DECISIONS IN NEW PRODUCT DEVELOPMENT (A)

Statistics Topics: **Data Collection**
Data Types
Graphical Displays

Data File: **npd.xls**

Entrepreneurs often use incubator programs for several months to jump-start their new businesses. According to the National Business Incubation Association (NBIA), business incubation is a dynamic process of business enterprise development, where incubators provide hands-on management assistance, access to financing, and orchestrated exposure to critical business or technical support services. Primary sponsors of incubators are nonprofit organizations, such as academic institutions or government agencies. A 1998 study of the Business Incubation Industry done by NBIA reports that North American incubators have created nearly 19,000 companies still in business, and more than 245,000 jobs.

An important decision for start-up companies is whether or not to participate in incubator programs to assist in the development of a product. Alternatives for these start-ups is to pursue "angels" – investors who dig into their own pockets to give entrepreneurs their first financial lift or venture capitalists. However, venture capitalists are usually agents for other people's money and want to see evidence of viability before investing in companies.

Developing a new product is challenging. Today, product development managers face intense pressure to bring world-class products to market in record times. Many factors contribute to this pressure, including acceleration in the rate of technological development; improved mass communication; more intense competition due to maturing of markets and globalization; and a fragmentation of the marketplace due to changing demographics, shorter product life cycles, and the escalating cost of research and development.

Getting new products to market quickly is critical for a company to gain competitive advantage in the battle for market share. In fact, a shorter time to develop a new product can 1)increase sales through extended product life, 2) increase market share through pioneering, 3) increase profitability through pricing freedom and economy of scale, and 4) enhance a company's image as an innovation leader (e.g., Amazon.com, Apple, Honda, 3M and Wal-Mart). An article published in Fortune magazine (Feb. 1989) noted the following:

> *An economic model developed by McKinsey and Co. suggests that in a market with 20% annual growth rate and 12% price-drop per year, high-tech products that ship to market six months late, but on budget will earn 33% less profit over five years. In contrast, coming out on time and 50% over budget cuts profits only 4% in the same market. (p. 54)*

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To improve profitability and gain competitive advantage through new product development, the message is consistent from researchers and practitioners alike – accelerate development speed, reduce product cost, improve product performance, and cut development program expenses. All of these recommendations seem reasonable and companies like Hewlett-Packard Co., Honeywell Inc., Intel Corp., and Xerox Corp. have reported significant reductions (as high as 50%) in product development time, accompanied by lower development cost, improved product quality and increased market share. However, such dramatic results are yet to be realized in many small companies. If a company has limited resources (like most start-ups), one needs to make trade-offs between these four possible objectives. How does one go about choosing which trade-off to make?

To help with such decisions, a survey was administered to collect data about new product development practices from small firms, some of which had worked within business incubator programs. The main objectives of this survey were:

- to identify organizational characteristics of small firms that have participated in incubator programs;
- to compare length of development time, price, and competitive characteristics of the product across firms;
- to assess first-year market performance of new products for firm participants and non-participants in incubator programs.

Existing questions are: Is it an advantage for most companies to speed up the new product development process? What factors influence development time for developing new products and what are the influences of development time on market performance? Does it make a difference whether a company participates in an incubator program or not?

Data Collection

The **sampling frame** selected for the study consisted of a wide cross-section (9 different 4-digit Standard Industrial Classification[1], or SIC, groups) of small (less than 100 employees) manufacturing firms. The sampling frame was constructed from three sources. First, a random sample was drawn from a highly regarded commercial mailing list provider. Second, a complete **census** of the Small Business Innovation Research (SBIR) phase II award winners was obtained. Third, a list was compiled from names submitted by a census of the members of the leading association of small business incubator directors.

[1]Standard Industrial Classification (SIC) coding scheme was developed by the federal government to make it easier to collect and tabulate statistics on products, industries, or services (e.g., automotive, computer and data processing services, electronic and electrical equipment, health services, heavy construction equipment), especially in the various economic censuses. Now, many commercial sources present industry data using the different SIC groups.

The survey sponsor chose these firms to represent a wide variety of small businesses engaged in product development to investigate broad patterns of new product development activities independent of industry specific practices. The **unit of analysis** was the firm's most recently completed new product development project. Entrepreneurs (e.g., president or owner) were used as single key informants, since it was presumed that they had vested interest and intimate knowledge of their firms' new product development processes. The pretest interviews and discussions with industry experts confirmed the owner's knowledge and accessibility of the development process.

The data collection phase proceeded in four stages. First, the survey administrators undertook unstructured personal interviews with several entrepreneurs and industry experts. The interviews focused on identifying the most important issues facing the key decision-maker. During this stage, it was noted that new product development is an infrequent activity in many small firms; at any one time many firms are unlikely to have recently completed a project. This was evidenced by several hundred responses indicating that the firm had not recently developed a new product.

The second stage of the data collection process was the development of the survey, which was based on a literature review and feedback obtained during the personal interviews. The qualitative feedback focused on the content and wording of the measurement indicators to minimize measurement error. The third stage was the mailing of 3071 invitations to potential participants in the study, of which, 592 (19.3%) executives agreed to participate. Since the unit of analysis was the firm's most recently completed new product development project, only those firms that had recently completed, or were close to the completion of the product development project were considered for the research. There was no regional bias among those who agreed to participate in the survey. This approach enabled the survey researcher to construct a list of firms that had recently developed a new product. In addition, this approach enabled them to identify the key decision-makers and to gain their commitment.

The final stage of data collection was the actual mailing of the surveys (see **Exhibit 1**) to those who had agreed to participate in the study. Once these surveys were returned, the information was coded and entered into Excel to be used for **descriptive** and **inferential** analysis.

Non-response bias was assessed by comparing early versus late respondents as suggested by Armstrong and Overton (1977). The time between when the questionnaire was mailed and when it was returned was used to form early (67%) and late (33%) respondent groups. Subsequent statistical tests revealed that no significant differences existed between the groups regarding company age, staff size, new products recently launched, and number of products currently sold. Therefore, non-response did not appear to be a major concern in this survey. Sixty non-respondents were also contacted by telephone in order to determine the reason for nonparticipation. The majority reported that they had not recently developed new products.