, respectively) (Table 1).

Actual performance measures also vary between companies focusing on different new prod-

uct types. Just as companies focusing on product improvements reported higher perceived performance measures, these companies appear to have higher actual performance levels as measured by the percent of new products still on the market after 5 years. Fifty-two percent of all participants' products introduced over the past five years are still on the market, accounting for 17 percent of annual sales revenues in the most recent year (Table 1). The seven companies focusing the majority of their efforts on improvements have 63 percent of the products introduced over the past five years still on the market, accounting for 39 percent of annual sales revenues -- well above the average of all participants. The six companies focusing on imitations, however, find that fewer of their products (25 percent) introduced over the last five years are still on the market, accounting for just 9 percent of annual revenues -- well below the average of all participants.

Discussion

If the new product behavior of the participants in this study is at all reflective of other food manufacturers, it is clear to see why the level of innovativeness of new food products is declining.

Few of the firms participating in this study place emphasis on developing innovative products. This result does not appear to be influenced by the size or ownership of the participants themselves. The large firms generally introduced more products than the smaller firms, but the relationship between firm size and the type of products introduced was not discernible. The publicly-owned firms showed a tendency to introduce more innovative products and private companies tended to introduce imitative products, but since there was nearly an equal amount of private and public companies in the sample (five private and six public), no one company type influenced the aggregate totals. Additionally, the new product objectives of increasing both total profits and total sales revenues seem to be universal across firms, whether they focus on innovative, improved, or imitative products.

Why, then, do many of the participants focus so heavily on imitative products, when imitations appear to result in the lowest performance of all new product types? An answer may be found by reviewing the product development practices of the firms. Companies focusing the majority of their effort on imitative products and companies focusing the majority of their effort on improved products have more of their ideas reaching prototype development (50 percent and 30 percent, respectively), test-market (22 percent for both), and full-scale launch (27 percent and 20 percent, respectively) than do companies focusing on innovations. These companies have just twenty percent of ideas reaching prototype development, ten percent reaching test-market, and only five percent ever being launched. Furthermore, companies focusing on imitations test-market less than half as many of the products they eventually launch than do companies focusing on improvements, and only concept-test one-quarter as many. The level of testing done for innovative products was not discernible from this sample of firms since only one participant claims to focus the majority of its efforts on innovative products. It can be assumed that more testing is done on innovative products.

These findings suggest that companies focusing on imitative products do not have to spend as much effort on screening their ideas and products during the development process, an activity which

takes time and resources. Accordingly, companies focusing on imitative products average 5.7 months of development time for each product launched, while companies focusing on improvements average 16 months of development. Again, the development time for innovative products was not discernible, but presumably would be even longer.

The discussion above supports the fact that imitative products cost less to develop (because of the lesser amounts of screening and testing), take less time to develop, but also lead to lower performance than improved products and innovative products. Improvements are generally higher cost, take longer to develop, but generally result in the highest performance. Innovations, while the data were inconclusive, presumably have the highest cost, take the most time to develop, but were shown to result in lower overall performance than improvements.

Furthermore, the performance of different types of new products has varying degrees of uncertainty. While imitative products result in the lowest performance, their performance is generally most certain. A company chooses to imitate products that have succeeded in the market, drastically lowering its risk. Improved products generally have more certain performance, but not as certain as an imitation (note *New Coke*). Innovations clearly have the least predictable performance.

A manifestation of this uncertainty is found in the relationship between retailers and the manufacturers attempting to launch new products. Retailers play an important role in new product success. Retailers are influential in determining which manufacturer's products get shelf space. According to McLaughlin and Fredericks (1992), retailers reject 56 percent of the new products presented to them. Manufacturers are much more likely to convince retailers of the expected performance of imitative or improved products than of innovative ones. Therefore, manufacturers may have incentives against developing too many innovative-type products.

These observations all point to the conclusion that risk-return relationships may be the underlying force driving new product behavior. The high number of imitative product introductions may stem from the fact that the returns are higher

once adjusted for costs, performance risk, and acceptance uncertainty. Although less certain, the much greater performance of improvements could explain why there are so many of them. Perhaps the low number of innovations suggests that the "first-on-the-market" reward is not high enough to undertake the performance risk, the acceptance uncertainty, and the higher costs associated with them. In the food industry, it appears to be more favorable to improve upon or simply imitate someone else's innovation.

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