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New Product Forecasting

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New Product Forecast is Always Tricky

In the past five years, DVD sales of films have been a safety net for several big media conglomerates, providing steady profit growth as other parts of the business fell off. But the net may be fraying. Last week, DreamWorks Animation SKG created a stir on Wall Street and in Hollywood when it disclosed that lower-than-expected DVD sales of "Shrek 2" meant it would likely post a second-quarter loss and report lower-than-anticipated full-year earnings. The movie was a huge hit in theaters and sold millions of DVD units. As a result, media stocks have been in the doldrums.

– Excerpts from WSJ News, 7/5/2005.

Ten Interesting Tidbits

10. Who popularized the phrase “always a bridesmaid and never a bride”? The creation of ‘Halitosis’ market.
9. When Heinz launched their "green" ketchup in 2000, it delivered the highest increase in sales in the brand's history.
8. When Kleenex was first introduced to the market in 1924, it was marketed as a make up or cold cream remover.
7. When Scott Paper Co. first started manufacturing toilet paper they did not put their name on the product because of embarrassment.
6. Over one million Pet Rocks were sold in 1975, making Gary Dahl, of Los Gatos, California, a millionaire. He got the idea while joking with friends about his pet that was easy to take care of, which was a rock.
5. Nintendo was first establish in 1889 and they started out making special playing cards.
4. Marlboro was the first cigarette company to market a cigarette that had a red filter called "beauty tip." This was done to hide the lipstick marks left on the filter from women smokers.

Ten Interesting Tidbits

3. In Hong Kong, delivery times are primarily influenced by traffic conditions on elevators. It often takes drivers longer to travel vertically than horizontally, as access to elevators is so congested during "high peak" hours.

2. Viagra was meant to be a high blood pressure medication, but a side effect led to the development of Viagra and the creation of 'Erectile Dysfunction' market.

1. St. Clair County, Illinois, spent $330 million dollars for a new airport that no airline was interested in using. For one year, the airport was kept in operation for 12 hours per day, staffed with 27 employees, and a full fire crew and maintenance staff. In that entire year, neither a single passenger nor even one plane used the airport. $2.5 million in upgrades were approved for the second year, even though airlines continued to express no interest in the airport.

UPDATE : "MidAmerica Airport last month announced it has served more than 10,000 passengers so far this year" – News Dated 7/7/2005.
Original estimates for the airport made in 1997 projected the airport would serve 1.1 million customers by 2000.

Presentation Motivation

- What is a New Product?
- Why do we introduce New Products?
- Why should we generate New Product Forecast? What distinguishes it from a ‘usual’ forecast? What are its key characteristics?
- What are the typical methods used for New Product Forecasting?
- How have companies fared in forecasting New Products?
- How can we improve the forecast accuracy?
- A ‘First Principles’ view of New Product Forecasting
- If all else fails…!

What is a New Product?

Any product that is,

- a cost improvement (reduced cost or price versions of the product for the existing market)
- a product improvement (new, improved versions of existing products/services, targeted to the current market)
- a line extension (incremental innovations added to existing product lines and targeted to the current market)
- a market extension (taking existing products/services to new markets)
- a new category entry (new-to-the-company product and new-to-the-company market, but not new to the general market)
- new-to-the-world (radically-different products/services vs. current offerings and markets served)

New Product Proliferation

An 18-Year Comparison of Consumer Packaged Goods Product Launches

Number of Product Launches	1980	1998
Cereals	34	192
Ice cream, Frozen yogurt	57	556
Spices, Extracts, Seasonings	61	403
Deodorizers, Air refresheners	53	372
Paper towels, Napkins	11	126
Milk, Yogurt drinks	26	255
Coffee	11	384
Beer, Ale	25	187

Figure by MIT OCW.

Why Do We Introduce New Products?

Reasons Based on Empirical Evidence

- According to researchers, on average, almost 20% of a company sales result from New Product introductions.
- Within the New Product sales, almost half come from line extensions.
- On average, 26% of revenue at engineering companies is earned from products less than three years old.
- Executives expect new product revenue as a share of total sales to hit 34% in 2007, up from just 21% in 1998.
- Companies with strong enabling R&D strategies are 73% more profitable.
- Research indicates that 70% of today's manufactured goods will be obsolete in six years.
- For companies in the fastest-moving industries such as high tech and fashion goods, obsolescence may take only a year or two.

New Product Introductions are Critical

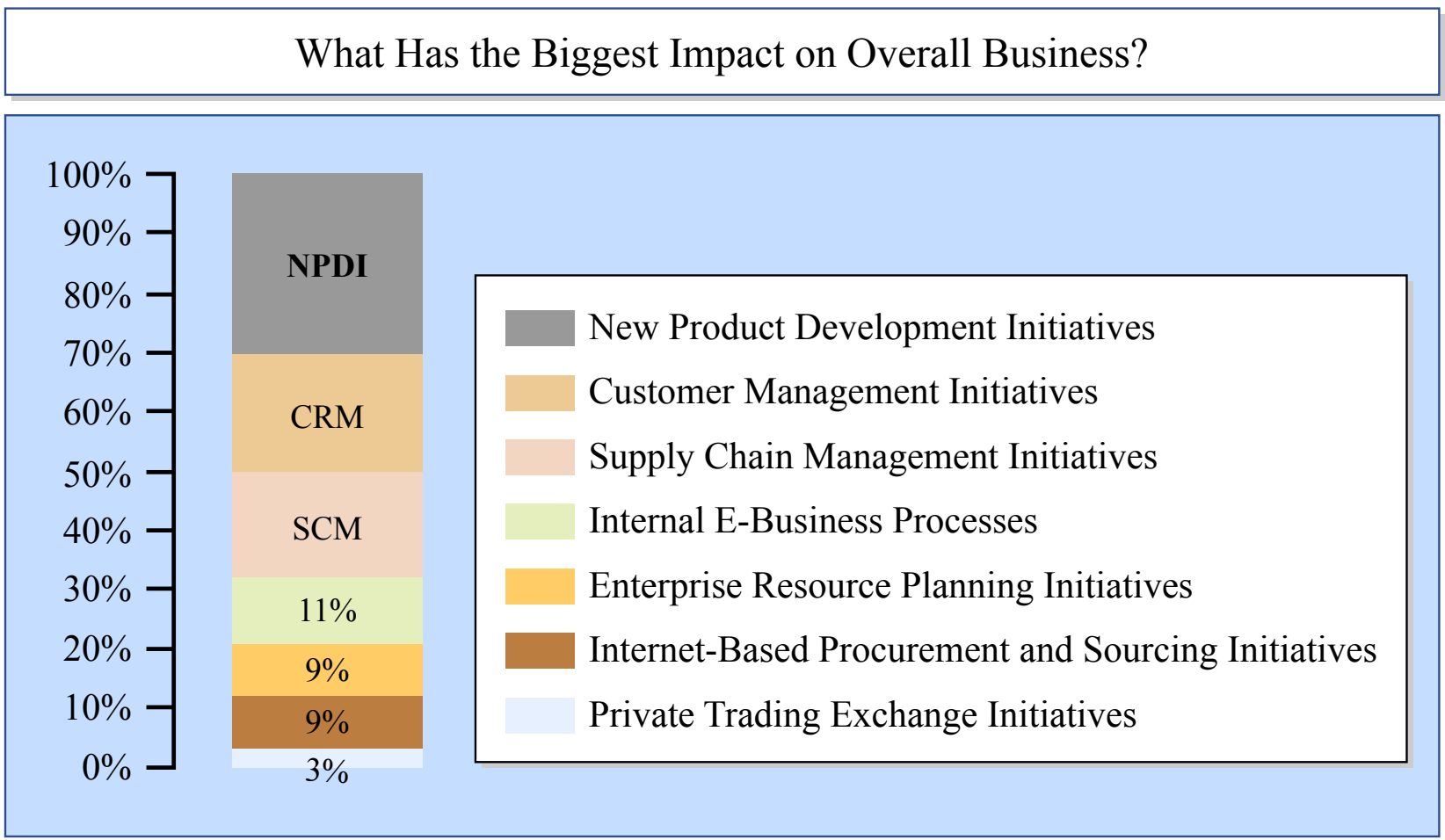

Figure by MIT OCW.

New Products Drive Value

Stock Market Valuations Exceed Existing Asset Values

Company	Share Price		% of Valuation Based on: New Investments	% of Valuation Based on: Existing Assets
Dell Computer	28.05		78%	22%
Johnson & Johnson	56.20		66%	34%
Procter & Gamble	90.76	↑	62%	38%
General Electric	32.80	Growth	60%	40%
Lockheed Martin	62.16	Companies	59%	41%
	36.94	Past	8%	92%
	49.40	Cash Cows	5%	95%
	35.00	↓	3%	97%

Figure by MIT OCW.

Top CEOs Agree…

- “In this regard the only source of profit, the only reason to invest in companies in the future is their ability to innovate and their ability to differentiate. Today, organic growth is the key. It's going to determine who gets rewarded and it is absolutely the biggest task of every company." - Jeffrey Immelt, Chairman and CEO, General Electric Presentation at *MIT,* September 2003
- “You only get a position in the future by investing, creating something new, and staying ahead of the competition. So it’s simple: invest or die.” - Craig Barrett, CEO, Intel *Business 2.0,* January/ February 2004

In Summary

- Partly as a consequence of the increasing rate of New Product introductions but also because of the drive of technology advances, product life cycles are shortening.
- Companies are increasingly dependent on revenues from New Products to drive their top lines each year.
- Newer products typically command higher margins in the market while older products are impacted by competitive challenges and waning customer interest.
- New Products allows companies to grow revenues and retain high margins by creating new customers in new markets.
- Even when a company's top line isn't increasing, it needs New Products to replace existing products that are reaching end-of-life.
- New Products drives growth which drives value, and high valuations allow companies to raise money in the markets at the best rates, acquire competitors, and attract the best people.

What is the Purpose of Generating a Forecast?

New Product Forecast Timeline

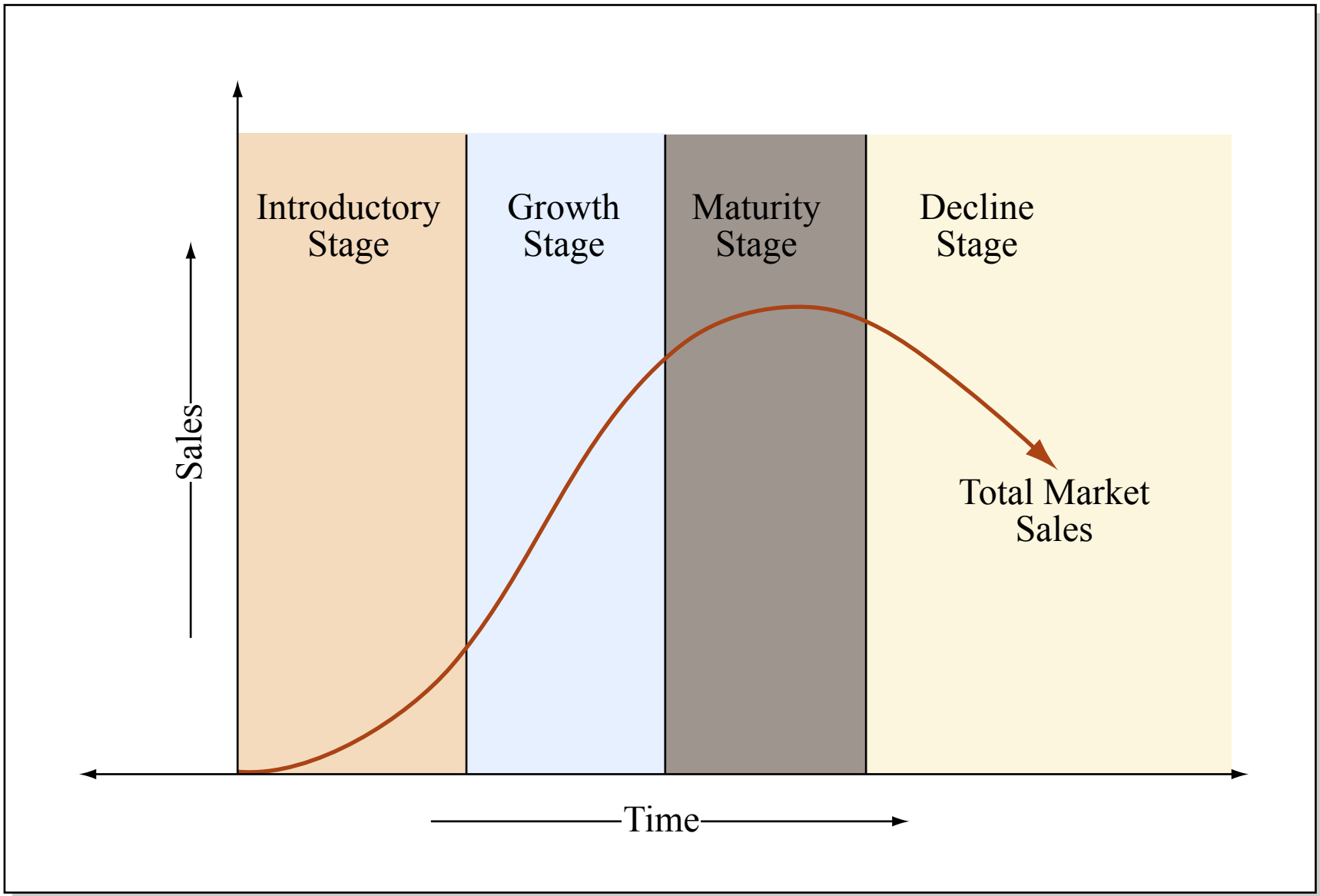

Figure by MIT OCW.

Key Reasons for Forecasting New Product?

- Product launch decisions,
  - eliminating an unprofitable product is an equally useful reason to forecast as introducing a successful product.
- Capacity planning
- Manufacturing decisions on raw materials procurement, manufacturing schedules, and finished goods inventory levels
- Logistics decisions on network design and physical distribution planning
- Marketing decisions on marketing budgets and promotion schedules
- Sales decisions on support materials and salespeople training
- Finance decisions on corporate budgets and financial expectations for the new product

New Product Forecast Characteristics

- Strategically important to the business
- Extremely uncertain future demand patterns
- Very unstable demand
- Little or no demand history
- Demand highly influenced by numerous macro (external) factors
- Sometimes done a few years before the product is even launched
- More suited for qualitative techniques
- Significant impact on the long run profitability of the product
- In majority of the cases, it is performed by the Marketing department

Commonly Deployed Techniques/Methods*

- Customer/market research– 57%
- Jury of executive opinion – 44%
- Sales force composite – 39%
- Looks-like analysis – 30%
- Trend line analysis – 19%
- Moving average – 15%
- Scenario analysis – 14%
- Exponential smoothing – 10%
- Experience curves – 10%
- Delphi method – 8%
- Linear Regression – 7%
- Decision trees – 5%
- Simulation – 4%
- Others: Quant Methods – 9%

* Based on a survey of 168 companies.

Commonly Deployed Techniques/Methods*

- B2B firms tend to depend on Qualitative forecasts more than the B2C firms.
- B2B firms have a longer forecasting horizon (34 months) compared to the B2C firms (18 months.)
- On an average, companies use 3 different methods to forecast new product.
- Of the 150 respondents,
  - 8% were “very dissatisfied” with their new product forecasting process,
  - 45% were “dissatisfied,”
  - 27% were neutral,
  - 19% were “satisfied,” and
  - only 1% of respondents were “very satisfied” with their new product forecasting process.

Performance So Far…

The performance of New Product Forecasting efforts has not been good so far,

- a study of 53 products from 16 firms and found that the mean forecast error was 53%.
- another study found the average forecast accuracy across all types of new products to be 58%.
- an investigation of market forecasts for the high technology products of personal computer, artificial intelligence, and fiber-optics, found that the average ratio between actual sales and forecasted sales was 0.79 in the first year, 0.60 in the second year, 0.51 in the third year, 0.46 in the fourth year, and 0.41 in the fifth year.

Is a Good Forecast Critical?

- According to Herb Baum, Chairman, President and CEO of the Dial Corporation , in consumer business, “80% of all new products fail, only 4% reach the 20 MM level and 0.1% break the 100MM mark.”
- According to AMR Research:
  - 95% of new consumer products (1996-2001) lost money or broke even
  - Poor product introduction costs apparel makers 30% of annual revenue in markdowns
  - Food retailers spend $957,000 per store on new products that fail
- It is important to capture the initial demand of New Product accurately to ensure high availability at lowest possible cost. A lost sales may lead to loss of future revenue stream from sale of accessories, maintenance contracts, spare parts, upgrades, and complementary products.

Some Suggestions for Improvement

- According to one analysis of Computer industry:
  - recognize the importance of the new product forecasting task and develop a commitment (which includes financial resources) commensurate with the importance of the task to improve forecasts;
  - select new product forecasting data sources that bring the forecaster closer to the consumer (e.g., personal interviews, product demonstrations, focus groups);
  - use more than one method in combination throughout the product development process to develop forecasts; and
  - anticipate the volatility of the market to be entered and the behaviors of buyers within it as input to the new product forecasts.

Some Suggestions for Improvement

- According to one analysis of 76 industrial new product projects:
  - successful high-tech industrial projects tended to rely more on the internal qualitative forecasting techniques of internal expert judgment and internal brainstorming, versus unsuccessful high-tech industrial projects;
  - successful low-tech industrial projects tended to rely more on the traditional market research methods of one-on-one interviews with salespeople, surveys of buyers intentions, and formal surveys of customers;
  - results further suggested that successful firms, whether high-tech or low-tech, employed more new product forecasting techniques than unsuccessful firms.

In Summary

- Due to its very nature, New Product forecasting is not a good candidate for structured data driven approaches. Sophisticated techniques such as Diffusion Models work well in some cases, but as a general rule, these techniques tend to be ineffective.
- By limiting the forecasting system to statistical techniques we are assuming that the future demand is function of a limited set of variables that can be quantified, which is rarely the case.
- To circumvent this oversimplification of the problem, it is important to leverage multiple techniques and methods to include as many factors as possible, which necessitates the development of a robust process to be followed for consistency.
- Bottom line is that it is important to realize that more than anything else *product forecasting is more about process than techniques*! (this is true for any forecasting system.)

A First Principles View

- New Products increase Market Attractiveness (MA) as well as have a negative impact on system Operational Performance (OE) due to higher overall system uncertainty.
- Balancing MA and OE results in a trade-off which requires careful management.
- Managing uncertainty requires a systems approach.

How to Counter Uncertainty

- Many times Uncertainty reduction can lead to compromised market position which is more detrimental than operational inefficiency
- Managing Uncertainty calls for a portfolio of techniques that fall into two main categories:
  - Uncertainty Reduction
  - Risk Management
- First and foremost, look for cost effective ways to reduce Uncertainty to the extent possible while retaining intended benefits of Uncertainty.
- Counter the remaining Uncertainty by using Risk Management techniques.
- How? Some suggestions…

Uncertainty Reduction

- Uncertainty reduction techniques can be categorized into 3 groups:
  - Risk Pooling
    - Platform strategy – Toyota Prius
    - Standardization – Sport Obermeyer
    - Product Modularization – ?
    - Consolidation
  - Time Compression
    - Cycle Time reduction - Zara
    - Postponement - ?
  - Information Management - Improve system knowledge by instituting information gathering methods:
    - Focus Groups/Expert Opinions : Zara and Sport Obermeyer
    - Creating History : Example?
    - Early Sales Information : National Bicycle
    - Data Mining : 7-Eleven

Risk Management

- The best way to manager risk is via flexibility of various types.
- But, flexibility for the sake of flexibility is a dangerous option.
- Each situation requires careful analysis and a detailed design effort before implementation.
- A system can be made flexible using creative approaches such as:
  - Supply contracts : Blockbuster Video
  - Demand Shaping : Dell
  - Flexible capacity : Eli Lilly
  - Capacity Segmentation : HP Printers, Microsoft Xbox, and Sport Obermeyer
  - Postponement : Example?
  - Outsourcing

Conclusions

- New Products are critical to the success of a company but inherently difficult to forecast.
- New product forecast should be generated using a well defined process deploying multiple techniques and methods.
- New products injects uncertainty into the system.
- A portfolio of techniques should be used to address uncertainty via uncertainty reduction and risk management.
- Risk management depends largely on system flexibility.

References

- Accenture Report, “New Product Introduction”.
- Armstrong, J., “Benchmarks for New Product Forecast Errors”. Report, December 2002.
- Cooper, R., “Doing it Right: Winning with New Products”. Product Development Institute Inc., 2001.
- Fader, P.S., B.G.S Hardie, and R. Zeithammer, “Forecasting New Product Trial in a Controlled Test Market Environment”. Journal of Forecasting, August 2003.
- Fader, P.S. and B.G.S Hardie, “The Value of Simple Models in New Product Forecasting and Customer-Base Analysis”. August 2004.
- Kahn, K.B., ”An exploratory Investigation of new product forecasting practices”. The Journal of Product Innovation Management, Issue 19, 2002.
- Jain, C.L., “Benchmarking New Product Forecasting”. The Journal of Business Forecasting Methods and Systems, Fall 2003.
- Lee, H., “Triple-A Supply Chain”. HBR OnPoint 8096.
- Morrison, J.S., “Life-Cycle Approach to New Product Forecasting”. The Journal of Business Forecasting, Summer, 1995.
- SAP Report, “New Product Development and Introduction”.
- Shrute, A., “Forecasting New Products with Limited History: Nabisco’s Experience”. The Journal of Business Forecasting, Fall, 1998.
- Urban, G.L., B.D. Weinberger and J.R. Hauser, “Premarket Forecasting of Really-New Products”. Journal of Marketing, Jan 1996.